

# 2019

## H2 Geography

1.	ACJC	
2.	ASRJC	
3.	CJC	
4.	DHS	
5.	EJC	
6.	HCI	
7.	JPJC	
8.	MI	
9.	NJC	
10.	NYJC	
11.	RVHS	
12.	SAJC	
13.	TJC	
14.	VJC	
15.	YIJC	



ANGLO-CHINESE JUNIOR COLLEGE

JC2 H2 Geography Preliminary Examinations (2019)

H2 GEOGRAPHY

9751/01

Paper 1 Structured Essay Questions

30 August 2019

3 hours

Additional Materials:            Writing Paper  
    World outline map

### READ THESE INSTRUCTIONS FIRST

Write your name and class in the spaces provided below, and on all the work you hand in. Write in dark blue or black pen on both sides of the paper. You may use an HB pencil for any diagrams or graphs. Do not use staples, paper clips, glue or correction fluid.

Answer three questions. One from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question. Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer. The world outline map may be annotated and handed in with relevant answers. You are reminded of the need for good English and clear presentation in your answers.

The number of marks is given in brackets [ ] at the end of each question or part question.

At the end of the examination, your answers to each Section should be securely fastened and separated into 3 bundles. The cover page must be attached as the top sheet to your answers to Section A.

This question paper consists of 3 printed pages of questions.

[Turn over

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### Section A – Tropical Environments

Answer **one** question from this section.

- 1 (a) With the aid of diagrams, explain how the Walker Circulation and the El Niño Southern Oscillation (ENSO) affect atmospheric circulation and rainfall patterns in the tropics. [12]
- (b) To what extent is the intertropical convergence zone (ITCZ) the reason for the climate types and rainfall patterns in the tropics? [20]
- 2 (a) Explain the causes of mass movement in the humid tropics. [12]
- (b) 'Climate is the most important factor determining landforms types and their formation in the tropics.'
- How far do you agree with this statement? [20]

### Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a) Explain why the various ways to measure and monitor development in countries at low levels of development may be limited. [12]
- (b) To what extent is the dependency theory relevant in understanding development today? [20]
- 4 (a) Explain how countries at low levels of development may not benefit in being resource-rich. [12]
- (b) 'There is more success in using water conservation to manage water scarcity compared to other strategies.'
- How far do you agree with this statement? [20]

[Turn over

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**Section C – Sustainable Development**

Answer **one** question from this section.

- 5** (a) Compare the causes of climate change between countries at high and low levels of development. [12]
- (b) Assess the effectiveness of strategies used to manage climate change. [20]
- 
- 6** (a) Explain the factors contributing to the occurrence of pluvial floods in cities at low levels of development. [12]
- (b) Assess the effectiveness of strategies used to mitigate the effects of pluvial floods. [20]

[End

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**ANGLO-CHINESE JUNIOR COLLEGE**  
**JC2 H2 Geography Preliminary Examinations (2019)**  
**H2 GEOGRAPHY Paper 1 Structured Essay Questions – ANSWERS**

**H2 Generic Level Descriptors for 12m SEQ sub-part (a)**

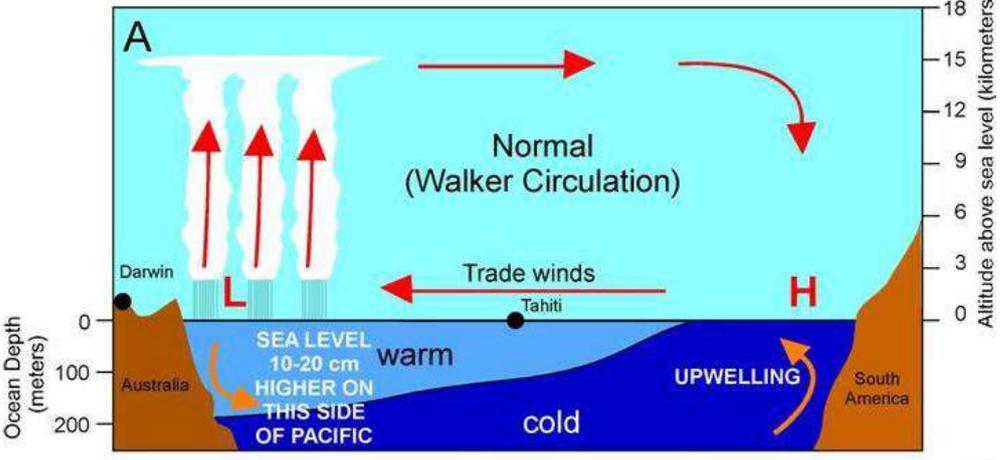
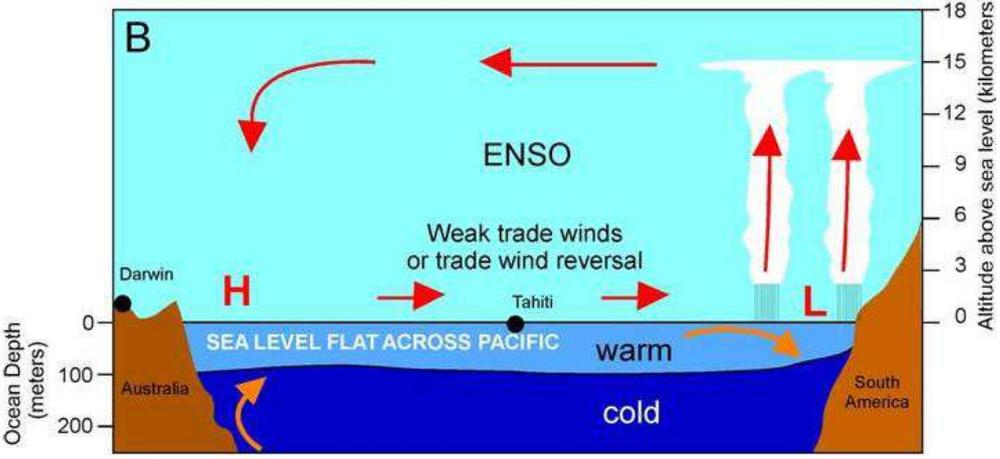
Levels	Marks	Descriptors
4	10-12	<input type="checkbox"/> Response is consistently analytical and comprises purposeful explanations. <input type="checkbox"/> Response addresses the question fully using accurate and detailed knowledge. <input type="checkbox"/> Depth of relevant knowledge and understanding is evident throughout. <input type="checkbox"/> Response is coherent and <input type="checkbox"/> Use of terminology is accurate throughout
3	7-9	<input type="checkbox"/> Response is analytical and explanatory rather than descriptive. <input type="checkbox"/> There is clear focus on the question. <input type="checkbox"/> Response demonstrates relevant knowledge and understanding. <input type="checkbox"/> The response is coherent and <input type="checkbox"/> Use of terminology is mostly accurate.
2	4-6	<input type="checkbox"/> Response include analysis and explanation but is generally dominated by description. <input type="checkbox"/> Response reflects understanding of the question and <input type="checkbox"/> Is generally relevant <input type="checkbox"/> Some parts of the response may be unclear <input type="checkbox"/> Use of terminology is limited.
1	1-3	<input type="checkbox"/> Response lacks focus on the question. <input type="checkbox"/> Response is generally fragmentary and lacks a clear structure and organization. <input type="checkbox"/> There may be many unsupported, brief or incomplete assertions and /or arguments <input type="checkbox"/> with some inaccurate use of the terminology
0	0	<input type="checkbox"/> No creditworthy response.

**H2 Generic Level Descriptors for 20m SEQ sub-part (b)**

Levels	Marks	Descriptors
5	17-20	<input type="checkbox"/> Response is perceptive, logical and has strong evaluative elements. <input type="checkbox"/> Evaluation is relevant and comprehensive. <input type="checkbox"/> Strong evidence of synoptic thinking; knowledge from different topics is synthesised purposefully. <input type="checkbox"/> Response fully addresses the demands of the question and features detailed accurate knowledge reflecting depth of understanding of the subject content. <input type="checkbox"/> The argument or discussion is coherent and well supported by relevant material. <input type="checkbox"/> Use of terminology is accurate.
4	13-16	<input type="checkbox"/> Response displays a sound evaluative element. <input type="checkbox"/> There is evidence of synoptic thinking through synthesising knowledge from different topics. <input type="checkbox"/> Response is generally focussed on the demands of the question and features accurate knowledge, reflecting depth of understanding of the subject content <input type="checkbox"/> The argument or discussion coherent and supported by relevant material. <input type="checkbox"/> Use of terminology is accurate and appropriate
3	9-12	<input type="checkbox"/> Response is broadly evaluative rather than descriptive. <input type="checkbox"/> Response addresses question and features accurate knowledge to show some understanding of the subject content <input type="checkbox"/> Argument or discussion is mainly coherent and supported by material that is largely relevant. <input type="checkbox"/> Use of terminology is relevant and mostly accurate.
2	5-8	<input type="checkbox"/> Response is largely descriptive. <input type="checkbox"/> Response attempts to provide an argument to addresses the question. <input type="checkbox"/> The weakest responses in this level may lack balance and/or depth. <input type="checkbox"/> Response structure is broadly coherent but may lack clarity. <input type="checkbox"/> Some lapses in the use of terminology though generally accurate.
1	1-4	<input type="checkbox"/> Response lacks focus on the question and may be largely irrelevant to it. <input type="checkbox"/> Response is fragmentary and lacks clarity. <input type="checkbox"/> There may also be many unsupported, brief or incomplete assertions and /or arguments <input type="checkbox"/> with limited use of the terminology
0	0	<input type="checkbox"/> No creditworthy response.

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## Section A – Tropical Environments

Question	Answer	Marks
1(a)	<p>With the aid of diagrams, explain how the Walker Circulation and the El Niño Southern Oscillation (ENSO) affect atmospheric circulation and rainfall patterns in the tropics.</p>	[12]
	<p><u>Indicative content</u></p> <p>Award up to <b>4 marks</b> for accurate diagrams that include details of the atmospheric circulation, Trade winds, low and high pressure locations in the circulation, ocean waters of different temperature, the thermocline, convection on the respective sides of the Pacific Ocean for Walker circulation and for warm ENSO, the locations. Samples of the possible diagrams are shown in Fig. 1A for Walker circulation and Fig. 1B for warm ENSO.</p> <p><b>Fig. 1A: Cross section showing associated features of the Walker Circulation</b></p>  <p><b>Fig. 1B: Cross section of the features associated with warm ENSO</b></p>  <p><b>Legend</b>  L – Low pressure  H – High pressure</p>	

**Features associated with normal Walker circulation:**

1. The NE and SE trade winds blow equatorward, converging at the intertropical convergence zone, and over the ocean surface of the Pacific ocean moves air westward across the width of the tropical Pacific.
2. The winds shift warm ocean waters at the surface towards the Western Pacific where Australia and Indonesia lie.
3. A thick layer of warm ocean water forms over the western Pacific Ocean, elevating the waters 10-20 cm compared to the eastern Pacific Ocean as shown in Fig. 1A. The boundary that separates the warm water at the surface and cold waters at depth is termed as the thermocline. As a result of the thicker layers of warm waters over at the western Pacific Ocean, the thermocline is found at greater depth (Fig. 1A).
4. Sea temperatures near Australia is 8°C higher than in Peru. The thick layer of warm waters over at the western Pacific ocean heats up the air above it, leading to convectional uplift. As the air rises, low pressure is created at the ocean surface as shown in Fig. 1A. Adiabatic cooling occurs with the rising air, and when dewpoint temperature is reached, condensation occurs forming thick clouds which eventually bring rain to lands like Australia, Indonesia and parts of Southeast Asia (Fig. 1A).
5. While the tradewinds push the warm water westwards, the warm water off the coast of Peru that is displaced by the wind leads to the upwelling of cold water from the ocean depth. This leads to a much lower ocean temperature at the surface at the eastern Pacific Ocean.
6. The low temperature of the surface waters off the west coast of South America, leading to air subsidence, where air sinks and warms adiabatically. This sinking air formed the sinking limb of the Walker circulation.
7. The sinking air creates a high pressure location here, and with adiabatic warming, there is no condensation, and no clouds nor rainfall could be formed. This results in a dry conditions for the eastern Pacific Ocean.

**During warm ENSO = El Nino = weakened Walker Circulation**

1. The trade winds weaken or even die in the Western Pacific.
2. In an extreme El Niño year there is sometimes even a reverse direction of flow (Fig.1B).
3. The piled-up water in the west, sloshes back east, leading to a 30cm rise in sea level in Peru carrying the warm water pool east with it.
4. Thus the region of rising air moves east with the associated convectional uplift.
5. The Eastern Pacific ocean becomes 6-8°C warmer. The comparatively warmer waters off western coast of South America leads to heating of the overlying air, causing air to rise and cool adiabatically. This becomes rising limb of the warm ENSO circulation as shown in Fig. 1B. Convection and rain clouds form here.
6. Rainfall occurs over the eastern Pacific Ocean, while the sinking limb of the warm ENSO circulation suppresses raincloud formation, leading to high temperature and aridity for lands around the western Pacific Ocean.

Can include cold ENSO = La Nina (*Not crucial*)

- Stronger version of normal Walker Circulation
- Lands in the western Pacific Ocean are wetter and cooler than usual

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	<p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)</i></p> <p><b><u>Examiner's comment:</u></b></p> <ul style="list-style-type: none"> <li>• As the question has specified that diagrams are to be drawn, it must be included.</li> <li>• All diagrams placed in essay must be referred to and explained in the essay. If not, no marks will be awarded for the diagrams.</li> <li>• To facilitate reference to the diagrams in the essays, all diagrams must be numbered and given title as well.</li> <li>• If straight lines are to be drawn, please use a ruler.</li> <li>• In the case of the diagrammatic representation of the Walker circulation and the warm ENSO, decide on whether you want to use the 2-D or 3-D view.</li> </ul>	
1(b)	<p><b>To what extent is the intertropical convergence zone (ITCZ) the reason for the climate types and rainfall patterns in the tropics?</b></p>	[20]
	<p><u>Indicative content</u></p> <p><b><i>Suggested intro</i></b></p> <p>For most parts of the tropics, especially for the humid tropics, the climate type is largely the result of the operation and movement of the Hadley cell of which the intertropical convergence zone (ITCZ) is an integral feature of. So the rainforest tropical climate type (Af), the monsoonal climate (Am), and the savanna climate type (Aw), these climate types and its associated annual total rainfall and seasonality of rainfall is largely the result of the Hadley cell and the seasonal changes to the location of the ITCZ. The semi-arid tropical climate type of BSh and the hot arid tropical desert climate of the BWh type can be accounted for using the Hadley cell and the ITCZ in some parts, but all locations within the tropics with BSh and BWh climate types can be explained using only the Hadley cell and the ITCZ. In some locations within the tropics, the climate type there requires explanation using the topographic reason, while in others, the relevant factor could be that of cold ocean currents. While the climate types, and seasonality of rainfall can be explained using the Hadley cell, the ITCZ, topography and cold ocean currents, over different time-scale, other explanations are needed. In the medium term rainfall pattern over 3 – 7 would require the use of the Walker circulation, El Nino and La Nina, while the decadal variations would need the explanation involving tropical cyclones and long-term climate change.</p> <p><b><i>Suggested structure of body of essay</i></b></p> <ul style="list-style-type: none"> <li>• <b>Describe the key features of the climate types</b> of each of the 5 climate types of the humid and arid tropics, ie, Af, Am, Aw, BSh and BW, in terms of average temperature and rainfall over each month of the year, highlighting the months of high and low temperature, and state the annual total rainfall for each of the climate type. Make brief comparison across the five climate types, for example, in terms of the duration of the wet and dry season.</li> <li>• <b>Explain</b> that the annual total rainfall and the seasonality are the results of the proximity of the rising limb of the Hadley cell where Trade winds converge to form the ITCZ, the resultant onshore winds that bring moisture to selected tropics over the two key seasons of 'summer' and 'winter' in the respective hemispheres. The processes leading to the formation of the Hadley cell, formation of the low pressure and high pressure cell over the Asiatic continent resulting in the monsoon winds, the nature of land-sea contrast in thermal capacity and how these alters the</li> </ul>	

	<p>location of the ITCZ, seasonal reversal of winds directions for monsoonal lands and the resultant wet and dry seasons associated with the changes to onshore and offshore winds.</p> <ul style="list-style-type: none"> <li>• Other than latitudinal position determining the amount of annual total rainfall, inclusion of the role of <b>topography</b> and <b>cold ocean currents</b> would be the expected response of a higher order answer.</li> <li>• The explanation of the operation of the various processes and factors in accounting for the five tropical climate types should be interweaved with an actual station for each of the tropical climate types.</li> </ul> <p>Possible link to other topics include tropical cyclones (Topic 1.2) and Climate Change that alters rainfall and temperature over long-term (Topic 3.1)</p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b)</i></p> <p><b><u>Examiner's comments:</u></b></p> <ul style="list-style-type: none"> <li>• Describe the climate types first; not to plunge straight into explanations for the climate types in the tropics.</li> <li>• The Hadley cell, migration of the overhead sun, the ITCZ and latitude are part of the same larger narrative used to explain the five climate types, and should be treated by separate factors. Similarly the monsoon wind is the result of the same Hadley cell that migrates northwards and southwards through the seasons of one single year. So do not argue them as separate factors, or use them to counter the role played by the ITCZ.</li> <li>• One error noticed amongst some candidates is the conceptual error of attributing the low moisture and low rainfall on the leeward side of a mountain or topographic barrier to the fact that all the rainfall has been dropped on the windward side and hence the leeward side is dry. While this may be true, a more important phenomenon is that on the leeward side, which no longer pose a topographic barrier that pushes air upwards, the air parcel on the leeward side descends, and in the process warm adiabatically (this is the exact opposite of what happens on the windward side where air rises, expands, and cools adiabatically).</li> <li>• Using a map to illustrate the location of the two ITCZ may aid you in being more effective in explaining the role of migration of the Trade winds, wind reversals, and onshore and offshore winds.</li> </ul>	
<b>2(a)</b>	<b>Explain the causes of mass movement in the humid tropics.</b>	<b>[12]</b>
	<p><u>Indicative content</u></p> <p>The causes of mass movement in the humid tropics revolve around a few broad group of factors – climate, geology, and human activities.</p> <ul style="list-style-type: none"> <li>• The nature of the climate of the humid tropics in terms of high input of rainfall and the consequent role of water in affecting shear stress and strength should be elaborated.</li> <li>• Tropical cyclones is an example of an atmospheric event, just like La Nina, which can contribute substantial amount of water to the slope (discuss the multiple role of water in adding to shear stress, and reducing shear strength – eg. addition of weight adds to shear stress, lubricating the surface of joints, fissures and fault lines</li> </ul>	

→ reduced shear strength)

- The high rate of chemical weathering in the humid tropics and the consequent creation of a thick layer of porous and permeable overlying the impermeable substrate of unweathered parent is another condition that give rise to selected types of mass movement.
- Certain geological conditions where the layers of rocks are dipping downslope or where a permeable layer of rock overlies an impermeable layers can promote conditions for translational rock slide in the former, and rotational slumping in the latter case.
- The role of geomorphic forces can lead to slumping or rockfall when the base of slopes are undermined by eroding agents like the river or the marine waves. In the case of a river going round a meander bend, the concave bank is eroded at the base where the river water is in contact with the bank. This undermining is essentially removing toe support, increase shear stress while reducing shear strength, and the material above tends to undergo slumping.
- Volcanic eruptions and earthquakes are found in the humid tropics in locations like Indonesia, and the Caribbean and on the western part of South America, and these have the potential to lead to slope failures. In locations where volcanic ash on the slope mixes with rainfall from tropical cyclones, this is a recipe for the formation of lahar or mudflows.
- Human activities during construction on slopes of roads or railway tracks tend to remove toe support while at the same time steepening the slope; once again shear stress is increased. Without the toe support, shear strength is reduced.

Candidates are expected to support the causes of mass movement with examples of events that have occurred.

A higher level response will offer detailed explanation of how the factors will lead to changes in shear stress and strength; and will link the factors to the various mechanisms / processes of mass movement including falls, flows, slumps, and creep while being supported by examples of events where these factors have operated.

*Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)*

*Examiner's comments:*

- Note that 'natural **hazard**' is not interchangeable with the 'natural disaster'. *Natural hazard* refers to the natural event that is occurring and has the potential to be hazardous to mankind, but *natural disaster* means refers to the natural hazard that has occurred and imposed a substantial devastation to a community of people and their habitat.
- For the various causes of mass movement in the humid tropics, include short examples to substantiate your statements.

2(b)	<p><b>‘Climate is the most important factor determining landforms types and their formation in the tropics.’</b></p> <p><b>How far do you agree with this statement?</b></p>	[20]
	<p><u>Indicative content</u></p> <p>The landforms that could be considered in the evaluation of the role of climate in landform formation could include landforms found in both the humid and the arid tropics, and hence include: fluvial landforms (downstream changes in channel width and depth, meandering and braided streams, wadis, canyons, alluvial fans), rills, gullies, badlands, cone, tower, &amp; isolated karst, inselbergs, deep weathered profiles, tafoni, aveoli, mesa, buttes, yardangs, sand seas, sand dunes, deflation hollows, desert pavements, and loess.</p> <p>A higher level of response would not only show how climate does play a vital role in the kinds of landforms developed and that there are different types of landforms created as a result of the differences in climate the two broad types of humid versus arid tropical climates, but candidates will also recognize the role of geology in terms of resistance of rocks, rock permeability and porosity, topography, vegetation, tectonic processes, and also the influence of human activities. Candidates will also indicate how climate together with other factors, can influence the type of erosional, transportational and depositional processes which shape formation and the final morphology of landforms in the arid and humid tropics.</p> <p>Possible links to other topics include arid and humid hydrological cycle (Topic 1.1), mass movements (Topic 1.1), weathering (Topic 1.1), channel morphology (Topic 1.1) , tropical deforestation (Topic 1.2) and Climate Change (Theme 3.1).</p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b)</i></p> <p><b><u>Examiner’s comments</u></b></p> <ul style="list-style-type: none"> <li>• Include explanation of the processes to show how these processes have contributed to the features of the landforms. For example, show how weathering processes of carbonation can lead to the formation of cone and tower karst, tafoni and aveoli.</li> <li>• Rills and gullies can occur both in the humid and the arid tropics. In the arid tropics, rills and gullies form the badlands. In the humid tropics, rills and gullies usually form due to the loss of the protective vegetation cover.</li> </ul>	

### Section B – Development, Economy and Environment

- 3 (a) Explain why the various ways to measure and monitor development in countries at low levels of development may be limited. [12]

Examiner's Comments – Q3 was not a popular choice; with only 5/50 students attempting it.

Examiners comments:

- Focus of the question is on why 'ways' are limited; not simply what they are
- 'Ways to measure and monitor' – suggests the use of indicators (e.g. use HDI to measure and monitor) as well as generic approaches (e.g. qualitative ways of measuring and monitoring)

#### Introduction

- What is development and how can it be measured and monitored
- Some ways to measure and monitor
  - Using **quantifiable data** to inform of state of development and hence progress over time
    - E.g. using singular indicators like GDP per capita
    - E.g. using composite indicators like HDI
  - Using **targets** set by self or others to track devt / progress
    - E.g. using MDG set by UN
- Why these ways are limited? Reasons
  - Limitations of using singular indicators
  - Limitations of using composite indicators
  - Limitations in using MDGs
  - Data is never entirely complete (problems with data collections)
  - Data can have biases (problems with data collections)

#### Main body //s

Ways of measuring and monitoring devt	Limited because of ..... Explanation with ref to context; and possible eg/s to illustrate
Using singular indicators	<ul style="list-style-type: none"> <li>• <b>The narrow focus of singular indicators make using them limited in measuring and monitoring devt; a multi-dimensional concept</b></li> <li>• <b>Context</b> → Besides the concept of devt being multi-dimensional, in some NIEs and LDCs non-economic devt has often taken a back seat to economic devt</li> <li>• <b>E.g.</b> → Measuring only the economic progress with GDP or FDI data for China would leave out the negative social and environmental impacts. Explain how manfg activities have led to such impacts.</li> </ul>
Using composite indicators	<ul style="list-style-type: none"> <li>• <b>While wider in focus, not all composite indicators are effectively multi-dimensional</b> <ul style="list-style-type: none"> <li>○ E.g. HDI: explain what is HDI and highlight that it leaves out environmental</li> <li>○ <b>Context</b> → Besides the concept of devt being multi-dimensional, in some NIEs and LDCs non-economic devt has often taken a back seat to economic devt</li> </ul> </li> <li>• <b>Similar to single indicators, these indicators may not effectively show how devt varies across space; specifically intra-national differences</b> <ul style="list-style-type: none"> <li>○ <b>Context</b> → In some NIEs and LDCs, devt is often highly concentrated in core areas only</li> <li>○ <b>E.g. Conc in core – Brazil</b> → concentration of economic activities and wealth in the southeast within industrial triangle of Rio de Janeiro, Sao Paulo and Belo Horizonte</li> <li>○ <b>E.g.</b> issues with GDP per capita or even HDI – average across the population; yet wealth may concentrated within a small group of people (e.g. Nigeria and oil)</li> </ul> </li> </ul>

Using MDGs	<ul style="list-style-type: none"> <li>• <b>MDGs are not comprehensive to include all aspects of devt</b> <ul style="list-style-type: none"> <li>○ What are MDG – Using globally set, specific targets that help measure and monitor devt (explain with some of these goals)</li> <li>○ Doesn't include political and cultural aspects</li> </ul> </li> <li>• <b>MDGs as a quick fix solutions rather than sustained solutions</b></li> </ul>	
Data collection	<p>Administrative constraints</p> <ul style="list-style-type: none"> <li>• Households may be omitted due to incomplete mapping of enumeration units</li> <li>• Lack of trained staff to administer census, high cost of hiring surveyors especially for the survey of remote regions</li> <li>• Census collection may not be regularly or accurately done <ul style="list-style-type: none"> <li>○ LDC with weak or unstable govt → e.g. Ethiopia, Sudan, and Afghanistan. Census collection is not done regularly due to instability of the govt, weak infrastructure or disruption caused by war.</li> </ul> </li> </ul> <p>Physical access to areas:</p> <ul style="list-style-type: none"> <li>• Transport difficulties in remote rural areas (often made worse by seasonal weather patterns like monsoon)</li> <li>• Any relevant e.g.</li> </ul>	<p>Validity of data analysis</p> <ul style="list-style-type: none"> <li>• Urban and rural governments in order to increase their parliamentary seats and/or funding may inflate data</li> </ul> <p>Access to people:</p> <ul style="list-style-type: none"> <li>• Nomads and homeless may be difficult to record</li> <li>• Language barriers; e.g. Cameroon has 20 major language groups</li> <li>• In some areas where literacy levels are low, people may have problems fulfilling up the forms and/or know administrative procedures</li> <li>• In northern India and the Middle East, male enumerators are not allowed to interview women.</li> </ul>

### Conclusion

- Hence measuring and monitoring devt can be limited due to firstly the inability for the measures to capture what devt means and secondly due to limitations associated with data collection in LDCs. seen from the following
  - Ensuring that measure/s used are multi-dimensional in nature
  - Ensuring that while measurements used are broad enough to measure the entire country's level of devt, there are also indicators measuring intra-regional and inter-societal development gap
  - Issues in data collection and analysis

3b) To what extent is the dependency theory relevant in understanding development today? [20]

**Areas to explore**

- How to understand devt – theories explaining devt
- One such is dependency theory (explain briefly what) - **Dependency theory** is the notion that resources flow from a "periphery" of poor and underdeveloped states to a "core" of wealthy states, enriching the latter at the expense of the former.
- Application of the theory to current times → consider the following ideas
  - What the theory defines as devt
  - Its assumptions
  - What the theory claims leads to devt
  - For the above, you need to also show how in addition to the dependency model, there are other explanations that help us understand development (e.g. core-periphery model, government and physical factors)
- Possible syn links
  - Theme 3.1 : Needs of the urban poor
  - Theme 3.2: UL and development
  - Theme 1.1 and 3.1: Climate and climate change as a factor affecting devt

Key ideas	Application to today?	
	Evidence to support	Evidence to refute
<b>What the theory defines as devt</b> ○ <b>Devt as economic devt</b>	<ul style="list-style-type: none"> <li>○ While recognizing social measures as key outcomes of under-devt which results from the dependent r/ship, the theory still sees economic devt as crucial in achieving devt</li> <li>○ For most countries, this can be seen by <u>government's efforts at economic devt; often aimed at enhancing the country's comparative advantage (CA)</u>.</li> <li>○ <b>E.g.</b> → any eg of govt efforts at enhancing CA (e.g. China's SEZs, Singapore's Science Parks, Singapore's Indus Cluster → highlight both role as regulator and provider) -- here global trade is seen as an avenue for economic growth; hence devt</li> </ul>	<ul style="list-style-type: none"> <li>○ Now a broader definition of devt to consider <u>social and environmental dimensions</u> as well. There is now an increased recognition of the duality of the r/ship (i.e. economic and non-economic dimensions affecting each other; rather than non-economic being seen as only an outcome of economic )</li> <li>○ Due to concerns about <u>climate change</u>: Despite being a cheaper source of fuel, China is moving away from the use coal to cleaner sources of energy (e.g. dams for HEP, increasing solar energy plants) (Syn Link 3.1 CC)</li> <li>○ Despite economic revenue from <u>bauxite exports</u>, Malaysian govt imposed a ban on <u>bauxite mining</u> due to environmental concerns (Syn Link 2.2 EI)</li> </ul>
<b>What the theory defines as devt</b> ○ <b>Devt and under-devt</b>	<ul style="list-style-type: none"> <li>○ Theory states that with devt, there will always be a flip side to the coin; under-devt.</li> <li>○ Based on its assumption of disputing the idea of trickle-down effect</li> <li>○ There is <b>direct global-scale application</b> of the theory seen in the global economy with the poor terms of</li> </ul>	<ul style="list-style-type: none"> <li>○ However, there is also evidence to show how locations which were secondary to the core were able to develop themselves in the long run which serving the core – Rise of <b>NIEs such as Singapore, Taiwan (or even China) which</b></li> </ul>

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	<p>trade for LDCs. The terms of trade for underdeveloped LDCs relative to the DCs deteriorated over time.</p> <ul style="list-style-type: none"> <li>○ Dependency theory suggests that the success of the DCs was a highly contingent upon historical r/ship with the LDCs; where the former as colonial leaders and latter as colonies. This dominance created a highly exploitative colonial relationships b/w DCs and LDCs.</li> <li>○ <b>E.g.</b> → <u>World Trade</u>: Lower-income countries rely on the export of commodities/services that are low in value-add and price and need to import items that are relatively high in value-add and price. Hence, they need to export in relatively large volumes to be able to afford a relatively low volume of imports. Many LDCs are primary product dependent and the world market prices of primary products are low compared to manufactured goods and services.</li> <li>○ The situation is worse when a large percentage of LDCs exports are concentrated in a single or small number of <u>primary products</u> which reinforce sensitivity to foreign demand by making the lower-income countries highly vulnerable to fluctuations in demand for their principal product/s. <b>E.g.</b> → Nigeria's reliance on petroleum based exports making up 98% of its total national exports in 2006. <u>Fluctuating oil prices</u> makes the revenue from such exports equally fluctuating. (Syn Link 2.2 Resource Curse)</li> </ul>	<p><b>found a place within the global economy to perform lower and then higher value add activities (give one eg)</b></p> <ul style="list-style-type: none"> <li>○ Hence as upward transition zones according to <u>the core-periphery</u> model, the connectedness with the core enabled devt in these areas. In fact the trickle-down effect for many of these NIEs occurred within a span of 40-50 years.             <ul style="list-style-type: none"> <li>○ Also seen in the case of NIEs that used EI to develop themselves (<b>e.g. Malaysia</b>)</li> </ul> </li> <li>○ This was also seen at the <u>national scale</u> for some countries as development from core areas spilled over to the next proximate areas (<b>e.g. Brazil or China – give one e.g.</b>)             <ul style="list-style-type: none"> <li>○ Brazil: Industrial triangle of Rio, SP and Belo Horizonte as the core in the SE of Brazil; benefits spillover to the centre-west</li> </ul> </li> </ul>
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**Hence, application?**

- Dependency theory today helps us understand the state of the less developed LDCs with one explanation based on dependency on the core
- However, for some areas, growth has been appropriately channeled towards economic growth.

**Its assumptions**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>○ The theory states that success of the advanced industrial economies <b>does not</b> serve as a model for the currently developing economies.</li> <li>○ This can be seen in the case of</li> </ul> | <ul style="list-style-type: none"> <li>○ While, the path maybe slightly varied, the end goal of being part of the global economy is the same.</li> <li>○ Hence, once again the success</li> </ul> |
|---|---|

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	<p><u>exploitative r/ships set up by IOs</u> in the name of monetary aid. Contrary to the aims of International Monetary Fund and the World Bank, greater integration into the global economy is not necessarily a good choice for poor countries – <b>discuss the issue of conditionality imposed (any e.g.)</b></p> <ul style="list-style-type: none"> <li>○ E.g. IMF policies forcing trade liberalization on a developing country where industries are not strong enough can actually cause more harm. Local industries could not compete, and rising interest rates made job creation virtually impossible.</li> <li>○ For instance, when the IMF intervened in Kenya in the 1990s, they made the Central bank remove controls over flows of capital. The consensus was that this decision made it easier for corrupt politicians to transfer money out of the economy (known as the Goldenberg scandal). Critics argue this is another example of how the IMF failed to understand the dynamics of the country that they were dealing with – insisting on blanket reforms.</li> </ul>	<p>of NIEs from the 60s -90s have become inspiration for many LDCs to follow suit</p> <ul style="list-style-type: none"> <li>○ Furthermore, the interconnectedness of the global economy no longer makes dependent LDCs completely voiceless. Within global economy, the importance of LDCs as primary commodity producers and lower value-added manfg and serve producers have also become important <ul style="list-style-type: none"> <li>○ Give e.g. of any GPN of any TNCs – show how global locations for production and sales despite being DCs and LDCs are highly integrated</li> </ul> </li> </ul>
<p><b>Hence, application?</b></p> <ul style="list-style-type: none"> <li>○ Dependency theory remains limited in not offering a viable alternative to dependent LDCs</li> <li>○ The interconnectedness and extensive spread of the global economy strongly binds together dependent LDCs and dominant DCs together</li> <li>○ However, it must also be noted that there is now an increasing voice for LDCs within international platforms as well</li> </ul>		
<p><b>What the theory claims leads to devt</b></p>	<ul style="list-style-type: none"> <li>• Dependent states should attempt to pursue policies of self-reliance. The best position to take, as suggested by the Dependency theory is a policy of controlled and pragmatic interactions with the world economy: poor countries should only endorse interactions on terms that promise to improve the economic and social welfare</li> <li>• E.g. Asian NIEs – highly state-controlled; state-curated involvement in the global economy <b>(give any eg – Taiwan, S'pore of how govt controlled devt; here the focus is on govt actions; some of which is not even 'capitalist' or 'democratic' in nature – e.g. banning labour unions, having protectionist policies) (other</b></li> </ul>	<p>Some of these ideas can be illustrated to show that dependency is not the only explanation; but rather other factors influencing devt also exist</p> <ul style="list-style-type: none"> <li>• Alternative forms of devt – via aid from IOs</li> <li>• Need to consider sustainable development</li> <li>• Physical factors that limit extend of devt (e.g. Maldives – need to invest in CC adaptation, Brazil's N/NE with Amazon rainforest)</li> </ul>

	<p><b>egs – Malaysia – protectionist policies to encourage their home-grown automobile sector)</b></p> <ul style="list-style-type: none"> <li>• While the theory doesn't look at more <u>localized scale</u>, the idea of self-reliance has been applied for several localized <u>bottom-up approach</u> to achieve specific devt goals (give one eg)</li> </ul>	
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### Conclusion

- Dependency theory remains crucial in helping us understand the uneven devt at a global scale. Its explanation based on dependent and dominant relationship is definitely important to understand the plight of global trade and position of many LDCs
  - Dependency explanation helped us understand the global uneven balance of trade
  - Key ideas of self-reliance and role of state have been used extensively to explain how other crucial stakeholders are important to enable devt
- However, the theory alone is not able to explain everything about current state of devt
  - On a national scale – where dependent LDCs have shown tremendous progress over time due to their involvement in the global economy
  - On a local scale – physical factors also explain the under-devt of certain locations; rather than dependency explanation

### 4 (a) Explain how countries at low levels of development may not benefit in being resource-rich. [12]

#### Introduction

- What is being resource-rich (r-r)? Presence of extractive industries (EI)...
- Some LDCs which are r-r
- How they may not benefit from being r-r
  - **Economic processes associated with EI that limit benefit**
    - World trade in primary commodity – fluctuating prices
    - Limited labour advantages due to use of specialist expat labour and the use of highly mechanized production techniques
    - Economic leakage due to repatriation of profits
  - **Political outcomes due to dominance of EI that limit benefit**
    - Increasing chances of corruption and conflicts
  - **Negative social and environment impacts that may outweigh the benefits**
    - Income disparity and social woes in the countries
    - Labour exploitation and safety
    - Environmental degradation and depletion of resource

#### Main body //s

Factor	Category	Explanation with ref to context; and possible eg/s to illustrate
Fluctuating world prices	Economic	<ul style="list-style-type: none"> <li>• <b>Primary commodity prices based on world trade are often fluctuating and hence reliance on these for govt revenue becomes risky for LDC govts</b></li> <li>• <b>Context</b> → For some LDCs, they are heavily reliant on primary commodity; including natural resources for their revenue</li> <li>• <b>E.g.</b> → Nigeria's dependence on oil, measured by oil exports as a percentage of total national exports or by oil rents as a % of overall govt revenue, has been extremely high. This has intensified vulnerability to the volatility of the global oil price.</li> <li>• Simultaneous to the increase in oil production, the export of agricultural products began to decline. While agricultural products constituted approximately 80% of total national exports in 1960, already in 1976 they accounted for only 4%. This devt was</li> </ul>

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		<p>accompanied by a surge in food imports to meet the needs of the locals in Nigeria</p> <ul style="list-style-type: none"> <li>• <b>E.g.</b> → LDC govts in countries that are r-r- over-borrow because they have improved credit-worthiness when revenues are high. During the 1970's when oil prices were high, resource rich countries used them as collateral for debt but during the 1980's commodity prices fell significantly. This led to debt crises when revenues declined in Mexico, Nigeria and Venezuela in the 1980s.</li> </ul>
Limited labour advantages	Economic	<ul style="list-style-type: none"> <li>• <b>Nature of most EIs – technology-intensive and rely on skilled labour to handle the specialized machinery needed for EI</b></li> <li>• <b>Context</b> → In LDCs, limited supply of very specialized skilled labour. Hence local labour is used for lower value added work</li> <li>• Hence limited transfer of skills, value-add</li> <li>• <b>E.g.</b> → Widespread unemployment in Nigeria. The oil industry is generally very capital intensive but not labour intensive. In Nigeria this structural problem is particularly pronounced, as oil is hardly processed within the country but rather immediately exported upon extraction. Despite the contribution to GDP, the entire oil industry in the country is said to employ only about 35,000 people, directly and indirectly. As a result, unemployment particularly youth unemployment is extremely high in the Niger Delta, markedly higher than in the rest of the country.</li> </ul>
Economic leakage due to repatriation of profits	Economic	<ul style="list-style-type: none"> <li>• <b>Limited capture of benefits by LDC as most of the profits are repatriated back to home economy of TNCs that are extracting the resource.</b> In some cases, only a small share of the production value of the resource stays in the host LDC. One explanation is that many <i>fiscal regimes</i> (i.e. taxation rules about how to split the profits between companies and governments) fail to compensate the state and communities for depleting their resources and related environmental damage or loss of livelihood.</li> <li>• <b>Context</b> → These bad deals can happen when LDC govts are so eager to encourage resource extraction that they lower the rates for taxes and royalties without understanding the true value of their resources.</li> <li>• <b>E.g.</b> → In Nigeria, the % of oil revenues refunded to the producing regions was progressively reduced from 50% in 1970 to 20% between 1975 and 1979 and down to only 3% between 1992 and 1999. This is mainly due to a high degree of leakage resulting in either the repatriation of profits to foreign countries.</li> </ul>
Increased risk of corruption and conflict	Political	<ul style="list-style-type: none"> <li>• Reliance on natural resources, particularly oil revenue, has made it more likely for govts to become or remain authoritarian over the past 30 years. This is due to the sources of revenue for the country. When countries collect large revenues from natural resources, they are less dependent on levying taxes on citizens, and thus citizens feel less invested in the national budget. In contrast, the government budget is derived from resource revenue. With this in mind, the views and needs of citizens become less important than the views and needs of extractive industries.</li> <li>• <b>Context</b> → In many LDCs that are r-r, such authoritative govts own and control the resources.</li> </ul>

		<ul style="list-style-type: none"> <li>• <b>E.g.</b> → President Obiang sells two-thirds of Equatorial Guinea's oil to U.S. corporations like ExxonMobil and Hess, and has recently spent \$55 million of these petro-dollars adding a sixth private jet to his fleet. He used his country's remarkable oil windfall to consolidate his personal power.</li> </ul>
Stemming from corruption, large income disparity; social problems	Social	<ul style="list-style-type: none"> <li>• <b>With increased control of resources by a smaller % of residents, many people within these LDCs do not benefit from the export earnings from EI.</b></li> <li>• <b>Context</b> → For some LDCs, growing population and corrupt politicians make the reliance of resources worse.</li> <li>• <b>E.g.</b> → Because of the huge influx of oil money, Equatorial Guinea now has the fourth-highest average income in the world; 15% higher than the per capita income of the United States. Yet almost all the income is at the top. Despite having a per capita income higher than the USA, raw sewage runs through the streets of the country's capital, three-quarters of the country's people are malnourished, and the majority of its citizens survive on less than what one could buy in the United States with \$1 a day. The proportion of government spending dedicated to health and education in Equatorial Guinea falls well below the regional average. Rather than benefiting the people, vast sums of the country's oil revenues have gone to personal purchases for President Obiang.</li> </ul>
	Envirt	<ul style="list-style-type: none"> <li>• <b>Even when economic gains are somewhat materials, environmental damage in the long run may diminish whatever benefits derived from EI.</b></li> <li>• <b>Context</b> → LDC govt do not have rigid environmental legislation that control the rate of extraction. Mostly this is due to the need to consolidate their comparative advantage.</li> <li>• However, over extraction and/or pollutive extraction methods can cause immediate and long term damage to the fragile ecosystems that these EI are based on.</li> <li>• <b>E.g.</b> → Due to the lack of sustainable management on the part of the multi-national oil companies (ROLE OF TNCs) on the one hand and the Nigerian state (STATE) on the other, oil production is causing severe environmental damage in the Niger Delta. Oil spills have led to the contamination of water resources, the destruction of farmland, and the dispersion of toxic materials.</li> </ul>

### Conclusion

- While EIs have the potential to bring in immense export earnings, LDCs that are r-r- may not benefit from these due to several reasons stemming from economic to political to social and environment.
- Economically, profit repatriation and limited labour benefits become crucial concerns especially when EI is dominated by TNCs.
- Similarly, when corrupt govts do not effectively used whatever revenue that does remain in the country, even less benefits spillover to the majority of people.
- In addition, social and environmental degradation from EI create long term problems for these LDCs who need to channel more of their already limited funds to address these.

4(b) 'There is more success in using water conservation to manage water scarcity compared to other strategies.' How far do you agree with this statement? [20]  
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**Areas to explore**

- What is water scarcity (WS)?
- Types of strategies to manage water scarcity (WS) – demand-driven vs supply-driven – depending on the causes of WS
- What does ‘success in managing water scarcity’ entail? Assessment criteria should consider → the following ideas
  - A) To effectively manage WS, strategies must address the reason/s behind the WS which stems from the imbalance from dd and ss → hence should target both dd and ss
  - B) To effectively manage WS, chosen strategy must also be successfully implemented by the govt (factors controlling success – govt planning and \$)
  - C) To effectively manage WS, chosen strategy must also be well-received by the people (factors controlling success – social receptiveness of people)
- Possible syn links
  - Theme 3.1 : Needs of the urban poor (water needs)
  - Theme 3.2: Pluvial flood (no-regrets initiative)
  - Theme 1.2: Flooding, Deforestation

Strategy	Explanation and eg
Water conservation – using campaigns	<ul style="list-style-type: none"> <li>- <b>Obj of strategy</b> : Conserving use of water in order to <u>reduce demand through campaigns</u> to promote lower usage</li> <li>- Successful e.g. - Zaragoza, Spain, which instituted its Water Saving City project in 1997 with a goal of reducing domestic water use by 1 million cubic meters per year. The net effect has been a “water scarcity impact” of 1.176 cubic meters of water per year, according Water 2030. This is a per capita water use reduction of roughly 51 liters, down from 150 liters a day in 1997 to 99 liters a day in 2012, despite a 12 percent population increase.               <ul style="list-style-type: none"> <li>○ Somewhat successful e.g. - Singapore’s demand side mgt includes wide ranging water conservation initiatives, including education programmes, have been effective in encouraging individuals and industry to use water wisely, and have seen per capita domestic water consumption decrease from 176 litres per day in 1976, to 165 litres per day in 2003, and 152 litres per day today; the target for 2030 is 140 litres per day.</li> </ul> </li> <li>- <b>When will it be more successful?</b> <ul style="list-style-type: none"> <li>○ When WS is demand-driven → in the case of water-abundant tropical areas like Singapore, our rising affluence has led to increasing demand for water. A typical situation in the case of the most DCs</li> <li>○ Hence, increasing supply alone would further increase demand</li> <li>○ Thus, in such cases, conservation strategies are crucial. Conservation is <u>key to sustaining the supply-demand balance</u>, especially in areas expected to have continued population growth and/or consumption.</li> </ul> </li> <li>- <b>And when will it be less successful?</b> <ul style="list-style-type: none"> <li>○ <u>Socio-economic factor</u>: People are not receptive to the campaigns; espily in the case of DCs like Singapore where some people may think in more hedonistic ways; have a more consumerist lifestyle (e.g. supply of water readily available with an affordable cost; either directly supplied or purchased in shops). Furthermore, campaigns alone may not be effective in reducing demand.</li> </ul> </li> </ul>
Water conservation – using economic	<ul style="list-style-type: none"> <li>- <b>Obj of strategy</b> : Conserving use of water in order to <u>reduce demand through economic disincentives</u></li> <li>- Successful e.g. - In Singapore, concurrent to the diversification and</li> </ul>

disincentives	<p>expansion of water sources, PUB has put in place <b>well-thought out and comprehensive demand management policies</b> that included the following:</p> <ul style="list-style-type: none"> <li>- <b>tariff on the domestic consumption and non-domestic consumption</b> - effective from 1 July 2000, domestic consumption of up to 40 m<sup>3</sup>/month and non-domestic uses were increased to a uniform rate of S\$1.17/m<sup>3</sup>. For domestic consumption above 40 m<sup>3</sup>/month, the tariff became S\$1.40/m<sup>3</sup>, which is higher than for non-domestic consumption. The earlier cheaper block rates for the first 40 m<sup>3</sup> of domestic consumption was eliminated</li> <li>- <b>the Water Conservation Tax (WCT)</b>, levied by the Government to reinforce the water conservation message. Effective 1 July 2000, WCT was increased to 30% of the tariff for the first 40 m<sup>3</sup> for domestic consumers and all consumption for non-domestic consumers. However, domestic consumers pay 45% WCT when their water consumption exceeds 40 m<sup>3</sup>/month. In other words, there is now a financial disincentive for higher water consumption by households.</li> <li>- <b>the Water-Borne Fee (WBF)</b>, a statutory charge prescribed to offset the cost of treating used water and for the maintenance and extension of the public sewerage system. Effective 1 July 2000, WBF was increased to S\$0.30/m<sup>3</sup> for all domestic consumption.</li> <li>- <b>When will it be more successful?</b> <ul style="list-style-type: none"> <li>o Again when WS is demand-driven → in the case of water-abundant tropical areas like Singapore, our rising affluence has led to increasing demand for water. A typical situation in the case of the most DCs.</li> <li>o E.g. in the case of China, increasing consumption of water led govt privatizing water to curb the increasing demand. Prior to 1979 and under the old command economy, public utilities, including the supply of water, were all run by State Owned Enterprises (SOEs). Services were supplied as a public good. Hence water rates were very low and water departments had to be subsidized by the central authority.</li> <li>o Central govt decided to drop the old principle of treating water as a public good and began a new strategy of supplying water on a commercial basis.</li> <li>o It put in place a new policy on water rates and insisted that state run water companies operate at a profit. To convince the public, the party propaganda blamed the failure in water supply both on treating water as a public good and, in particular, household's failure in saving water. The municipal govts helped to establish huge water companies or public utility companies through regional merges, who then provided water on a commercial basis.</li> </ul> </li> <li>- <b>And when will it be less successful?</b> <ul style="list-style-type: none"> <li>o <b>Socio-economic factor</b>: However, conservation is frequently criticized in the environmental media for being ineffective, especially in the absence of meaningful water management policy and low water prices. For instance, even when taxed heavily or charged higher for domestic consumption of water, if there are ready supply of water with an affordable cost that can be purchased in shops, then conservation efforts may not meet their overall objectives (cheaper alternatives)</li> <li>o <b>Socio-economic factor</b>: When privatized, water then becomes too costly a commodity for middle and lower income groups to afford.</li> <li>o <b>E.g.</b> → In China: The average water rates in 35 cities increased 8 fold increase in 15 years. In Beijing the hike has been more</li> </ul> </li> </ul>
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	<p>dramatic; between 1989 and 2003 water rates were raised 9 times, from 0.12 RMB to 2.9 RMB, a 23 fold increase. Water bills account for 2.5% of monthly household income, water is deemed to be unaffordable and hence the necessity to conserve water. <b>While achieving the aim of conservation, this came at a concern of whether a basic need was deprived for these urban residents.</b> (Syn Link Th 3.1 Urban needs)</p>
<p>Increasing water storage - Supply-based strategies</p>	<ul style="list-style-type: none"> <li>- <b>Such as building dams</b></li> <li>- <b>Obj of strategy</b> : Control <u>supply of water</u> by tapping on existing bodies of water; with the aim of <u>increasing water supply</u> especially during periods of low rainfall</li> <li>- Successful e.g. – Marina Barrier Program in Sg, Aswan Dam in Egypt</li> <li>- <b>When will it be more successful?</b> <ul style="list-style-type: none"> <li>o Again when WS is supply-driven → while water-abundant, Sg has small catchment area. Hence reliance on water from external sources like Malaysia. Thus in order to enhance water security, the 4 National Taps approach was augmented. To develop the Marina catchment into a water catchment the Marina Barrage, which is a tidal barrier 350m wide located at the southern tip of Singapore, will keep seawater out of the Marina Basin. A new reservoir with a body of water with a surface area of 240 hectares located in the urban area is under construction and will be completed in 2007. The concept is that through natural flushing from monsoons over time the saline water originally in the Basin will be gradually displaced and turned into a body of freshwater. This body of freshwater will augment the local sources from water catchments, which is the first of the four National Taps. The resulting body of freshwater would then serve as a reservoir to boost Singapore’s water supply. The Marina catchment is the largest water catchment in Singapore. This programme spans an area of 10,000 hectares or one-sixth the size of Singapore.</li> </ul> </li> <li>- <b>Social and environmental factors:</b> Furthermore, the Barrage had <u>multiple functions</u> (no-regrets initiative)- Because the barrage would allow the water level in the basin to be maintained, it would also help to control pluvial flooding of low-lying areas in the city centre, an occasional occurrence when heavy rains coincide with high tides. Furthermore, it was also part of efforts to adapt to long term impacts of sea level rise. On a social front, it was also developed to be a place for recreation; part of efforts to enhance UL of the city. (Syn Link Th 3.1 CC, 3.2 UL and pluvial floods)</li> <li>- <b>And when will it be less successful?</b> <ul style="list-style-type: none"> <li>o <b>Socio-economic factor:</b> Dams to address water scarcity can be potentially expensive projects for some LDCs.</li> <li>o <b>Environmental factor:</b> Scale of the dams area too large that they cause environmental problems affecting QQT for downstream locations</li> <li>o <b>Political factor:</b> When such dams are built on Transboundary Rivers, there can be potential geopolitical hydro-conflicts. <b>E.g.</b> → River Jordon and the Arab-Israeli Six-Day War in 1967 due to the intended Unity Dam proposed by the Arab states and construction of the National Water Carrier by Israel</li> </ul> </li> </ul>
<p>‘Re-using’ non-traditional sources of</p>	<ul style="list-style-type: none"> <li>- <b>Such as desalination, greywater, NEWater (choose one)</b></li> <li>- <b>Obj of strategy</b> : ‘Re-using’ non-traditional sources of water to boost existing supply of water</li> </ul>

water - Supply-based strategies	<ul style="list-style-type: none"> <li>- <b>Desalination</b> - An increasingly popular solution to fresh water scarcity is <b>treating saline or brackish water sources through a process known as desalination or desalinization</b>. Many nations <b>are increasing their investments in desalination</b> with a goal of having new, more reliable water sources to meet explosive, growing demand.</li> <li>- Successful e.g. –These include the United Arab Emirates, nations with limited available water supplies such as Cyprus, and water-stressed areas of the United States. There are an estimated 16,000 desalination plants in operation, the largest of which are located in Saudi Arabia, the United Arab Emirates, and Israel.</li> <li>- <b>When will it be more successful?</b> <ul style="list-style-type: none"> <li>o Again, coming from the perspective of managing water scarcity by balancing both demand and supply, in some areas with physical scarcity, increasing the supply of water is a must. Hence many arid regions have invested much into desalination as well as technology to create other sources of water</li> <li>o <b>E.g.</b> → In the <b>United Arab Emirates</b>, for example, water demand is expected to double between 2011 and 2020. Most of that demand is being filled through desalination, with roughly US\$3.27 billion spent annually for desalination.</li> </ul> </li> <li>- <b>And when will it be less successful?</b> <ul style="list-style-type: none"> <li>o <b>Socio-economic factor</b>: However, conservation is frequently criticized in the environmental media for being ineffective, especially in the absence of meaningful water management policy and low water prices. For instance, even when taxed heavily or charged higher for domestic consumption of water, if there are ready supply of water with an affordable cost that can be purchased in shops, then conservation efforts may not meet their overall objectives (cheaper alternatives)</li> <li>o <b>Socio-economic factor</b>: A very costly strategy that many not be within the reach of many LDCs</li> <li>o <b>Environmental factor</b>: Unfortunately, desalination <b>relies heavily on power-hungry, fixed facilities</b>. It is estimated that seawater desalination requires about 10 times more energy than is needed for pumping well water – <b>expensive strategy as it is energy-intensive</b>. Hence use of carbon-rich energy fuels will further add to global emissions and CC (Syn link Th 3.1 CC)</li> </ul> </li> </ul>
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### Conclusion

- o Water scarcity has a result of the imbalance between dd and ss – hence managing the scarcity must consider both dd-driven and ss-driven strategies
- o Conservation is a crucial dd-driven strategy
  - o Ultimate success depends on behavior of people
  - o This can be more immediately addressed with economic disincentives to persuade the conservation of water as opposed to using campaigns to promote the intended outcome
- o More importantly, alongside conservation, ss strategies must also be considered especially when the supply of water is already limited (as seen in the cases of physical water scarcity)
  - o Ss-driven strategies require more financial investments; in developing necessary infrastructure like dams or technology to reuse water
  - o Furthermore, some of these strategy do have other undesirable outcomes which must be weighed out to consider long term sustainability of the strategies.

## Section C – Sustainable Development

## Answer

- 5(a) Compare the causes of climate change between countries at high and low levels of development. [12]

Indicative content

Countries at high levels of development differ from countries at low levels of development only in a selected number of ways in terms of causes of climate change. The main cause of climate change in countries at high levels of development tend to be that of urbanization and industrialization. In the case of countries at low levels of development, there is a range of causes, depending on the stage of economic development of that particular low-level of development country. For Brazil, which is a developing country, while industrialization does contribute to greenhouse gases, the prolonged period of deforestation of the tropical rainforest leads to the loss of the carbon sink. For a location like Laos or Cameroon, the predominant cause would be the change of land use resulting in the loss of the tropical forest, while industrialization would not be the most significant.

The processes greenhouse effect and enhanced greenhouse effect would be discussed show the role played by the addition of greenhouse gases and how this can contribute to climate change.

***The greenhouse effect:***

The greenhouse effect is relatively simple. When energy from the sun reaches the surface of the Earth (**insolation /shortwave radiation**), some of its energy is

- **reflected** back toward space unchanged (reflected shortwave radiation) from clouds and ground surfaces, and
- **absorbed** by the surface (or objects on the surface) and a small component by the atmosphere,
- The energy absorbed by the ground surface and the atmosphere is subsequently re-emitted largely as **longwave / terrestrial** radiation.
- Some component of this longwave radiation travels directly **into space**, leaving the Earth,
- but a fair proportion of this is **re-absorbed by water vapour, carbon dioxide, and other greenhouse gases** in the atmosphere. This heats the atmosphere which in turn re-radiates longwave radiation in all directions.
- Some of it is **re-radiated back towards the Earth's surface**. These re-absorption and re-emission are the processes that form the greenhouse effect.

***The enhanced greenhouse effect:***

- Over the past 250 years, humans have been artificially raising the concentration of GHGs in the atmosphere. The burning of coal, oil, and natural gas, as well as deforestation and various agricultural and industrial practices, are altering the composition of the atmosphere. These human activities have led to increased atmospheric concentrations of a number of GHGs, including carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, and ozone in the lower part of the atmosphere. The increase of GHGs is at a far greater rate than would occur through natural processes and thus their concentrations are increasing.
- The **increased concentration of GHGs** in the atmosphere **enhances the absorption and emission of longwave radiation**.
- The altitude from which the Earth's radiation is effectively emitted into space is becoming higher with increasing concentration of GHGs. Because temperature is lower at higher altitudes, less energy is emitted, causing a positive radiative forcing.

The activities and the related processes releases greenhouse gases include industrial activities,  
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combustion of fossil fuels, deforestation, land-use change, selected agricultural activities. Some brief data on the extent of contribution from the different anthropogenic activities should be included. For example, the use of **fossil fuel** currently accounts for **80 to 85%** of the carbon dioxide being added to the atmosphere. **Deforestation** accounts for about **20%** of the CO<sub>2</sub> added to the atmosphere each year from human activities. The data on how much selected GHGs has increased since the 1750s should be included as well (See Table 1).

Greenhouse Gas	Concentration1750	Concentration	Percent Change	Natural and Anthropogenic Sources
Carbon Dioxide	278 ppm	413.86 ppm <i>23 Jan 2019</i>	48.8%	Organic decay; Forest fires; Volcanoes; Burning fossil fuels; Deforestation; Land-use change
Methane	700 ppb	1860.2 ppb <i>Sept 2018</i>	166.7%	Wetlands; Organic decay; Termites; Natural gas & oil extraction; Biomass burning; Rice cultivation; Cattle; Refuse landfills
Nitrous Oxide	270 ppb	333.15 ppb <i>Dec 2018</i>	23.4%	Forests; Grasslands; Oceans; Soils; Soil cultivation; Fertilizers; Biomass burning; Burning of fossil fuels
Chlorofluorocarbons (CFCs)	0	880 ppt (2003 data)	Not Applicable	Refrigerators; Aerosol spray propellants; Cleaning solvents
Tropospheric Ozone	237 ppb	337 ppb	42% Global levels have generally decreased in the stratosphere and increased near the Earth's surface	Created naturally by the action of sunlight on molecular oxygen and artificially through photochemical smog production

*Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)*

**Examiner's Comments:**

- Need to make a distinction between DCs and LDCs causes, and not to lump them together. There were candidates who discussed DCs and LDCs in the same factor, and this resulted in messy organization of the question which hampered understanding of the overall flow of the answer.
- Candidates tend to leap straight into the discussion on the causes of climate change without explaining how those activities can lead to climate change (e.g. burning of fossil fuels leads to climate change, but do not explain how that act leads to climate change). This resulted in loss of credit for many candidates due to incomplete explanation and links.
- Candidates need to make the distinction between greenhouse effect and enhanced greenhouse effect, as both terms stand for different ideas and outcomes.
- There were a few candidates who did not manage to define DCs and LDCs clearly, and brought in other terms such as NIEs into the mix, which resulted in their argument becoming convoluted due to a lack of distinction between countries. There were also candidates who classified DCs and LDCs erroneously, which resulted in a loss of credit.
- Majority of candidates tried to provide case studies and examples, but tended to be overly generic and not place-specific enough to make sense to the explanation (e.g. DCs in Europe gave off XXX amount of Carbon). Candidates need to be mindful to be more specific of their examples provided.

**5(b) Assess the effectiveness of strategies used to manage climate change. [20]****Indicative content**

Assessment of the effectiveness of strategies should consider the extent of success of both adaptation and mitigation strategies in managing the issue of climate change. Candidates should discuss the extent of effectiveness or failure of selected strategies in the context of examples of countries or regions where the strategies have been adopted.

Examples of adaptation strategies could include those that manage rising sea levels, changes to rainfall, flooding, water availability, and possible supporting examples that could be used include Maldives, Mauritius, Singapore, Bangladesh, Denmark, Netherlands, Venice, Italy;

Some mitigation strategies that candidates could use include the role of transborder cooperation and agreement, egs. Kyoto Protocol, Copenhagen Accord, the Paris Agreement and the related mechanisms like Carbon pricing, trade and credit, carbon tax, Clean Development Mechanism and Joint Implementation (JI), REDD+, and the variety of alternative fuel to fossil fuel which goes directly to cut the main source of excessive GHGs.

Candidates could suggest that both adaptation and mitigation strategies are crucial and complement each other when countries and the world attempt to manage the issue and the impacts of climate change. Candidates should also recognize that adaptation strategies tend to be more effective in deal with existing and future impacts of climate change, while mitigation efforts especially in cutting down and slowing down the rate of increase of global GHGs is currently deemed as very inadequate with many scientists ringing the alarm bells that there is a great possibility of runaway global warming and climate change.

A higher level response could apply a set of criteria or criterion consistently to evaluate different strategies. Another approach could be to consider what had been achieved given the challenges specific to the content.

Possible links to other topics include flood management strategies, water scarcity, transboundary sources of water supply, and tropical deforestation (Topic 1.2)

**Examiner's comments:**

- Question was rather well attempted, with only a handful of candidates who did not manage to complete the question either due to lack of time or did not comprehend question requirements.
- Majority of candidates were able to hit L3, as they provided a balanced argument of different factors. Candidates were able to either classify strategies according to international or regional and even national, and were able to share on how the strategies are effective or not. The evaluative component of the different strategies was rather well attempted by most candidates.
- Candidates were able to provide examples and case studies to support their claims, and the use of examples was poignant in proving their point and driving their arguments forward.
- However, there was only a few candidates who managed to make synoptic links to other topics, and this resulted in the rest of the candidates being stuck at L3 or a low L4, unable to move up in their scores. Candidates should be more mindful to make an attempt at synoptic links for future 20m essays.
- Organization of essays remains a problem for majority of candidates, as the lack of organization of the factors in their essay resulted in them being unable to have a coherent argument, causing a loss in credit.

6(a) Explain the factors contributing to the occurrence of pluvial floods in cities at low levels of development.

[12]

### Introduction

- What is pluvial flood (PF)
- Some eggs
- Factors causing it in LDC cities
  - **Primary factors**
    - Physical factors: Climate and climate change, geographical location of city
  - **Intensifying factors**
    - Human factors: limited infrastructural capacity due to ineffective planning and/or inefficiencies of the govt
    - Human factors: inefficient infrastructure due to clogged drains

### Main body //s

Factor	Role	Explanation with ref to context; and possible eg/s to illustrate
Climate	Physical factor; Primary factor	<ul style="list-style-type: none"> <li>• <b>Rainfall could be intense and/or prolonged; leading to PF.</b> This is usually associated with <b>short-duration storms</b> (of up to three hours) and with rainfalls &gt; 20–25 mm/hour. It can also occur following lower intensity rainfalls (~ 10 mm/hour) over <b>longer periods</b>, especially if the ground surface is impermeable as in the case of cities with increasing concretized land surface</li> <li>• <b>Context</b> → Regardless of status of development; dependent on the geographical location of the city</li> <li>• <b>E.g.</b> → Flooding hazards caused by heavy rainfall in Shanghai have been reported extensively in the last 15 years. Shanghai is in the East Asia monsoon area and frequently experiences torrential rains.           <ul style="list-style-type: none"> <li>○ <b>Made worse with geology (another physical factor)</b> → Shanghai is sensitive to flooding hazards due to <b>low-lying ground caused by land subsidence</b>. Shanghai sank by as much as 2.6 metres between 1921 and 1965, and in 2002 alone sank by 10.22mm.</li> </ul> </li> <li>• <b>E.g.</b> → Even in arid cities, although average rainfall is very low, the occasional rainstorms can generate flash floods that damage properties and result in loss of lives. Khartoum in Sudan has a BWh / hot desert type of climate. Annual rainfall is very low (162mm), but there can be the occasional intense storm. The city underwent two extreme pluvial flash floods, one in 2013 and another in 2014. The worst flash flood for Khartoum was in 1988. The total annual rainfall in 1988 reached 785.5mm. <i>Similarly the case for Jeddah and Al Riyadh (cities in Saudi Arabia, a country with higher level of devt).</i></li> </ul>
Climate change	Physical factor; Primary factor	<ul style="list-style-type: none"> <li>• <b>Climate change has led to increasing intensity and frequency of rainfall for some areas</b></li> <li>• <b>Context</b> → Regardless of status of development; dependent on the geographical location of the city</li> <li>• <b>E.g.</b> → Mexico City: Annual rainfall has increased from 600 mm to over 900 mm through the 20<sup>th</sup> century. Consequently, the annual incidence of flash flooding due to heavy rainfall has increased from one to two annual flood events to six or seven flood events. It is expected that the incidence of flash flooding will continue to rise in the future due to the increased frequency of heavy precipitation associated with climate change and variability.</li> </ul>
Poor govt planning	Political factor;	<ul style="list-style-type: none"> <li>• <b>PF occurs not simply due to increased precipitation; but rather</b></li> </ul>

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that leads to limited drainage capacity	Secondary factor	<p><b>due to the limited capacity of existing infrastructure. The latter could be due to contributing circumstances in many LDC cities.</b></p> <ul style="list-style-type: none"> <li>• <b>Context</b> → LDC cities have the following circumstances that lead to the reduced capacity of drainage systems which in turn lead to PF <ul style="list-style-type: none"> <li>• <b>A. Urban processes: Rapid urbanisation</b> that leads to increase people; especially in the fringes of the city. Such <b>sprawling cities with haphazard devt</b> make it difficult to plan for effective drainage mgt system</li> <li>• <b>B. Economic processes:</b> Limited capital availability together with a host of brown agenda issues limits the amount of capital available to develop effective drainage system</li> <li>• <b>C. Political challenges:</b> Furthermore corruption and other political challenges reduced investments into such social infrastructure</li> </ul> </li> <li>• <b>E.g.</b> → (for A) Mexico City in Mexico has a population of around 19.5 million and is one of the largest and most <b>densely populated urban areas</b> in the world. High percentage of the population live in <b>informal settlements that are vulnerable to flooding and landslides</b></li> <li>• <b>E.g.</b> → (for B) Khartoum City Centre in Sudan has a sewer system having a capacity of 24,000 sq. m covering 42% of 6.5 sq. km area. A 30 mm rainfall event would exceed the capacity of the city's sewer system by 4 times, leading to PF (<b>limited capacity</b>). For both the 2013 and 2014 flash floods, rainfall volume and the runoff generated exceeded the capacity of the city's sewage. The wet season for Khartoum is July and August. The rainfall on 30 July 2014 was 43 mm.</li> <li>• The flood risk here is made worse as there was <b>poor land use planning</b> resulting in the siting of settlements and infrastructure in natural valleys, for example, the Soba and the Green valleys. In fact, 80% of the urban and agricultural schemes are within the flood-prone zone.</li> </ul>
Insufficient financial capacity to build enough infras	Economic factor; Secondary factor	
Sprawling cities also become a challenge for LDC govt as they are unable to build adequate infras to keep up with the urban growth	Urban process; Secondary factor	
Despite the presence of infras, some of these function below their capacity due to clogged drains.	Social factor; Secondary factor	

### Conclusion

- Primary factors leading to PF – physical factors like climate and climate change and geological conditions
- Intensifying factors in many LDC cities – human factors associated with urban development as well as govt factors

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**6(b) Assess the effectiveness of strategies used to mitigate the effects of pluvial floods.**

[20]

**Areas to explore**

- Effects of pluvial flood?
- What is the idea of 'mitigate'? reduce the impacts.... By either (i) reducing the occurrence and intensity of flood OR (ii) preparing ahead and protecting against the effects, OR (iii) dealing with the effects after occurrence
- What are strategies used to mitigate pluvial floods? Assessment of these strategies
  - Assessment should consider some of the following
    - Direct impact of strategy on pl floods
      - Any reduction in flood occurrence? Flood intensity?
      - Minimising the impacts of floods on urban dwellers
    - Indirect impact of strategy on urban environment
      - Effect on urban liveability
      - Sustainability of strategy
    - Factors affecting effectiveness
      - Govt efficiency
      - Cost of strategy to urban govt, to urban dwellers
      - Receptiveness of people
      - Phase of urban development and associated processes
- Possible syn links
  - Theme 1.2 : Reasons for flooding and hence effectiveness of solutions attempted
  - Theme 2.1: Measuring effectiveness using development indicators such as MDG (Goal 7)
  - Theme 3.1: Effectiveness of the strategies based on essential needs of the world's poor
- **Following ideas must be brought out in the answer**
  - Managing PF is crucial as the environmental hazard as severe implication of UL of the city as safety and living comfort are affected.
  - Overall, a holistic flooding mgt approach is needed; rather than just to look at only flood-prone areas or certain stakeholders
  - There is a need for both hard and soft engineering approaches in managing these effects.
  - Success of mgt strategies are very much dependent on govt, capital availability, receptiveness of urban residents and urban processes that continue to re-shape the city

• **Key ideas with case studies (Details – Lt 10C)**

	<b>What was done?</b>	<b>Evaluate</b>
<b>Singapore (DC city)</b>	<ul style="list-style-type: none"> <li>• A holistic storm water management strategy that dealt with source of flooding (i.e. where rainwater fall), pathways (i.e. drains, canals, rivers) and receptors (i.e. possible areas where flood water may flow to such as roads, buildings and basement) → Syn Link Theme 1.2 – Factors affecting Floods</li> <li>• Holistic mgt focused on various scales of intervention involving both structural and non-structural approaches               <ul style="list-style-type: none"> <li>○ Urban scale</li> <li>○ Community scale</li> <li>○ Building scale</li> </ul> </li> <li>• Students must be able to</li> </ul>	<ul style="list-style-type: none"> <li>• Direct impacts: Initial success as flood occurrence has reduced since the last City-wide approach ensures greater success as various contributors to flood are considered               <ul style="list-style-type: none"> <li>○ However, smaller scale of the city of Sg allows the govt to take this approach</li> </ul> </li> <li>• Economic consideration: High cost approach – while more manageable for a small DC city-state of Sg, this will become more challenging for larger, sprawling cities in LDCs</li> <li>• Geographical advantage and constraints: (i) Smaller scale of the city-state allowed for an entire city approach. This will be a challenge for larger cities where flood water may not be</li> </ul>

	<p>mention specific examples from some of these scales for each of the above components (source, pathways and receptors)</p>	<p>generated within the city.</p> <ul style="list-style-type: none"> <li>• (ii) For Sg, spatial constraint makes it challenging in building more pathways that store the rainwater</li> <li>• Receptiveness of people: For building scale, it required cooperation of <u>shops and building owners</u> to put in place safeguards</li> <li>• Receptiveness of people: <u>Public</u> preparedness is also low as flooding has not been a problem for the city up till recent times. While measures are put in place (e.g. non-structural approaches – such as public updates via social media, etc), people are still unaware on what needs to be done to prevent floods and face flooding disaster</li> </ul>
<p><b>Gold Coast City (Australia) (DC city)</b></p>	<ul style="list-style-type: none"> <li>• As with Sg, the city took on a whole city approach.</li> <li>• In addition, Gold Coast City also focused on sustainable mgt of floods – economically, socially and environmentally in the long run → Syn Link Theme 3.1 – Dimensions of sustainable development</li> <li>• Structural measures: Includes a \$20.5 million storm water drainage capital works program in 2011-12 has helped to reduce the risk of flooding within the city and the impact of storm water pollution on waterways.</li> <li>• Non-structural measure: The city also developed a Strategic Decision Support System (SDSS) that enables Council to make decisions about flood disaster mgt. SDSS comprises a suite of computer models, data, methodical processes and multi-criteria evaluation methods and is used for continuous improvement of management decision making in an uncertain environment (due to climate change, for instance).</li> <li>• Non-structural measure: In addition to structural measures, Gold Coast City also put in place disaster mgt planning which includes responding to floods. One is the establishment of a disaster response centre. The</li> </ul>	<ul style="list-style-type: none"> <li>• Direct impact: Once again, a more holistic approach is more effective in managing floods.</li> <li>• Economic consideration: High cost approach – while more manageable for a small DC city-state of Sg, this will become more challenging for larger, sprawling cities in LDCs</li> <li>• Govt efficiency: Using computer stimulations, the city has used technology to assist flood management in reducing the impacts from floods.</li> <li>• Receptiveness of people: Immediate information to the people allows them to be better prepared. The higher level of awareness amongst Gold Coast residents also reduces impacts of flooding if it happens – enhances the liveability of the city as</li> </ul>

	<p>centre operates 24 hours a day, seven days a week, monitoring the city's risk of disaster even if there is no obvious threat so that, if necessary, a response can be activated immediately. In addition to its other roles, during disasters, the centre coordinates the warnings and information issued to the community. It also maintains situational awareness to ensure all response and recovery agencies make operational decisions based on the same, shared, up-to-date information.</p>	<p>people feel safe and have a heightened sense of belonging (Social liveability)</p>
<p><b>Bangkok (Thailand) (LDC city)</b></p>	<ul style="list-style-type: none"> <li>• Structural measures: Large-scale engineering measures targeted to manage pathways <ul style="list-style-type: none"> <li>○ Such as floodgates and embankments around the city, pumped drainage systems</li> <li>○ More recent post 2011 flood mgt planning aimed to raise flood walls by 2012</li> </ul> </li> <li>• Non-structural: Public education and land-use planning</li> <li>• Non-structural : As well as pre-emptive measures such as the flood control centre which monitors and controls hydro data, facilitates operation conditions, flood damage, etc. information is sent to people using social media as well as broadcast thru public radio</li> </ul>	<ul style="list-style-type: none"> <li>• Direct impact: Despite these measures, flooding still occurs (e.g. 2011 flood), however, the impact of the flood on the city centre was reduced (e.g. fewer structural and property damage). Overall, considered a failed approach</li> <li>• Indirect: In protecting the city centre, however outlying peri-urban and agri lands outside the embankments were flooded (vs the city-state- wide approach taken by SG). This in turn affecting the livelihoods and quality of life of those living in these areas who are also economically disadvantaged in the first place (shows perspective taking) (Conflicting interests)</li> <li>• Cost: Some of these strategies are expensive for a LDC city like BKK which sees a myriad of problems. E.g. short term plans in improving efficiency of drainage systems will cost the city 684 million Baht</li> <li>• Direct: Pre-emptive measures by the flood control centre proved to be useful in minimising loss of live and property damage; especially to smaller shop owners</li> </ul>

Other examples they can use to show singular strategies:

(i) Chennai, India – Chennai flood in Nov 2015 → Conflicting interest that led to poor flood management – Strategy: Dam.

- The extent of flooding was aggravated by the need to maintain water in the reservoirs for the drier periods. (Syn link: Theme 1.1: Climate)

- The higher than usual input of precipitation in Nov-Dec 2015 used up the storage capacity of

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the reservoirs, and the sluice gates had to be opened to relief the pressure. Authorities had to release a massive 30,000 cusecs from the Chembarambakkam reservoir into the Adyar River over two days, causing it to flood its banks and submerge neighbourhoods on both sides. It did not help that the Adyar's stream is not very deep or wide, and its banks have been heavily encroached upon over the years.

(ii) Brisbane, Australia - Brisbane 2010-11 flood & Wivenhoe Dam → Natural factors and flood mgt – Strategy: Dam.

- Until 2011, the most devastating flood in Brisbane had occurred in January 1974. The Wivenhoe dam was built in the early 1980s in response to the devastation caused by the 1974 flood.
- However, in 2011, the rainfall was more prolonged and of greater intensity. It is estimated that in the 7 days leading up to the 2011 flood, the Brisbane catchment received 40% more rainfall than during the equivalent period in 1974. (Syn link: Theme 1.1: Climate)
- All this rain meant that management of water releases from Wivenhoe dam became a critical issue. Some flood engineers believe that earlier water releases from the dam were too small, so later releases were much greater than should have been required. A massive release on 11 January was in large part responsible for flooding in Brisbane.

**ANGLO-CHINESE JUNIOR COLLEGE****JC2 H2 Geography Preliminary Examinations (2019)**

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**H2 GEOGRAPHY****9751/02****Paper 2 Data Response Questions****17 September 2019**

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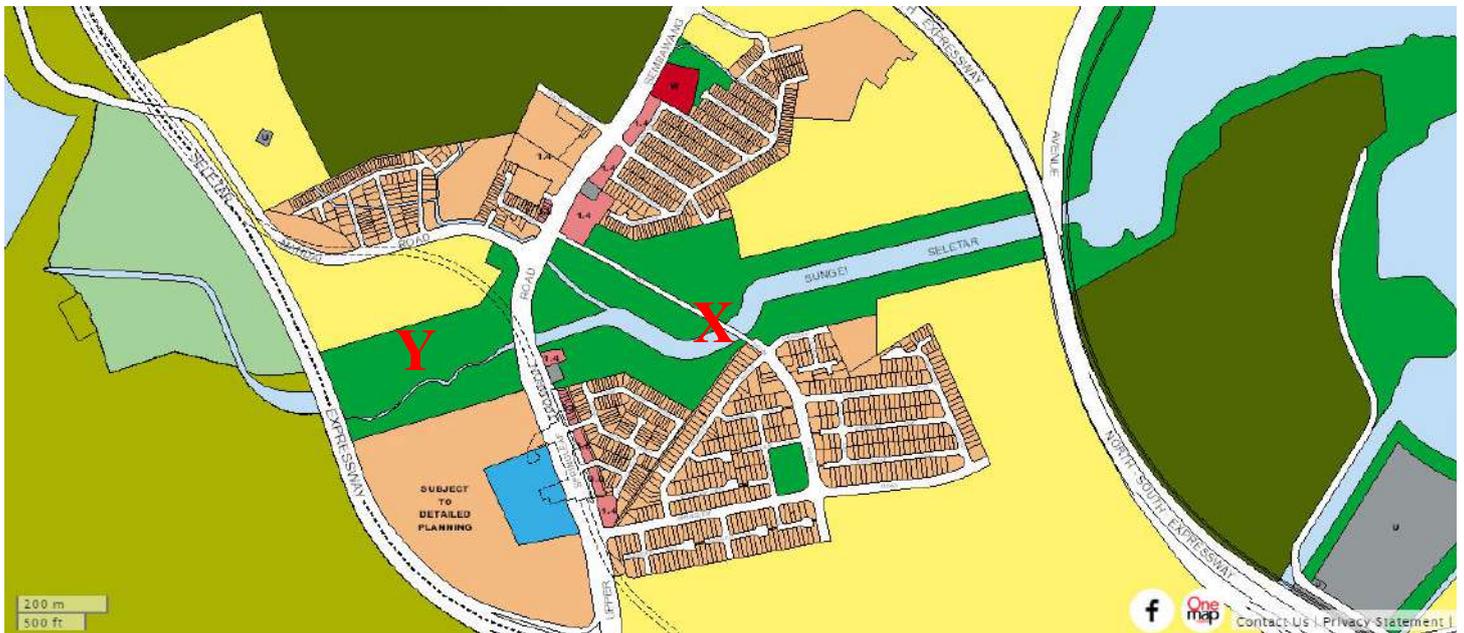
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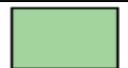
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## Resource 1 for Question 1

## Land use map of area around Sungei Seletar



## Map legend

 Residential	 Secondary forest (Military exercise grounds)	 Park / secondary forest	 Water body (stream, canal, pond, lake, etc)
 Reserve site (undeveloped land)	 Commercial & residential	 Open space	 Utility
 Residential with commercial at 1 <sup>st</sup> storey	 Place of worship	 Golf course	

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**Resource 2 for Question 1**

**Site X: Low-rise housing next to Sungei Seletar**



**Site Y: Upstream portion of Sungei Seletar with secondary forest on valley slope**



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### Resource 3 for Question 1

#### River depth data collected

Site X								
Distance from left bank (metres)	0	2.0	4.0	6.0	8.0	10.0	10.4	
River depth from left bank (metres)	0	0.3	1.63	3.4	4.1	0.6	0	

Site Y								
Distance from left bank (metres)	0	0.5	1.0	1.5	2.0	2.5	3.0	3.6
River depth from left bank (metres)	0	0.15	0.26	0.32	0.35	0.2	0.1	0

#### River velocity data

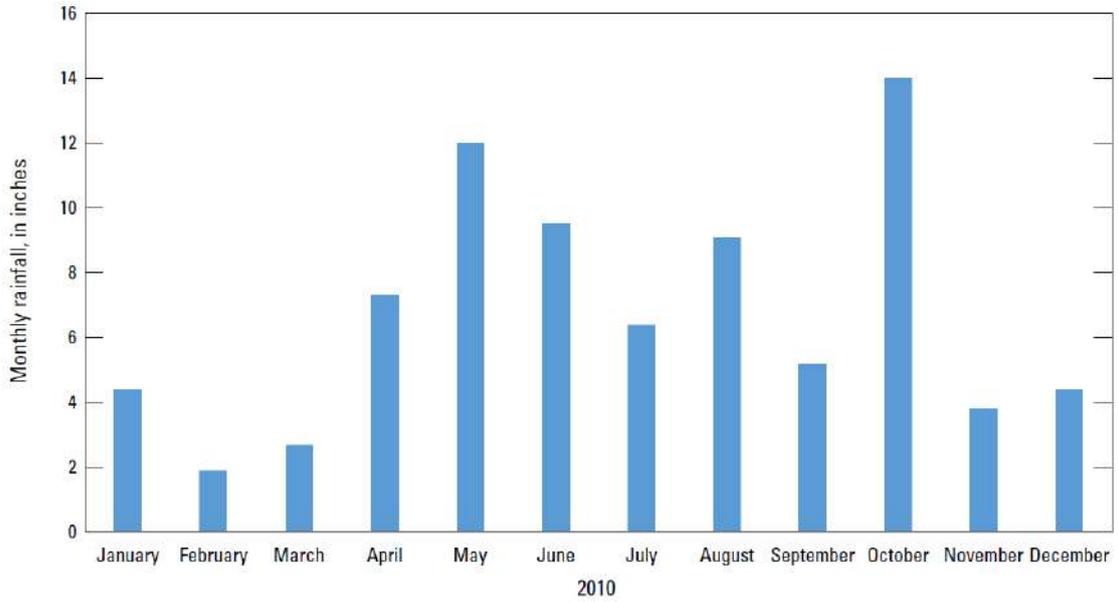
	Site X				Site Y			
	Velocity (metres/ sec)				Velocity (metres/ sec)			
Time	1	2	3	Average	1	2	3	Average
11.00	0.83	0.71	0.65		0.31	0.25	0.14	
14.00	0.86	1.22	0.98		0.42	0.23	0.56	

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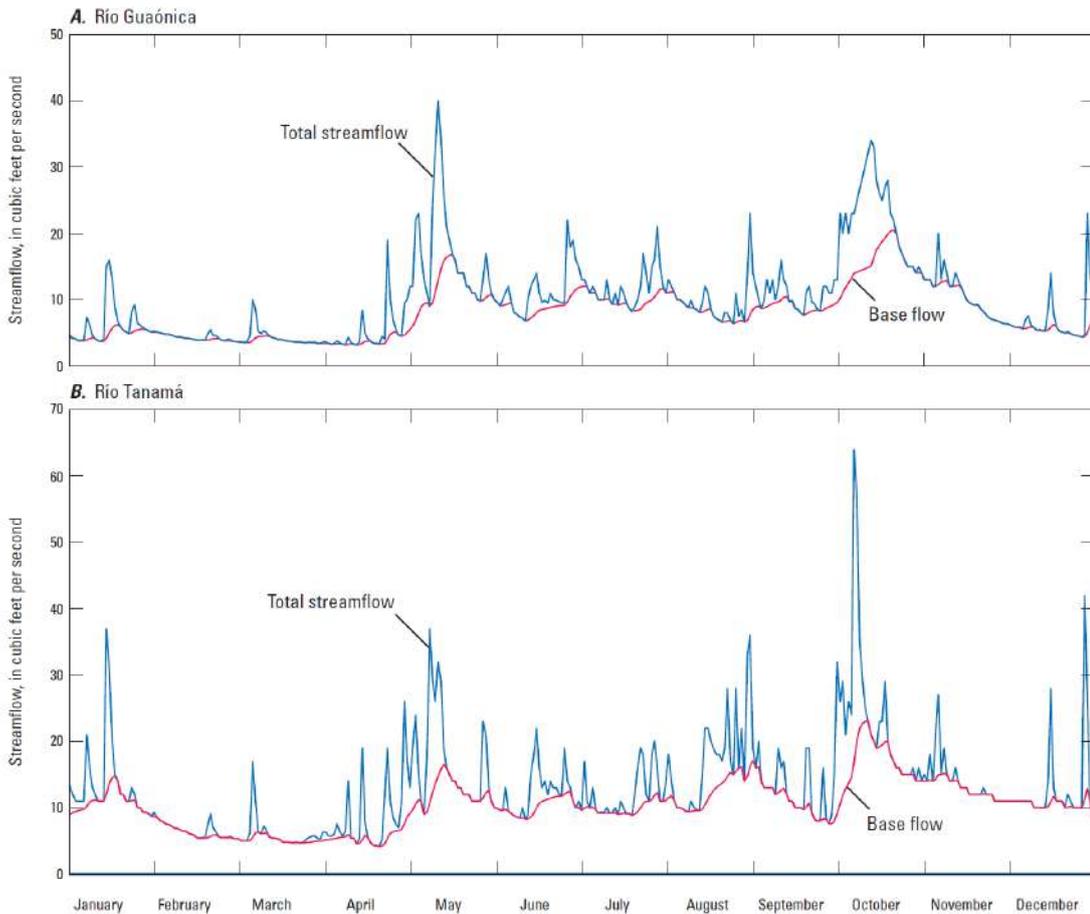
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Resource 4 for Question 2

Rainfall of a station near the two rivers,  
Rio Guaonica & Rio Tanama, Puerto Rico in 2010



Annual hydrograph of two rivers of Puerto Rico, 2010

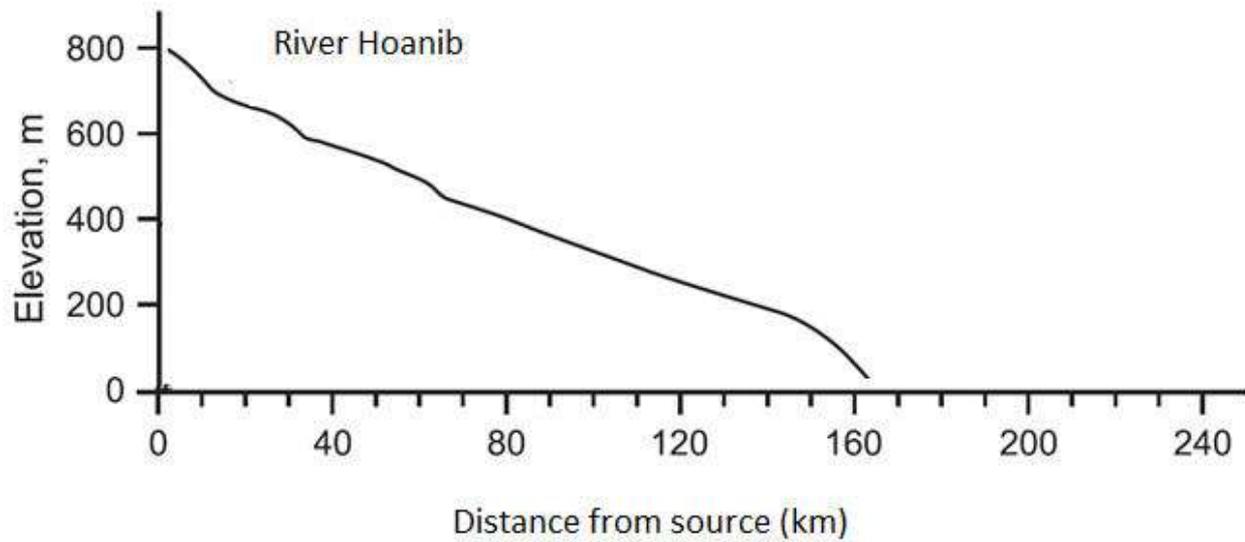


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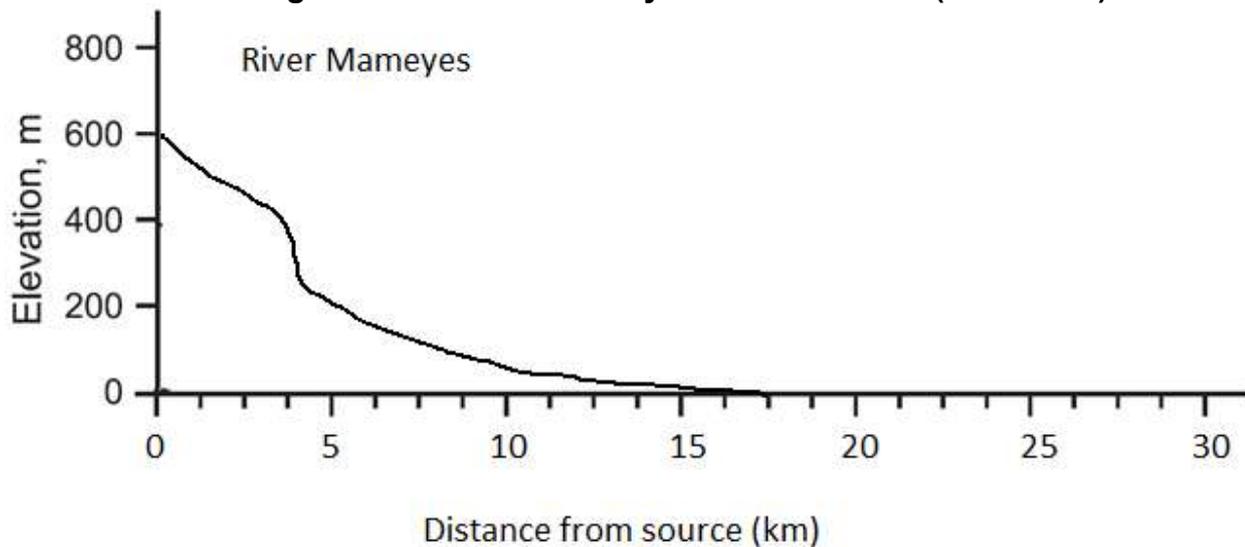
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## Resource 5 for Question 2

## Long Profile of River Hoanib in the Namib Desert (BWh climate)



## Long Profile of River Mameyes in Puerto Rico (Af climate)



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**Resource 6 for Question 2**

**Feature on river bed of a river in Puerto Rico  
(indicated by arrows)**

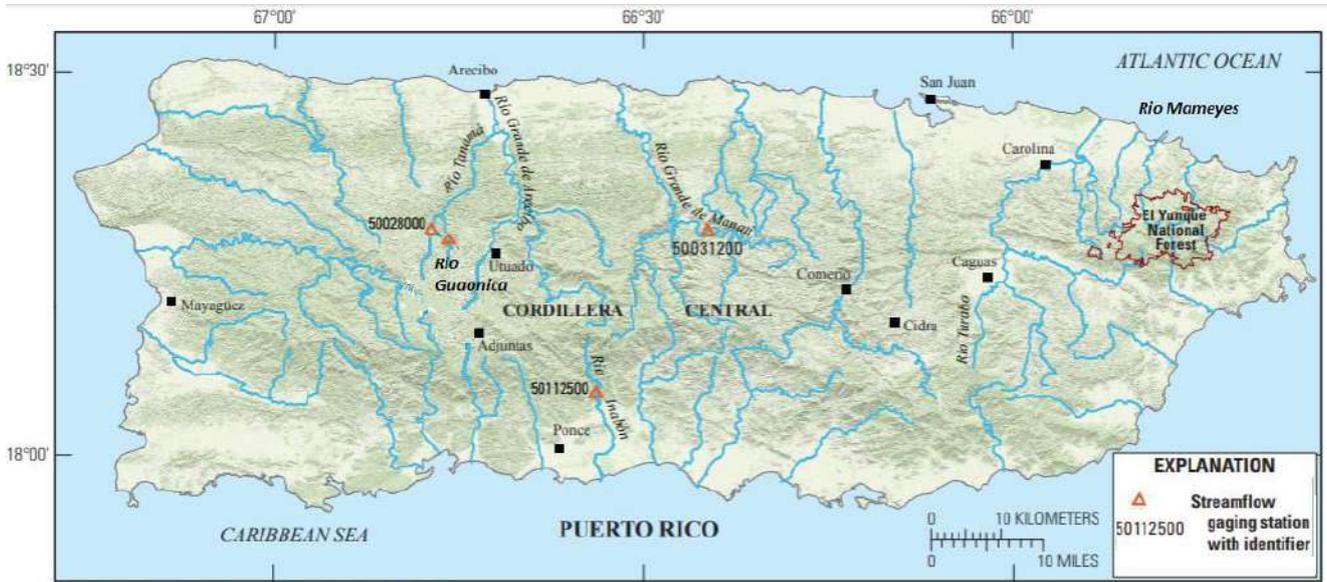


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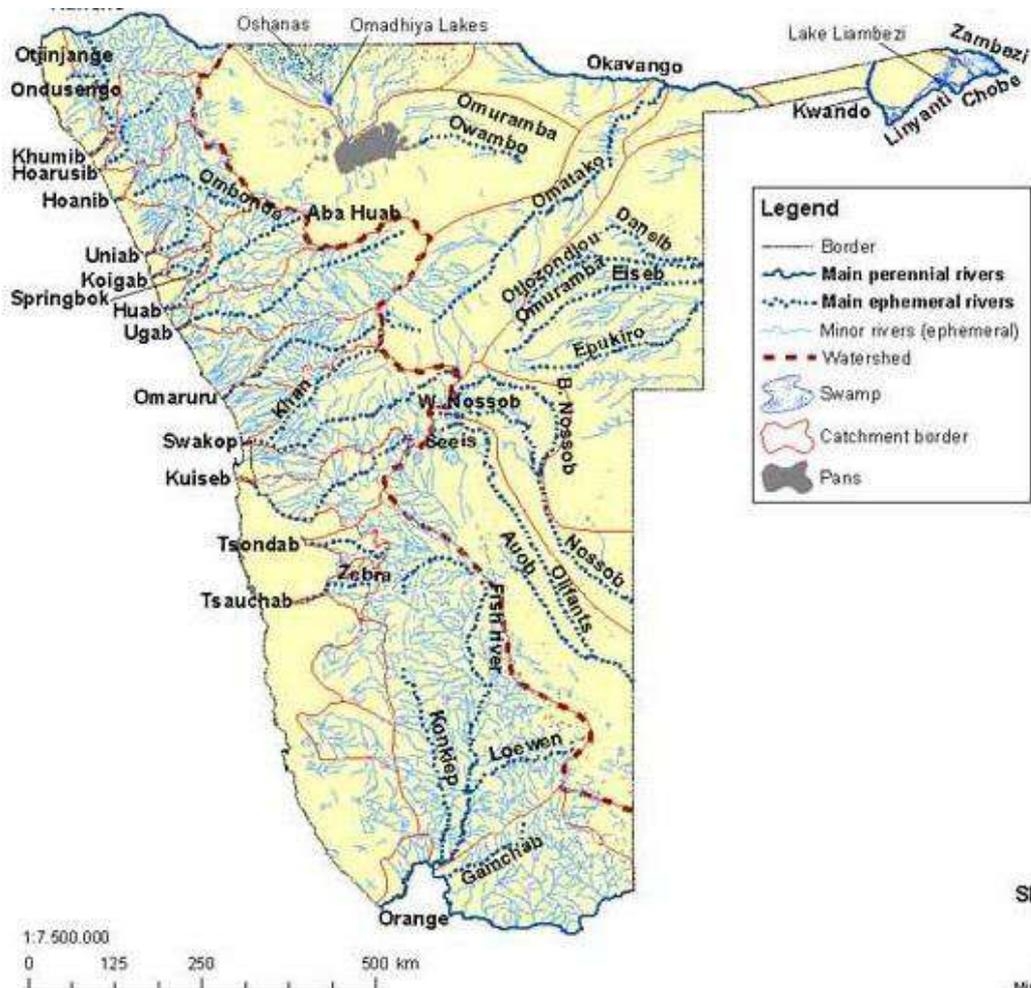
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Resource 7 for Question 2

Rivers of Puerto Rico



Rivers of Namibia



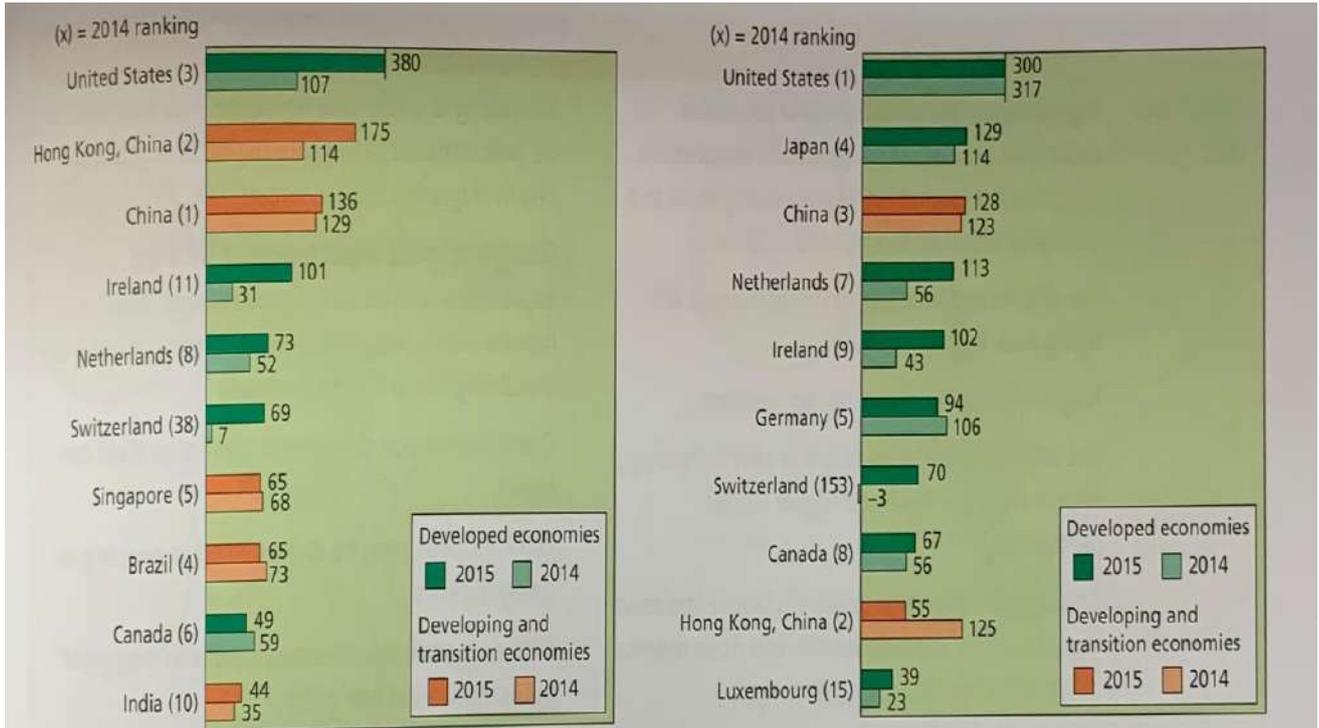
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Resource 8 for Question 3

Global distribution of FDI, 2014 and 2015

**A: Inward FDI (\$ billions),  
top 10 host economies**

**B: Outward FDI (\$ billions),  
top 10 home economies**

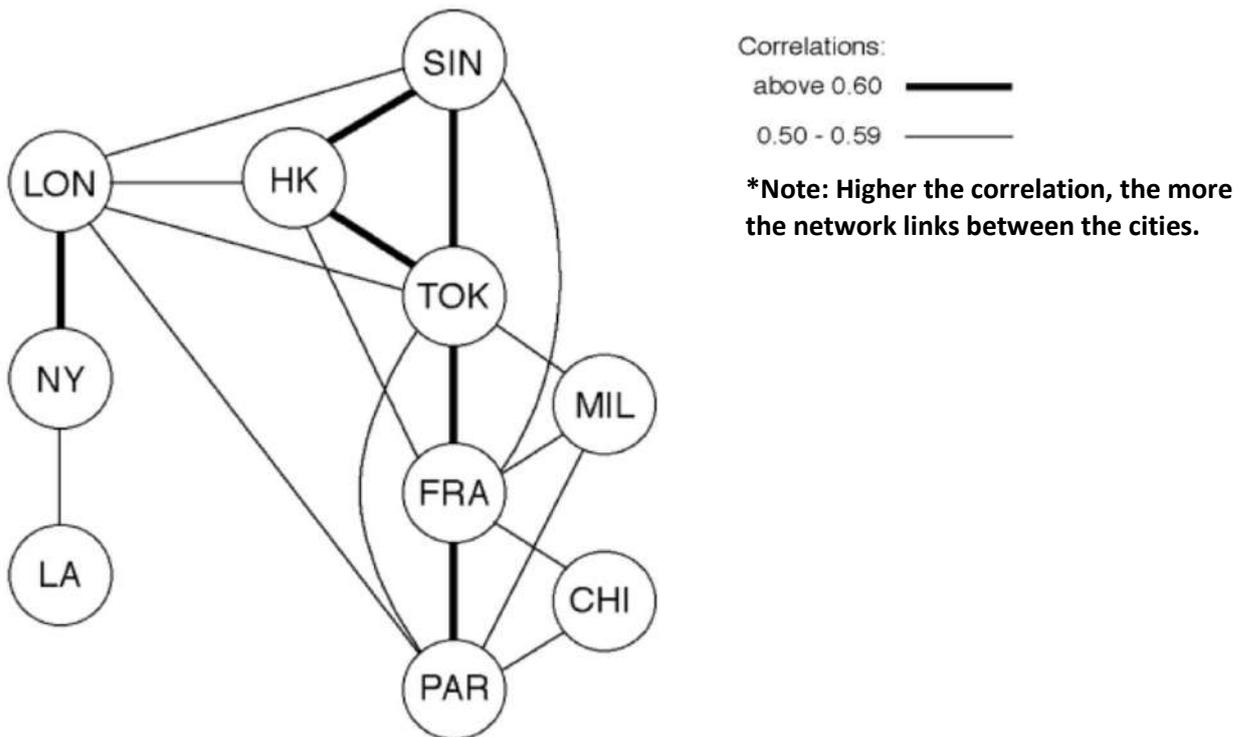


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Resource 9 for Question 3

Global production network (GPN) links between alpha global cities for selected service sectors, 2010



Americas	Europe	Asia
CHI – Chicago	MIL – Milan	SIN – Singapore
NY – New York	FRA - Frankfurt	TOK – Tokyo
LA – Los Angeles	PAR – Paris	HK – Hong Kong
	LON – London	

[Turn over

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## Resource 10 for Question 3

## Potential benefits in UK due to re-shoring

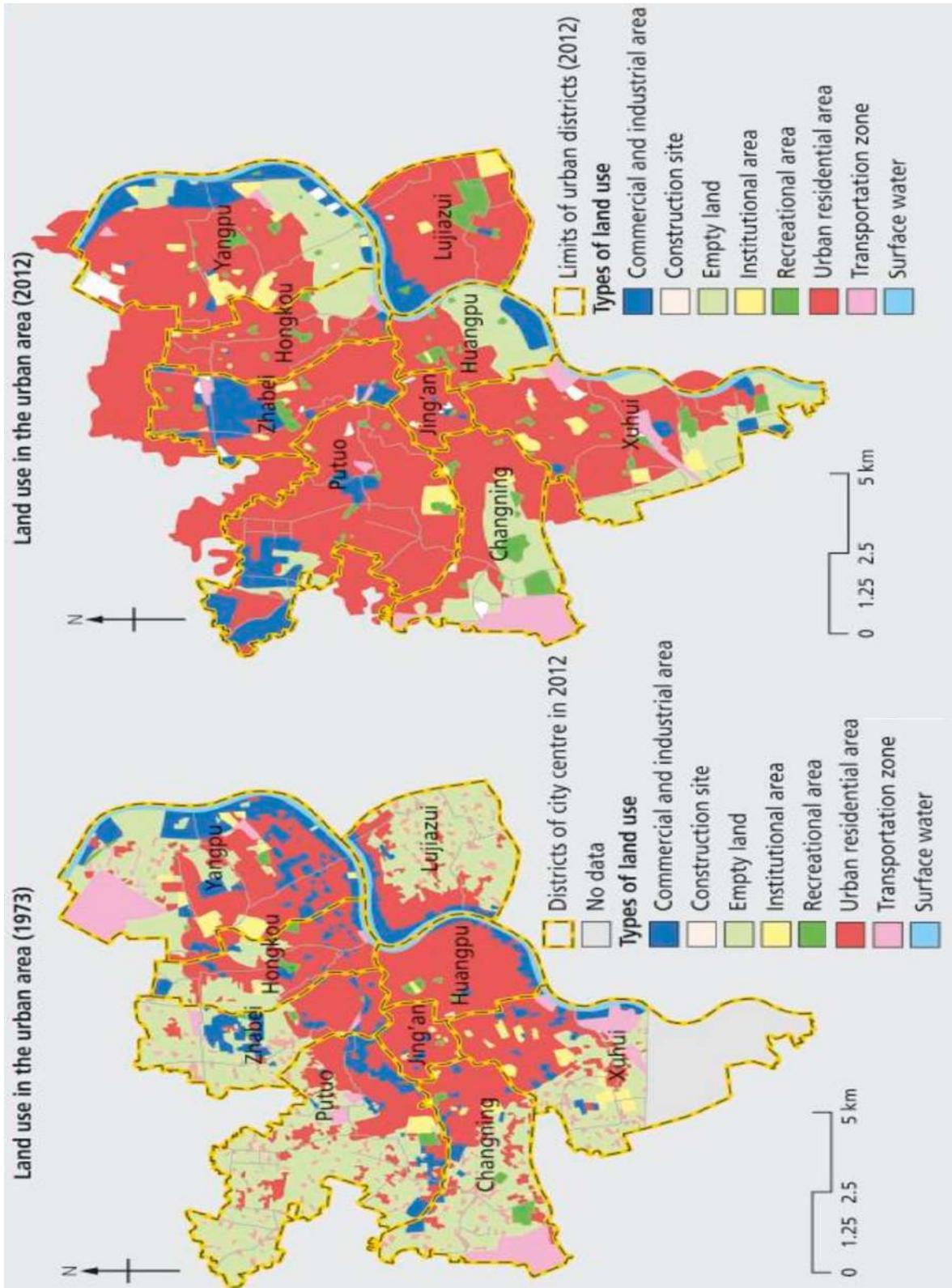
<u>Manufacturing Sector</u>	<u>Total GDP (£ million)</u>	<u>Total employment</u>	<u>Reasons for re-shoring</u>
Electronic and optical products	1 350	18 100	Supply and demand of skilled labour
Motor vehicles	1 130	26 300	Supply and demand of skilled labour
Other manufactured goods (incl musical, medical/ dental goods)	1 100	25 200	Managing complex supply chains
Clothing	1 100	28 000	Reduce transport costs
Paper and paper products	870	18 700	Managing complex supply chains

[Turn over

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Resource 11 for Question 4

Land use in Shanghai, in 1973 and 2012

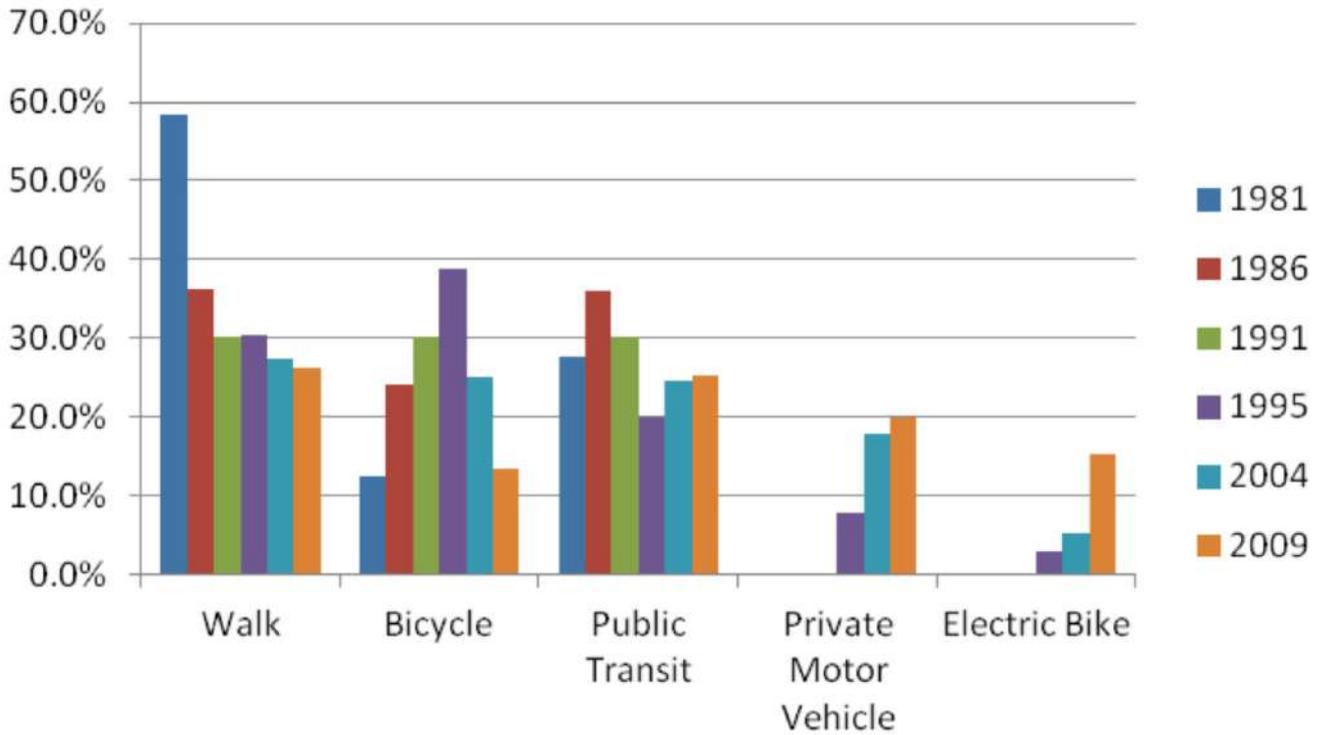


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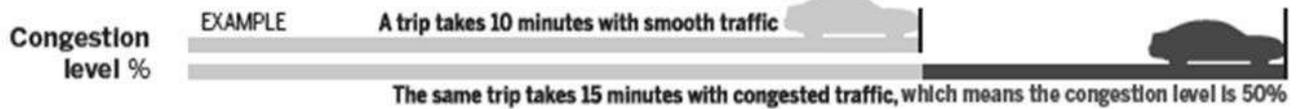
## Resource 12 for Question 4

## Changes in modes of transport in Shanghai, from 1981 to 2009



Resource 13 for Question 4

Average and Peak hour congestion levels (in %) for Chinese cities in 2010



	Average	Peak hours	
		Morning	Evening
Chongqing	38	82	84
Tianjin	38	56	64
Beijing	37	63	74
Guangzhou	37	40	73
Chengdu	36	64	67
Shanghai	35	66	67
Shijiazhuang	35	60	72
Fuzhou	34	59	74
Shenyang	34	56	65
Hangzhou	34	59	63
Shenzhen	34	54	81
Zhuhai	33	52	79
Changchun	33	56	63
Changsha	33	54	64
Nanjing	32	59	62
Quanzhou	30	39	61
Ningbo	30	59	69
Wuhan	29	51	58
Xiamen	26	43	64
Suzhou	25	50	55
Dongguan	25	41	54
Wuxi	21	37	48

**World rank**  
Top 20

		Congestion level %
1	Istanbul	58
2	Lodz	56
3	Mexico City	55
4	Rio	51
5	Moscow	50
6	Salvador	46
7	Recife	45
8	S. Petersburg	44
9	Palermo	42
10	Bucharest	41
11	Warsaw	40
12	Los Angeles	39
13	Taipei	39
14	Belfast	39
15	Chongqing	38
16	Rome	38
17	Tianjin	38
18	Dublin	38
19	Beijing	37
20	London	37

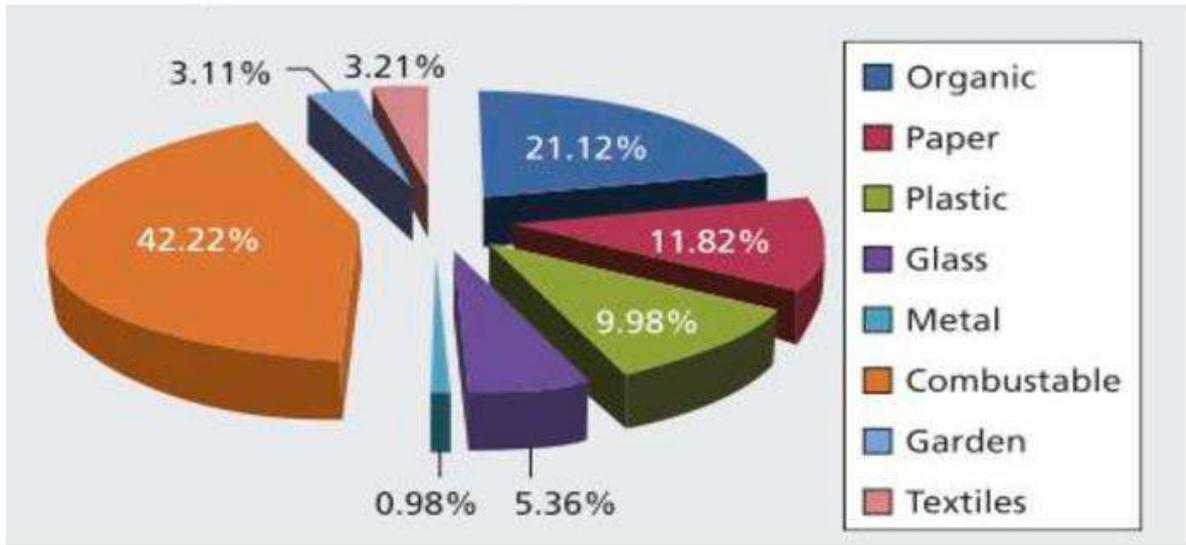
Source: TomTom Traffic Index  
XAN SABARÍS / CHINA DAILY

[Turn over

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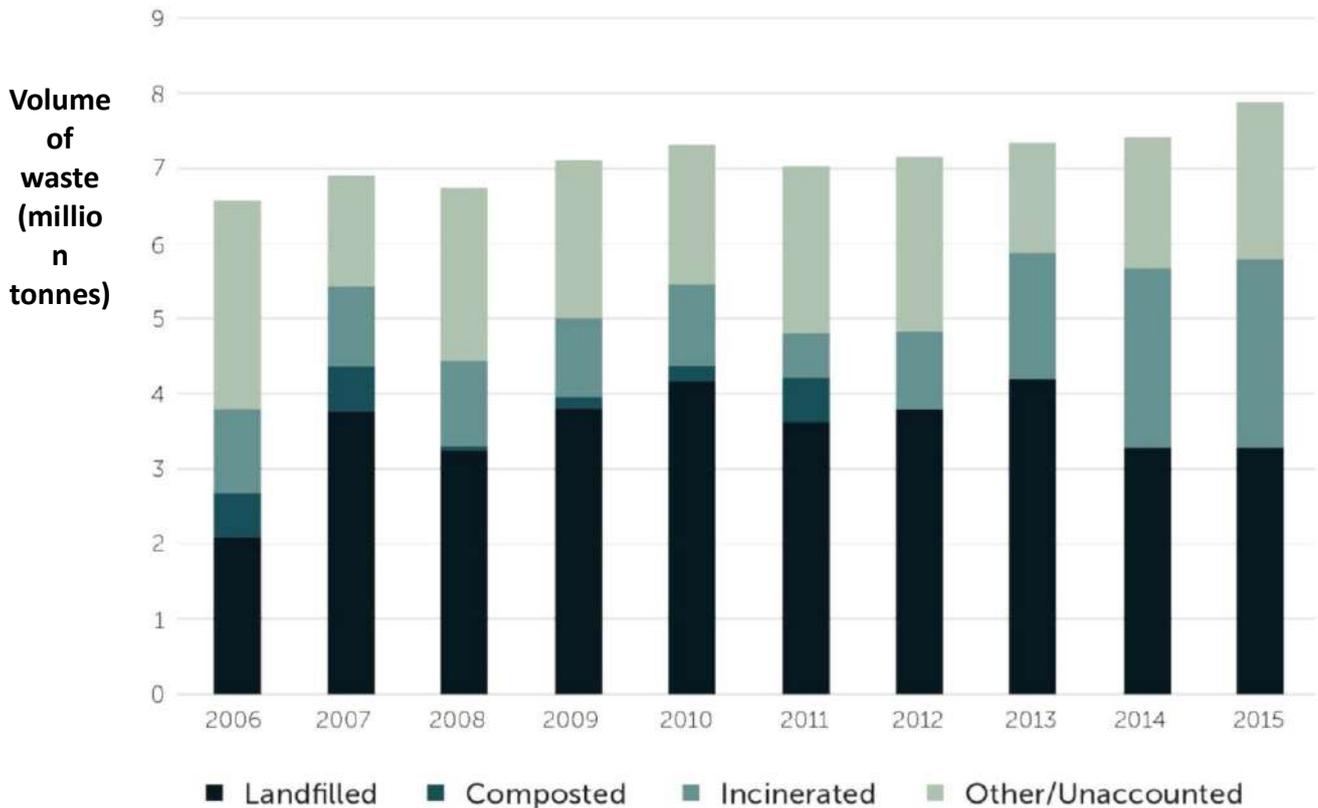
Resource 14 for Question 4

Types of wastes generated in Shanghai, 2012



Resource 15 for Question 4

Changing volume of waste for selected waste disposal methods in Shanghai, from 2006 to 2015



[End

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## ANGLO-CHINESE JUNIOR COLLEGE

### JC2 H2 Geography Preliminary Examinations (2019)

#### H2 GEOGRAPHY

9751/02

#### Paper 2 Data Response Questions

17 September 2019

3 hours

Additional Materials:            Writing Paper  
    1 Insert  
    World outline map

#### READ THESE INSTRUCTIONS FIRST

Write your name and class in the spaces provided below, and on all the work you hand in. Write in dark blue or black pen on both sides of the paper. You may use an HB pencil for any diagrams or graphs. Do not use staples, paper clips, glue or correction fluid.

Answer **all** questions.

The Insert contains all the Resources referred to in the questions. You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question. Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer. The world outline map may be annotated and handed in with relevant answers. You are reminded of the need for good English and clear presentation in your answers.

The number of marks is given in brackets [ ] at the end of each question or part question.

At the end of the examination, your answers to each Section should be securely fastened and separated into 3 bundles. The cover page must be attached as the top sheet to your answers to Section A.

This question paper consists of **6** printed pages and **1** Insert.

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## Section A

### Theme 4: Geographical Investigations

- 1 You as one of the members of a group of 30 students embarked on a field investigation on the research question of the level of flood risk of two riverine locations in the northern part of Singapore marked X and Y in Resource 1. The field investigation started at 10 am and ended around 3 pm.

Resource 2 shows two photographs. One photograph shows location **X** where the river is around 10 metres wide, and along the south side of this section of the river, is a dense area of low-rise landed residences. The second photograph shows location **Y** where the river is about 3 metres wide and is surrounded by secondary forest of a nature park.

Resource 3 shows the data on river cross-sections at Location X and Location Y, and also the velocity data at the respective cross sections.

The hypothesis the students proposed is:  
Location X has higher flood risk than location Y.

At each of the two sites, the students collected data on:

- River velocity
- River depth and width at some pre-determined intervals across the river
- Infiltration rate

The equipment that was used to collect primary river data included:

- Measuring tapes
- Orange
- Long string with plumb bob
- Metre ruler

River cross section data at location X was collected at the bridge crossing shown in the foreground of Resource 2. Velocity data for location X was collected downstream of the bridge, with the time taken for the floating object to cover the distance of 5 metres. At site Y, the data for cross section is obtained along the dashed line (A-B), velocity data is collection downstream of the dashed line for a distance of 5 metres.

To measure infiltration rate, the following equipment were used:

- Cut portion of PVC pipe with diameter of 15 cm and a length of 20 cm
- Metre ruler
- Block of wood
- Mallet (rubberised large hammer)

To collect the data for infiltration, the constant head method was used, and one point of data collection was obtained from each of the two sites X and Y.

- (a) Explain the suitability of the hypothesis. [3]
- (b) What are the possible risks and impacts that could arise from your investigation at the two sites? Explain how these risks and impacts can be mitigated. [6]
- (c) Explain how the wetted perimeter could be derived for each of the two locations shown in Resources 1-3. [3]
- (d) Your group noticed some irregularities in the data of river velocity and infiltration rate. Suggest how the process of data collection may be improved in order to obtain more reliable/accurate data. [6]
- (e) Evaluate the usefulness of the data collected on river velocity, wetted perimeter, river cross section, and infiltration rate in the assessment of flood risk at each of the locations marked X and Y in Resource 1. [7]

## Section B

### Theme 1: Tropical Environments

#### Rivers in Puerto Rico (Af climate) and Namibia (BWh climate)

- 2 Resource 4 shows the 2010 rainfall and annual hydrographs and baseflows of two rivers adjacent to each other in Puerto Rico, the Rio Tanama, and the Rio Guaonica. Resource 5 shows the long profile of two rivers, Rio Mameyes in Puerto Rico, and River Hoanib in the Namibia desert. Resource 6 shows the river bed of a river in Puerto Rico during low flow. Resource 7 shows the drainage density of Puerto Rico and Namibia.
- (a) Compare and account for the 2010 annual hydrographs (indicated in Resource 4 as *Total Streamflow*) of Rio Tanama and Rio Guaonica. [8]
- (b) Provide explanations for the nature of the long profiles of Rio Mameyes and River Haonib shown in Resource 5. [8]
- (c) Explain the formation of the fluvial feature shown in Resource 6. [4]
- (d) With reference to Resource 7, describe how and explain why the drainage density of rivers in Puerto Rico and those in Namibia are different. [5]

**Theme 2: Development, Economy and Environment****United Kingdom (UK) and the global economy**

- 3** Resource 8 shows the global distribution of inward and outward foreign direct investment (FDI) in 2014 and 2015. Resource 9 shows the global production network (GPN) links between alpha global cities based on results of an investigation by the Globalization and World Cities Research Network (GaWC) in 2010. The investigation looked at the network links in four key service sectors; accountancy, advertising, banking/finance and law. Resource 10 shows possible benefits in UK due to re-shoring.
- (a)** Compare the distribution of FDI as seen in Resource 8. [6]
- (b)** Suggest reasons for the distribution of FDI. [6]
- (c)** Describe the links between London and the other alpha global cities as shown in Resource 9. [4]
- (d)** Re-shoring is the process of returning the manufacturing of goods back to the company's original country.
- Using Resources 9 and 10 and your own knowledge, recommend whether the British government should consider re-shoring as a development strategy. [9]

### Theme 3: Sustainable Development

#### Urban development in Shanghai, China

- 4 Resource 11 shows the urban land use in Shanghai, in 1973 and 2012. Resource 12 shows the changes in modes of transport from 1981 to 2009. Resource 13 shows the average and peak hour congestion levels in some Chinese cities and selected cities around the world in 2010. Resource 14 shows the types of wastes generated in the city in 2012 while Resource 15 shows the changing volume of waste for selected waste disposal methods from 2006 to 2015.
- (a) Describe the land use changes in Shanghai as shown in Resource 11. [4]
- (b) Using Resources 11 and 12, suggest reasons for the changes in modes transport as shown in Resource in 12. [6]
- (c) Using evidence from Resource 13, describe the congestion levels in Shanghai. [5]
- (d) With reference to Resource 14, describe the type of waste generated in 2012. [4]
- (e) Using evidence from Resources 14 and 15 to justify your answer, suggest **two** ways to better improve waste management in Shanghai. [6]

[End

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**ANGLO-CHINESE JUNIOR COLLEGE**

**JC2 H2 Geography Preliminary Examinations (2019)**

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**H2 GEOGRAPHY**

**9751/02**

**Paper 2 Data Response Questions**

**17 Sept 2019**

## **MARK SCHEME**

## 2019 H2 Geog Prelims, Paper 2 (DRQs)

## Theme 4: Geographical Investigation

Question	Answer	Marks
1(a)	<p><b>Explain the suitability of the hypothesis.</b></p> <p>Award 1 mark for each point up to a maximum of 3 marks for argument supported by reference to given resource.</p> <p>Hypothesis is suitable because:</p> <ul style="list-style-type: none"> <li>• <b>Scale:</b> Appropriate size of the area for investigation: suitable since the two sites of X and Y are approximately 800 metres apart, and it is possible to split the group of students into two groups to examine only one of the two sites.</li> <li>• <b>Time:</b> Given the fact that there is 5 hours of working time, it is possible to collect the different set of data for the variables of infiltration rates, river velocity, width, depth and wetted perimeter.</li> <li>• With the river nearby, it is possible to obtain a <b>source for water</b> for the infiltration rate test.</li> <li>• Being a school-based investigation, the <b>equipment</b> are not sophisticated to use nor expensive to procure.</li> </ul> <p>It may <u>not</u> be suitable because:</p> <ul style="list-style-type: none"> <li>• <b>Scale:</b> In order to obtain variables beyond sites X and Y, may need to go other parts of the drainage basin of Sungei Seletar. For example, may want to gather infiltration rates not only at Sites X and Y, but the surrounding land that contribute overland flow to Sungei Seletar, or to measure the height of land in the surrounding area.</li> <li>• <b>Accessibility:</b> At site Y, since it is sited within a nature reserve, the thick undergrowth of a secondary forest may make trekking to the site very difficult.</li> <li>• For infiltration rates site that are further away from the river, it would be cumbersome to <b>transport heavy water</b> to such sites.</li> </ul> <p><i>Point marked</i></p>	[3]
1(b)	<p><b>What are the possible risks and impacts that could arise from your investigation at the two sites? Explain how these risks and impacts can be mitigated.</b></p> <p>Award 1 mark for any 6 of the following risks and impacts, and explanations as to how these can be mitigated.</p> <p><b>Reduce impact</b></p> <ul style="list-style-type: none"> <li>• Do not leave litter in both sites X and Y. Bring along a garbage bag, and have a person in each work group to be responsible for bagging the litter and taking it away with them.</li> <li>• Avoid unnecessary damage to trees and plants especially around and at site Y since it is a nature reserve; when making access to location Y, avoid breaking and/or cutting down overhanging branches for example.</li> <li>• Avoid unnecessary disturbance to inhabitants around both sites X and Y; at site X as</li> </ul>	[6]

it is near the residential areas, students should avoid loud noise; similarly at site Y, avoid disturbance to wildlife, nesting sites, river banks, and river channel itself.

#### **Reduce risk**

- Check the weather for the day before setting off to avoid being in the field during a thunderstorm; Singapore being a location known for having one of the highest lightning strikes in the tropics.
- Not to venture into the river for data collection when water is more than knee deep, for example for site X.
- Safety briefing regarding potential risk for falling into the river from the bridge - need to remind them not to over reach and over-lean over the railings, and those carrying out the readings from the bridge to be wearing a life-vest.
- Insect repellent to be used since students will be working in an area with secondary forest.
- Safety and risk to injury can be minimized by not engaging in horseplay, and being alert to threats from steep slopes, wildlife threat, avoiding trudging in thick grass and undergrowth. A first aid kit should be at hand, and students each should have a mobile phone in case of emergency, and know the relevant emergency numbers to call.
- Using the float method for river velocity at site X, no attempt should be made to retrieve the float (the orange) as the river is too deep for anyone to safely go into the water. There is to be a new float for each of the flow runs. Alternatively, a current meter could be used by extending it downwards with the bridge shown in Resource 2.
- Since the river depth and velocity measurement are taken from the bridge where vehicles would be going through, a watch out for traffic could be taken. A student member to be a traffic warden who could be stationed at each end of the bridge to give verbal warning to the data collector when vehicles are approaching. There is a road that separates the two sites, and students should use the pedestrian crossing or the pedestrian overhead bridge (if any) to traverse between the two sites.

*Point marked*

#### **Examiner's comments:**

- Not feasible to insist that only swimmers be allowed to conduct the river variables investigation.
- Soil particles are unlikely to be blown into the eyes of the researchers. This risk would not be occurring as there is very low wind speed within the forest, not like at the coast.
- Putting on a safety helmet to protect against falling branches in the forest is too extreme. Instead, taking caution to trek carefully through it may be more feasible.
- Similarly it is too extreme to need to seek the advice from and be accompanied by wildlife professionals in order to manage the risk of the wildlife in the secondary forest. A more feasible approach is to read up on how to manage when there is a wildlife encounter, e.g. That of bees or wild boars.

1(c)	<p><b>Explain how the wetted perimeter could be derived for each of the two locations shown in Resources 1-3.</b></p>	<b>[3]</b>
	<p>Award 1 mark each for the points made in relation to how the data can be collected and finally how the data can be used to derive the wetted perimeter.</p> <ul style="list-style-type: none"> <li>• In the case of site Y, as the river is narrow and shallow, it is possible for the students to stretch a measuring tape across the river at the location A-B as shown in Resource 2. Allow the tape to drag on the river bed, and hold it down with weights in the form of woody debris or small rock fragments.</li> <li>• As shown in Resource 3, at every 0.5 m (or 50cm), the metre ruler is used to measure the depth of the river. In the case of site X, as the river is much deeper, the plumb bob is lowered to touch the river bed, and the length of string is taken out and measured against the measuring depth in order to obtain the depth of the river at 2 metres interval across the width of the river as indicated by the data of width and depth indicated in Resource 3.</li> <li>• The data of width and depth can be used to plot the respective cross sections on a graph paper to scale. The wetted perimeter can be measured from the drawn cross section, i.e., to measure the portion of the river bed in contact with water.</li> </ul> <p><i>Point marked</i></p> <p><b><u>Examiner's comments:</u></b></p> <ul style="list-style-type: none"> <li>• The use of a heavy chain is not the expected answer since this piece of equipment is not in the given equipment list of the question.</li> <li>• Some candidates have no clue as to the concept of the wetted perimeter.</li> </ul>	
1(d)	<p><b>Your group noticed some irregularities in the data of river velocity and infiltration rate. Suggest how the process of data collection may be improved in order to obtain more reliable/ accurate data.</b></p>	<b>[6]</b>
	<p><u>Indicative content</u></p> <p>To improve the velocity data</p> <ul style="list-style-type: none"> <li>• Using the float method, there is a likelihood of the float being caught in woody debris, river sediment load, especially for site Y where the river is very shallow. The river section at site Y also flows around a meander bend, and the float may even be moving towards the concave bank, and may be caught in the shallow parts of the bank.</li> <li>• There are two possible ways to overcome this: <ul style="list-style-type: none"> <li>○ Increase the number of times of the float taking the run down the stretch of the river section; instead of only one run, there should be at least 3 – 5 times of the float going through the selected stretch of the river. This increases the chance for accuracy by reducing the weightage from fluke data.</li> <li>○ For the wider river at site X <ul style="list-style-type: none"> <li>▪ Use more floats: three different floats, one at the right bank, one at the left bank and one in the middle of the stream. Since velocity will differ greatly for a wide river; <b>or</b></li> <li>▪ Use a current meter, and at a fixed interval, for example where depth reading is taken, to dip the current meter into the river from the safety of the vehicular bridge.</li> <li>▪ Either of the methods suggested above will improve the reliability of the river velocity data from site X.</li> </ul> </li> </ul> </li> </ul> <p>There are two main strategies that can be adopted to improve the accuracy of the infiltration rate data:</p>	

- Use of not only the inner ring of an infiltrometer, but also an outer ring. This way there will not be higher than it should infiltration rate from the inner ring since the water infiltrating is prevented from seeping laterally with the presence of the water from the outer ring of the infiltrometer. This will improve the accuracy of the data collected.
- Infiltration data should also be taken not only from one site at X and one at Y, but should also be taken from several sites beyond these two sites, but within the drainage basin of Sungei Seletar. This will improve the reliability of the data, and avoid the bias that may arise by using only one or two sites for data collection.

*Levels marked*

Level	Marks	Descriptors
3	5-6	Response demonstrates accurate knowledge of river velocity data and infiltration data collection methods, issues with accuracy and/or reliability of these and relevant improvements. Reflects a good understanding of the context of the investigation and of data collection technique.
2	3-4	Response demonstrates good knowledge of river velocity and infiltration data collection methods. Provides an explanation of issues relating to reliability and/or accuracy with some reference to possible improvements. Description may be limited in depth and detail or apply mostly to one set of measurement (eg. either velocity or infiltration rate). Some of the response may focus on generic river fieldwork issues and improvements and not relevant to the context of the investigation.
1	1-2	Response shows some knowledge of relevant data collection methods. Some reference is made to the issues with accuracy and reliability but may recommend inappropriate or irrelevant improvements or incorrect explanation of the methods. Response may be of limited relevance to the given context.
0	0	No creditworthy response.

**Examiner's comments:**

- Parallax error is unlikely since the constant head method is used for infiltration investigation.
- Need to contextualize the mitigation or improvement suggested; for example, when discussing the need for more readings to be taken, it is more applicable for Site X than at Site Y, as the former is much wider and deeper.
- Those suggesting that data collection should be taken over more number of days – this will create the problem of having very different weather conditions over the different days, and data across the different days, particularly that of infiltration would not be comparable.

**1(e) Evaluate the usefulness of the data collected on river velocity, wetted perimeter, river cross section, and infiltration rate in the assessment of flood risk at each of the locations marked X and Y in Resource 1.**

**[7]**

**Indicative content:**

Usefulness points could include the fact that

- **Wetted perimeter** is an indicator of the extent of frictional drag which reduces channel efficiency in transporting the discharge and river load. The greater the frictional drag, the slower the water will be transported out of the site, and hence the higher the flood risk for that site
- Using the **cross sectional area** and dividing it by the **wetted perimeter** produces a

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new data, ie, **hydraulic radius (HR)**. This HR is a good indicator of channel efficiency, and the higher the HR, the more efficient the channel is in transporting its discharge.

- Having the cross sectional area and the river flow velocity, data, it is possible to derive river discharge of the two sites. **River discharge** data will show the relative response of the two sites in relation to rainfall events.
- **Infiltration** data provides an indication of the **geology/permeability** of the area immediately around the two sites X and Y, and acts as an indicator of the proportion of rainfall that will travel as overland flow versus baseflow in contributing to river discharge. A high infiltration rate would indicate a slow response of river discharge since a greater portion of rainfall will take the slow route underground via baseflow to add water to the channel. When the bulk of the rainfall comes from overland flow, it leads to a shorter lag time to peak discharge, and hence a higher flood risk.

Besides the data that was collected, candidates should refer to other information that would be useful in ascertaining flood risk. These could include the following:

- Nature of catchment area (land use, relief, vegetation cover, drainage density)
- Nature of channel (channel bed gradient, channel pattern – whether it be meandering or braiding; degree of sinuosity; nature of the river banks and bed – whether it be concretised or the banks and bed are composed of alluvium or bedrock)
- Nature of rainfall event (duration, intervals between rainfall events, intensity and amount of rainfall)
- Historical data of flooding at the two sites.
- Examine nature of measures employed (be it hard or soft engineering) that may in existence in the basin.

A higher level response will prevent evaluation of usefulness of resource and of knowledge of river variables measurements as well as a detail discussion of how the other information that is useful in being able to assess flood risk. For example, candidate can make reference to Resource 1 which provides the land use of the Sungei Seletar drainage basin for sites X and Y, and that the land use of the basin for site Y being more natural compared to the more built-up nature of the basin surrounding site X would result in higher flood risk. Using Resource 2, candidate could indicate that at site X, the river is channelized – wider, deeper and concretised, while at site Y, river is narrow, shallow, and more sinuous and thus based on just this alone, may have higher flood risk. Candidate should explain how, for the data that are not available in the resource given in the question, for example, rainfall data, past flood events, topography (elevation), can be relevant in the assessment of flood risk for the two sites.

Levels marked

Level	Marks	Descriptors
3	6-7	<ul style="list-style-type: none"> <li>○ Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the assessment of flood risk in the context of the two sites.</li> <li>○ Provides a logical and well-developed evaluation, which may include</li> </ul>

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		<p>perceptive insights for the strongest responses.</p> <ul style="list-style-type: none"> <li>○ Reflects strong critical thinking skills and a good understanding of the requirements of the question.</li> </ul>	
<b>2</b>	3-5	<ul style="list-style-type: none"> <li>○ Response demonstrates good knowledge and understanding of geographical investigation skills and methods relevant to the given context.</li> <li>○ Provides an evaluation, which may be limited in depth and detail.</li> <li>○ Response reflects critical thinking skills in general, but may not always be relevant to the question.</li> </ul>	
<b>1</b>	1-2	<ul style="list-style-type: none"> <li>○ Response shows inadequate knowledge and understanding of geographical investigation skills and methods.</li> <li>○ Response has some, though limited, relevance to the given context.</li> <li>○ Provides little or no evaluation.</li> <li>○ May include material that is not relevant to the question.</li> </ul>	
<b>0</b>	0	<ul style="list-style-type: none"> <li>○ No creditworthy response.</li> </ul>	
<p><b>Examiner's comments:</b></p> <ul style="list-style-type: none"> <li>• It is not enough to simply state that one way to widen the range of data to be collected in order to assess flood risk is to interview people; it should be accompanied by the elaboration of what sort of data should be collected in the survey, and how the data would be relevant for flood risk assessment.</li> <li>• Should not discuss data accuracy or reliability or validity for this section of the question; for eg. stating that only one day of data is collected is irrelevant for this section of the question.</li> </ul>			

Question	Answer	Marks
<b>2(a)</b>	<b>Compare and account for the 2010 annual hydrographs (indicated in Resource 4 as Total Streamflow) of Rio Tanama and Rio Guaonica.</b>	<b>[8]</b>
	<p><u>Indicative content</u></p> <ul style="list-style-type: none"> <li>• Almost similar rise and fall in river discharge at around the same time. <ul style="list-style-type: none"> <li>○ For example, distinct peaks of river discharge for both Rio Tanama and Rio Guaonica occur around the same months of Jan, May, October and December 2010.</li> <li>○ Timing of low flows similarly occur around the same months for both the rivers; Feb to early April, and end October to early December.</li> </ul> </li> <li>• During time of low flows, baseflow contributes almost entirely to river discharge for both rivers.</li> <li>• Differences <ul style="list-style-type: none"> <li>○ Peak flows differ in values, with higher peak flows for most of the high flows for Rio Tanama than that of Rio Guaonica. High peak flows for Rio Tanama exceeded that of Rio Guaonica three out of four times: <ul style="list-style-type: none"> <li>- Jan: 38 vs 27 cfs</li> <li>- Oct: 63 vs 32 cfs</li> <li>- Dec: 42 vs 22 cfs</li> </ul> </li> <li>○ Bigger difference between low and high flows for Rio Tanama than Rio Guaonica</li> <li>○ More rapid response of Rio Tanama to rainfall events than Rio Guaonica;</li> </ul> </li> </ul>	

example, more flood peaks for Rio Tanama between April to May, and much steeper rising and falling limbs for Rio Tanama during Aug and Sept, compared to Rio Guaonica.

- Almost similar contribution from baseflow, but slight lower contribution from baseflow Rio Tanama, especially during between Arpil to Oct.

**Explanations for pattern observed:**

- Geological differences could be likely contributing reason for the high peak flows and more flashly nature of the hydrograph of Rio Tanama. When rocks or soils are not permeable, water is not able to infiltrate nor be transmitted easily from the surface downwards through percolation or laterally via throughflow and interflow.
- With lower rates of infiltration in the Rio Tanama basin, with the input of precipitation, a greater bulk of the rainfall will remain at the surface as overland flow, either as Hortonian overland flow (HOF) or as Saturation overland flow (SOF). When rainfall intensity exceeds the infiltration capacity of the rock or soil, the excess rainfall will not enter thus forming HOF.
- Since there is a still a far bit of baseflow contributing to river discharge, Rio Tanama does allow for some infiltration to occur, but probably at a lower rate compared to Rio Guaonica. The higher the contribution of overland flow to river discharge, the higher the flood peak and the more flashy the river regime as in the case of Rio Tanama.
- A second likely factor that may account for the higher peak flows of Rio Tanama could be that vegetation cover could be lower in density compared to that of Rio Guaonica. The presence of vegetation provides several conditions that leads to higher soil porosity and permeability leading to higher infiltration and lower overland flow. This includes prevention of rainsplash, preventing inwashing of fines, roots that provide passages for entry of water, litter that protects the surface, and humus which provides the colloidal matter that ensures a porous soil structure by forming large soil peds.
- Steeper relief can yet be another explanation for the more rapid response of Rio Tanama to rainfall event compared to Rio Guaonica. Steeper slopes in the Rio Tanama basin could be causing less rainfall to infiltrate, and instead flow down the slope rapidly towards the river channel, thus accounting for the steep rising limbs of the storm hydrographs.
- The seasonality of rainfall is the explanation for the high and low flows for both rivers. The high flows in Jan, May, Aug, and Oct all coincide in higher rainfall for those respective months, where rainfall was 4.2 ins in Jan, 12 ins in May, 14 ins in Oct. The lower flood peaks for both rivers between May to Sept could be due to the higher loss of water resulting from evaporation, and could also be due to loss as a result of higher water usage by humans during the hotter summer period.

*Levels marked*

Level	Marks	Descriptors
3	7-8	Response demonstrates a clear knowledge and understanding of the operation of the input and flows of the hydrological cycle, together with the influence of seasonality of rainfall on river discharge for both storm and annual hydrograph. It uses relevant, detailed and accurate factual information and conceptual

		understanding. Evidence from the resource/(s) is used to support the statements made. Reflects strong critical thinking skills and may include perceptive insights for the strongest response.	
	2	4-6	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context of the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks details and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.
	1	1-3	Response shows a poor understanding of the context of the question. Uses basic factual information and conceptual understanding which has some, but limited, relevance to the question. Source(s) is not used or not accurately used to support the response.
	0	0	No creditworthy response.
Question	Answer		Marks
<b>2(b)</b>	<b>Provide explanations for the nature of the long profiles of Rio Mameyes and River Haonib shown in Resource 5.</b>		<b>[8]</b>
	<p><u>Indicative content</u></p> <p><b>River Haonib</b></p> <ul style="list-style-type: none"> <li>• A much longer river with the source at 800 m above sea level, extends slightly over 160 km before reaching the sea.</li> <li>• From the source to about 20 km downstream, the river profile appears to be slightly concave.</li> <li>• Little change in channel slope from 20 to 150 km; two small knickpoints at 32 km and 64 km downstream location</li> <li>• Convex long profile near to the river mouth between 148 to 160 km downstream location.</li> </ul> <p><b>Rio Mameyes</b></p> <ul style="list-style-type: none"> <li>• Largely a long profile that is concave upwards from source to mouth.</li> <li>• Long profile is interrupted by a very distinct knickpoint at around 3.8 km downstream where the channel drops over 150 m in a short stretch of less than 1 km.</li> <li>• From 4 km downstream to 17 km, the river long profile becomes progressively more gentle in the downstream direction.</li> </ul> <p>Explanations:</p> <p><b>Concave long profile</b> is typical of rivers in locations with high rainfall like that of the Rio Mameyes. The high rainfall provides the high input of water into the channel.</p> <ul style="list-style-type: none"> <li>• With increasing distance downstream, where more and more tributaries will join the main trunk stream, the river will gain progressively higher discharge in a downstream direction.</li> <li>• The higher discharge will lead to progressively higher energy in a downstream direction. The river also becomes more efficient in transmitting the river flows</li> </ul>		

and its sediments as a number of variables will change in response to the increasing discharge downstream.

- With higher discharge in a downstream direction, the river with it higher energy, is more erosive, and this energy is used to erode the channel bed and banks, widening and deepening the river in a downstream direction.
- With a wider and deeper channel, the cross sectional area increases at a faster rate compared to the increase in wetted perimeter. This leads to a progressively higher hydraulic radius (HR) which is an indicator of channel efficiency. The higher HR, the more efficient the channel is in transporting its discharge and sediment load. This larger channel cross section reduces channel roughness as the proportion of the river flow that will undergo frictional drag is reduced, and also accounts for the higher efficiency of channel flow transport.
- As the river transports the load downstream, the load will knock against each other and become progressively finer in a downstream direction in the process termed as attrition. The fining of river load downstream also reduces channel roughness, and hence improve channel efficiency leading to higher river energy in the downstream direction.
- Since most of the river variables of increasing discharge, progressive fining of sediment load, increasing HR, increasing width and depth of river all lead to increasing energy downstream, there is no necessity for the river to maintain a steep channel gradient. Thus, a progressively more gentle channel slope is used with increasing distance downstream, creating the concave upward profile of the Rio Mameyes. This gentle long profile is often achieved through the river taking a progressively more sinuous or meandering course in a downstream direction.

**Convex profile of the River Haonib** is largely a result of the river adjusting its long profile in response to the diminishing river discharge as it progresses downstream.

- As the River Haonib progresses downstream, water is lost to seepage into the ground, and a large part is lost particularly to evaporation resulting from the hot arid climate of the Namib desert.
- With lower discharge, the river tends to lose efficiency, and tend to deposit its load forming oxbow lakes and creating a braided channel.
- Often the weak unconsolidated banks without anchoring by vegetation will widen through undermining and collapse, and become progressively wider, but shallow.
- A cross sectional shape that is wide and shallow incurs high frictional drag, and also increases channel roughness as a result of a low HR (result of high wetted perimeter in relation to channel cross sectional area).
- Channel roughness is also increased as a result of the coarse load that lies on the river bed. Little chance for attrition since the river is likely to be ephemeral where river flow occurs during the occasional rare storm event.
- With low channel efficiency, and decreasing river energy in a downstream direction, the river adjusts its channel bed by steepening in order to transport its discharge and sediment downstream. The lower the river energy, the steeper the channel gradient, and thus the convex profile of the River Haonib.

The **knickpoints** in both the river long profile can be the result of a number of reasons, and include:

- Geological differences in rock resistance to erosion – weaker rocks are eroded faster compared to a more resistant band of rocks, and where the rocks are

eroded faster, a plunge pool could form, and eventually a waterfall would form. This can result in the formation of a knickpoint. The weaker rocks could also result from the presence of fault which may be exploited by the river to undergo a comparatively higher rate of erosion to create a steepen profile and a hence the knickpoint.

- A lowering of the base level of erosion, resulting from either a tectonic uplift of the land over which the river lies, or resulting from a fall in sea level, allows for a river to gain in potential energy. This gain of energy allows for the river to be 'rejuvenated' and vertically erodes downwards into the river bed in an attempt to reach the new lower sea level. At the point where vertical erosion is more intense, the river profile steepens, and forms the knickpoint.

*Levels marked*

Level	Marks	Descriptors
3	7-8	Response demonstrates a clear knowledge and understanding of the various factors that can affect the river long profile. It uses relevant, detailed and accurate factual information and conceptual understanding. Evidence from the resource/(s) is used to support the statements made. Reflects strong critical thinking skills and may include perceptive insights for the strongest response.
2	4-6	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context of the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks details and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.
1	1-3	Response shows a poor understanding of the context of the question. Uses basic factual information and conceptual understanding which has some, but limited, relevance to the question. Source(s) is not used or not accurately used to support the response.
0	0	No creditworthy response.

**Examiner Comments:**

- Generally, this question was not very well done as students were unable to provide a detailed account of how and why the long profile of the two rivers is such.
- The numerous conceptual errors made by candidates included the erroneous identification of relationship between infiltration and overland flow, the wrong ID and explanation of knickpoints and a lack of understanding of what concave and convex are.
- Candidates in general were able to describe the long profile based on the data provided, but lost majority of their credit when it came down to explanation of the long profile, as their numerous conceptual errors resulted in them losing credit in their answers.
- Candidates need to be mindful of the overall coherence of their answers. More often than not, candidates tend to generalise or assume that the

	<p>examiner knows what they are going to write about, resulting in them leaving out certain key factors and/or explanations, causing a loss in coherence of their answers.</p> <ul style="list-style-type: none"> <li>Generally, majority of candidates managed to hit L2 with description of the long profile of the river, and were unable to hit L3 due to a lack of explanation of the reasons that could account for the shape of the long profile.</li> </ul>	
Question	Answer	Marks
2(c)	<b>Explain the formation of the feature shown in Resource 6.</b>	<b>[4]</b>
	<p>Award 1 mark for description/identification of the fluvial feature and up to 3 marks for the explanation of the feature.</p> <p>Feature shown is several potholes on the river bed. Almost circular depression with steep side walls and almost flat base; the one in the foreground contains many fragments of rocks, some angular and some relatively round with smooth surface.</p> <p>Explanation:</p> <ul style="list-style-type: none"> <li>Largely a result of river abrasion, which is a process of river sediment or load being transported over the bed of a bedrock river.</li> <li>A small irregularity on the surface of the river may trap one river fragment or pebble, and water flowing over the surface generates an eddy that swirls the rock fragment and abrade that surface of that small depression.</li> <li>Over time, with further abrasion, the depression deepens and widens, to become a pothole. When the pothole is large enough, more fragments may be trapped in it, and over time, the pothole can enlarge since more fragments or pebbles would be trapped for some time and not be transported out the deep pothole.</li> </ul> <p><i>Point marked.</i></p> <p><b><u>Examiner comments:</u></b></p> <ul style="list-style-type: none"> <li>Candidates in general did not do well for this question, as they either did not identify the feature or did not explain the formation process well.</li> <li>Candidates need to revise on their erosion processes. Many candidates, perhaps due to not knowing the exact process, listed down all the erosion processes in their answer hoping to get one right. Candidates are advised to avoid doing so in future, as this is frowned upon by examiners.</li> <li>With regards to explanation of the process, candidates need to be mindful to get the correct explanation down, and avoid leaving gaps in their explanations which would result in a loss of credit.</li> <li>There were candidates who drew diagrams to illustrate their explanation. While diagrams are encouraged, candidates need to be mindful that their diagrams answer to the question, and that their diagrams are well sketched and labelled.</li> </ul>	

2(d)	<p><b>With reference to Resource 7, describe how and explain why the drainage density of rivers in Puerto Rico and those in Namibia are different.</b></p>	[5]
	<p>Award 1 mark for identification that river densities are higher in Namibia compared to those in Puerto Rico.</p> <p>Award 1 mark for the definition of the concept of drainage density (optional point):</p> <ul style="list-style-type: none"> <li>• The length of rivers in the area or drainage basin in relation to the total drainage basin area</li> <li>• Measured in km of river per square km of land</li> </ul> <p>Award up to a maximum of 3/4 marks for the explanation for the differences in drainage density, and these could include:</p> <ul style="list-style-type: none"> <li>• Climate differences: higher drainage density for hot arid climate like Namibia versus the lower drainage density for location like Puerto Rico which is in the humid tropics</li> <li>• Lack of vegetation to protect the ground against rainsplash in the hot arid desert – results in easy formation of large amount of overland flow (usually that of HOF) and creating flash floods. Sheetwash, rilling, and gullying, together with flash floods, leads to a highly dissected surface of the hot arid areas.</li> </ul> <p><i>Point marked</i></p> <p><b><u>Examiner comments:</u></b></p> <ul style="list-style-type: none"> <li>• Generally, about half the candidates were unable to identify the difference in drainage density of the two basins, resulting in loss of credit.</li> <li>• When accounting for the reasons, candidates generally did not come up with reasons that could explain the difference, but rather lapsed into a lengthy description of the drainage density, resulting in a loss of credit due to candidates not answering the question.</li> <li>• Candidates need to also be mindful of the definition of drainage density, and the knowledge of the definition will inform how they relate and answer to the question.</li> </ul>	

**2019 H2 Prelims P2 - ANSWERS (Q3,4)****Theme 2: Development, Economy and Environment  
United Kingdom (UK) and the global economy**

3. Resource 8 shows the global distribution of inward and outward foreign direct investment (FDI) in 2014 and 2015. Resource 9 shows the global production network (GPN) links between alpha global cities based on results of an investigation by the Globalization and World Cities Research Network (GaWC) in 2010. The investigation looked at the network links in four key service sectors; accountancy, advertising, banking/finance and law. Resource 10 shows possible benefits in UK due to re-shoring.

(a) Compare the distribution of FDI as seen in Resource 8.

[6]

**Common issues**

- More descriptive than comparative
- Limited number of points

**Levels based. See rubrics.**

Level	Marks	Descriptors
3	5 - 6	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.
2	3 - 4	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.
1	1 - 2	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited, relevance to the question. Source(s) is not used or not accurately used to support the response.
0	0	No creditworthy response.

**Key ideas:**

- **Sources of inward FDI vs Sources of outward FDI – DCs vs LDCs**
  - Similarities – There are both DCs and LDCs as sources of inward and outward FDI
  - Differences – However, dominance of DCs is more obvious as sources of outward FDI than inward FDI
    - Outward FDI – DCs make up 8 out of the 10 countries. LDCs/NIEs make up the remaining 2.
    - Inward FDI – DCs make up 5 out of the 10 countries. LDCs/NIEs make up the remaining 5.
- **Sources of inward FDI vs Sources of outward FDI – individual countries**
  - Similarities – Most of the countries are both sources of inward and outward FDI; 7 out of 10 including DCs such as USA, Ireland, Netherlands, Switzerland, Canada, as well as LDC/NIE of China, HK/China
  - Differences: Nature of exceptions -
    - Only Outward FDI –DCs only; Japan, Germany and Luxembourg
    - Only Inward FDI – NIEs/LDCs only Singapore, Brazil and India

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- Dominance of individual countries
  - Similarities – There is a dominance of USA (a DC) and China (NIE) in both lists.
    - USA: ranked first for both outward and inward FDI in both 2014 and 2015
    - China: ranked 2<sup>nd</sup> and 3<sup>rd</sup> for inward FDI in both 2014 and 2015. And ranked 3<sup>rd</sup> in 2015 for outward FDI
- Rate of FDI growth: Higher growth seen in inward FDI than outward FDI
  - Similarities – For both sources of inward and outward FDI; 7 out of 10 see increases while 3 out of 10 see decline
  - Differences: However, rates of increase for inward FDI are greater
    - Inward FDI – increases of over 3x growth – all DCs – USA, Switzerland and Ireland
    - Outward FDI – mostly slight increases only; exception of Ireland (137%) and Switzerland

**(b) Suggest reasons for the distribution of FDI.**

**[6]**

**Common issues**

- Reasons not directed as the distribution of FDI; rather only at TNCs

**Level based. See rubrics.**

Level	Marks	Descriptors
3	5 - 6	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.
2	3 – 4	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.
1	1 – 2	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited, relevance to the question. Source(s) is not used or not accurately used to support the response.
0	0	No creditworthy response.

**Key ideas:**

- Define FDI and link to TNCs
  - FDI – physical infras or lasting mgt interest
  - TNCs account for more than two thirds of world's FDI
  - Patterns are mostly explained by the investment decisions of TNCs
  - Hence important to consider the reasons for TNCs' investment decisions
- Outward FDI → Dominance of DCs as sources of outward FDI
  - Majority of the TNCs today originate from DCs; e.g. American TNCs – Apple, Ford, Japanese TNCs – Toyota, Swiss TNCs – Nestle
  - These TNCs manage their global operations from their home countries; hence their investment decisions are seen as outward FDI for their home countries
  - For either market- driven or cost-driven reasons, these TNCs venture out to the rest of the world in order to increase their profits
- Outward FDI → Reasons for China as the only NIE in the list
  - With rapid economic devt, the 21<sup>st</sup> century has seen a drastic increase in the

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number of Chinese TNCs such as Huawei, China Petrochemical Corporation or better known as Sinopec and TNCs from HK/China including Shangri-la Asia Ltd, HSBC

- For either market- driven or cost-driven reasons, these TNCs venture out to the rest of the world in order to increase their profits
- Inward FDI → Presence of NIEs/LDCs
  - Changing comparative advantage in performing manufacturing and service production in the favour of NIEs/LDCs have prompted many TNCs to re-locate their production activities to these countries; hence increasing inward FDI in the form of factories, office spaces, etc
    - Why the beneficial CA in these NIEs/LDCs – e.g. China, India, Brazil – cheaper labour cost, range of labour skills, disciplined labour, lower land and raw material cost, incentives from govt (financial, administrative and infrastructural)
    - Overall resulting in reduced cost of production for these TNCs
  - Increasing market dominance has also led to relocation of production plants to better serve the growing markets in these NIEs/LDCs
- Inward FDI → Presence of DCs
  - Most on the global FDI is accounted for by intra-firm activities – often involving TNC from a home country; which is often a DC to its intra-firm activity in a host economies
    - These host economy perform various functions; including higher value added activities like regional R&D and RHQ – requiring high skilled labour, global connectivity → all of which DCs have CA for
    - GPN of many goods also required higher value added component parts (e.g. memory chips, semiconductors, etc) → these are often outsourced from other specialty TNCs and made within their home DC (e.g. Apple buying network components from Infineon in Germany and Bluetooth from Murata in Japan) → this translates to higher valued DC-DC FDI; signaling high outward FDI for home and inward FDI for host economies)
  - DCs are also important markets even with more mature than NIEs/LDCs.
    - In addition, increasing protectionism from regional groupings like EU and NAFTA also forces TNCs to invest into other DCs
- Inward FDI → Individual countries
  - Market penetration is a crucial reason for the high inward FDI for both USA and China; two of the most populous countries with high or increasing levels of affluence
  - Hence TNCs may choose to locate production plants within these countries to cater to local demands (e.g. Nestle has the highest number of production plants in USA)

(c) Describe the links between London and the other alpha global cities as shown in Resource 9. [4]

#### **Common issues**

- Quite a few candidates described the other cities instead

**Point-based. Award 1m per point raised. Minus 1m collectively if no or limited evidence from data is given**

- **Overall**, London has strong correlation links with 5 other alpha global cities (GC) – with NY, Singapore, Hong Kong and Tokyo and Paris. This is second to Tokyo and Frankfurt with 6 links each.

- London has the **strongest correlation links** with New York than other alpha global

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cities (GC) – with NY, Correlation is above 0.6 while to other cities, London has links of with correlation between 0.50 -0.59

- **Regionally**, London has more stronger direct links with Asian GCs than other regions
  - London has direct link with correlation between 0.50 - 0.59 to 3 Asian GCs (Singapore, Hong Kong and Tokyo) as opposed to 1 European city (Paris; direct link with correlation between 0.50 - 0.59 ) and 1 American city New York (direct link with correlation above 0.60)
  - London has weaker links with Western European cities; with a correlation of less than 0.50; namely Frankfurt and Milan

(d) **Re-shoring is the process of returning the manufacturing of goods back to the company's original country.**

**Using Resources 9 and 10 and your own knowledge, recommend whether the British government should consider re-shoring as a development strategy.**

[9]

**Common issues**

- *Explanation not adequate. You need to elaborate and make blatant links to context.*
- *Must see from the point of view of the govt not the TNCs*

**Level based**

**Possible ideas to consider**

Introduction

- Reshoring vs other strategies
- Set the criteria with which you would be making your decision
- Clearly state your decision

One possible decision – While re-shoring can be encouraged for its potential economic benefits, it is wiser for a DC like UK to be selective with which sectors it wants to re-shore. Some lower-value added and labour-intensive manfg should not be re-shored as it would further reduce the country's competitiveness.

**To support re-shoring**

Point	Evidence	Explanation	However...
Potential economic benefits – employment	R10 – give data for the various sectors	- Being a DC, match between availability of skilled L and the demand for it for the respective sectors – hence further reinforcing the need to be selective in re-shoring  - Socio-economic benefit in creating employment; SOL  - Potential for indirect employment in other manufg and even service sectors  - Esply in the light of Brexit, which could lead to some TNCs moving to other parts of EU	- the high labour cost is a big deterrent for TNCs to relocate their production back home. Hence govt may need to provide financial incentives - thus whether economic benefits profit UK depends on whether these incentives are lower than the profits earned (i.e. incentives < profits)
Potential economic benefits – govt revenue	R10 – give data	- As production is relocated, there is a potential for export revenue. Such injection into the local economy is much welcomed	

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		<p>to boost economic growth</p> <ul style="list-style-type: none"> <li>- In particular for higher value added components parts or products – e.g. electronic and optical products</li> <li>- Also needed for the mgt of complex supply chain – connection into these chains can potentially create more investment opportunities for UK; esply to locations outside of Europe</li> </ul>	
Such benefits are especially important for areas experiencing effects of de-industrialization	Own Knowle – effects on inner city of Liverpool	<ul style="list-style-type: none"> <li>- Areas that have went thru' de-industrialization would have higher unemployment; esply for lower skilled workers</li> <li>- Re-shoring allows economic and social rejuvenation of these areas; often areas suffering from inner-city decline</li> </ul>	- however could contradict efforts to rejuvenate areas with service sectors

### To support SELECTIVE re-shoring

Point	Evidence	Explanation
Potential economic benefits – employment	R10 – give data for lower skilled sectors	<ul style="list-style-type: none"> <li>- Being a DC, a mismatch between availability of skilled L and the nature of employment; esply for paper and paper products</li> <li>- More difficult to convince related TNCs to re-shore as mentioned earlier</li> </ul>

### Arguments not to re-shoring

Point	Evidence	Explanation	However...
Economic benefits of off-shoring production	Own Knowl  Any TNC which has off-shored production	<ul style="list-style-type: none"> <li>- Comp adv theory – more cost efficient for NIE/LDCs to perform most of the production – for both TNCs and hence UK govt</li> <li>- Benefits such as profit repatriation</li> <li>- Hence UK govt needs to spend more to convince TNCs to re-shore</li> </ul>	- many issues with quality of production that may convince some TNCs to re-shore
Potential pollution from production activities	Own Knowl	<ul style="list-style-type: none"> <li>- increase in waste production and pollution (elaborate)</li> <li>- govt needs to spend more to manage these</li> </ul>	- as a DC, environmental legislation can be strictly reinforced
Other profitable sectors can be encouraged instead	Own knowl  R9 – importance of services	<ul style="list-style-type: none"> <li>- as a DC → focus on service sectors instead which the country has a CA for</li> <li>- presence of skilled labour, telecomm infras, etc</li> <li>- labour can be re-skilled to take up such employment</li> </ul>	- may need more time to re-skill people

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**Theme 3: Sustainable Development**  
**Urban development in Shanghai, China**

<b>4</b>	Resource 11 shows the urban land use in Shanghai, in 1973 and 2012. Resource 12 shows the changes in modes of transport from 1981 to 2009. Resource 13 shows the average and peak hour congestion levels in some Chinese cities and selected cities around the world in 2010. Resource 14 shows the types of wastes generated in the city in 2012 while Resource 15 shows the changing volume of waste for selected waste disposal methods from 2006 to 2015.
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**(a) Describe the land use changes in Shanghai as shown in Resource 11.**

**[4]**

**Point-based. Award 1m per point raised. Minus 1m collectively if no or limited evidence from data is given**

- Extensive urban sprawl – in all directions with the most growth seen south and northwest; extension of around 5km
- Reducing amounts of empty spaces – with sparing amounts in the eastern and southern parts of the city, with a radius of less than 1.25km
- Greater amount of urban residential areas – in all directions; towards the fringes of the city
- Commercial and industrial land use has also increased – in concentrated areas especially in the north in Zhabei; notably along the eastern boundaries of the city flanking both sides of the river
- Marginal increase in recreational areas ; often in-situ; e.g. southwest in Changning as well as some newer areas such as extreme east in Lujiazui
- Any other relevant land use description

**Examiner Comments:**

- Generally, this question was well done as students were able to identify the growth in greater urban residential areas
- However, many candidates were not specific on direction of growth or did not name the areas shown in the map
- Some candidates only focused on urban residential areas and did not talk about the other land use.

**(b) Using Resources 11 and 12, suggest reasons for the changes in modes transport as shown in Resource in 12.**

**[6]**

**Levels based. See rubrics.**

Level s	Mark s	Descriptors
3	5 - 6	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.
2	3 – 4	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.

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		<ul style="list-style-type: none"> <li><b>NOTE: For answers that fail to categorize the various modes of tpt, max 4/6</b></li> </ul>
1	1 – 2	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited, relevance to the question. Source(s) is not used or not accurately used to support the response.
0	0	No creditworthy response.

Change in mode	Reason/s with key urban concepts
Decreasing % using non-motorized tpt (NMT) ( <u>from R12</u> ) <ul style="list-style-type: none"> <li>Walk – constantly declining from 58% in 1981 to 26% in 2009</li> <li>Bicycle while increased from 12% in '81 to 38% in '95, declined to 14% in 2009</li> </ul>	<ul style="list-style-type: none"> <li><b>Environmental reason:</b> <i>Urban sprawl</i> as seen in R11 - increasing distance from residential areas in the fringes of the city to commercial/industrial concentration in the east, north and west of the city               <ul style="list-style-type: none"> <li>These distances cannot be covered comfortably using NMT</li> </ul> </li> <li><b>Socio-economic reason:</b> Increasing affluence of the LDC city as the country opened up to world trade since the 90s (<u>context</u>)               <ul style="list-style-type: none"> <li>Hence greater affordability and aspiration to own private vehicles</li> </ul> </li> </ul>
In contrast, % using motorized tpt increased ( <u>from R12</u> ) <ul style="list-style-type: none"> <li>Pt motor vehicles increased from 8% in '95 to 20% in 2009</li> </ul>	
Increasing % using greener modes of tpt ( <u>from R12</u> ) <ul style="list-style-type: none"> <li>Electric bike – increases drastically from only 3% in '95 to 15% in 2009</li> <li>Public transit – while decreased from 28% in '81 to 20% in '95, increased to 25% in 2009</li> </ul>	<ul style="list-style-type: none"> <li><b>Political reason:</b> With <i>rapid urbanisation</i> in LDC cities like Shanghai, traffic congestion became worse. This could have led to govt controlling number of private vehicles entering the city and imposing carbon/road tax on private vehicle owners. This could have led to people considering alternative modes of transport. (<u>context</u>)</li> <li><b>Technological reason:</b> Electric bikes become a more common and affordable feature since 2000. (<u>context</u>)</li> <li><b>Social reason:</b> More awareness about climate change and the increasing air pollution in the city further encourages people to reduce their carbon output. (<u>context</u>)</li> </ul>
Despite decrease over the years, dominance of walk (a non-motorized green mode of tpt) ( <u>from R12</u> ) <ul style="list-style-type: none"> <li>Walk – constantly declining from 58% in 1981 to 26% in 2009. But ranked as highest % throughout</li> </ul>	<ul style="list-style-type: none"> <li><b>(Why the dominance?) Environmental reason:</b> Used in combination with other methods; especially public transit</li> <li><b>Environmental reason:</b> Distance between home and work still remains within walking distance for some of the urban resident</li> <li><b>Urban process:</b> <i>Decentralisation of the commercial and industrial activities</i> as seen in R11. The commercial/industrial areas have spread out to various parts of the city in 2012; especially towards the west and south of the city</li> </ul>

**Examiner Comments:**

- Generally, this question was well done as students were able to describe changes in modes of transport
- Some candidates did not use the specific data and only spoke of the changes in broad terms
- Most however did not discuss about the dominance of walking even till 2009 and focused only on the rise of private transport
- Some candidates also did not identify the key reasons and focused solely on convenience and urban sprawl as the only reasons for change.

**(c) Using evidence from Resource 13, describe the congestion levels in Shanghai.**

**[5]**

**Point-based. Award 1 per point raised. Minus 1m collectively if no or limited evidence from data is given**

**Note: Answer should describe the congestion; not account for it.**

- On a national scale,
  - Shanghai is ranked 4<sup>th</sup> most congested city with an average congestion level is 35% → suggesting that over time, people are spending more time on the road
  - Morning and evening peaks for Shanghai are comparable to each other at 66% in the morning and 67% in the evening.
  - This is unlike some of the other top ranked cities where evening peak levels surpass morning peaks (e.g. second ranked Tianjin whose morning peak is 56% compared to its evening peak of 64%)
- On a global scale,
  - Shanghai is not featured as one of the top 20 cities; suggesting congestion in Shanghai is not as dire as other cities
  - Only nationally top ranked Chongqing and Tianjin and nationally second ranked Beijing are ranked 15<sup>th</sup>, 17<sup>th</sup> and 19<sup>th</sup> respectively based on the global rank
- Any other relevant description

**Examiner Comments:**

- Generally, most students did well if they were able to compare
- Some candidates did not use the specific data and only compared in broad terms
- Some candidates did not read data carefully and mistook the cities for areas found in Shanghai
- Most candidates did compare both on global and national scale
- However most did not talk about the differences between morning and evening peaks

**(d) With reference to Resource 14, describe the type of waste generated in 2007. 2012.**

**[4]**

**Point-based. Award 1m per point raised. Minus 1m collectively if no or limited evidence from data is given**

- Overall, wide range of waste generated
  - Majority of the waste is recyclable waste – organic, paper, glass, metal, garden, textiles – making up 45.68%
  - Non-recyclable waste (plastic) on the hand is lower – at 9.98%
- In terms of specific types of waste,
  - Most of the waste is combustible (can burn) – 42.22%
  - Followed by organic waste at 21.12%

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- Any other relevant description

**Examiner Comments:**

- Generally, most students did well if they were able to use the specific data
- Some candidates did not use the specific data and only compared in broad terms

**(e) Using evidence from Resources 14 and 15 to justify your answer, suggest two ways to better improve waste management in Shanghai.**

**[6]**

**Levels based. See rubrics.**

Level s	Mark s	Descriptors
3	5 - 6	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.
2	3 – 4	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response. <ul style="list-style-type: none"> <li>• <b>NOTE: For answers that merely describe strategies, max 3/4</b></li> </ul>
1	1 – 2	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited, relevance to the question. Source(s) is not used or not accurately used to support the response.
0	0	No creditworthy response.

**Any TWO relevant ideas. Each must be justified, explained and evaluated**

**Possible areas that can be improved:**

- Addressing a substantial amount of 'unaccounted' for waste
  - From R15 → Substantial volume– make up slightly less than a third of the waste mgt method in 2015
- Addressing the reduction of composting as a way of waste disposal
  - From R15 → Not a chosen method since 2012. Prior to that made up 9.2% in 2006.
  - From R14 → however, organic and garden waste make up a substantial portion of the overall waste in 2012; 24.23%
- Addressing the reliance on landfill and incinerators as a way of waste disposal
  - From R15 → in 2015, collectively both make up over 70% of waste disposal vs ard 50% in 2006
  - From R14 → however, organic and garden waste make up a substantial portion of the overall waste in 2012; 24.23%

**Possible answers**

- **Soln:** Creating a proper city-wide recycling program to sort out domestic waste and charge disincentives in clearing non-recyclable water
  - **Explain :**
    - Obj: Encourages more sustainable waste management approaches that are more

circular in nature

- How: As done in all German cities, domestic waste should be sorted before disposing – based on colour coded waste sorting
- While waste that can be recycled waste is not charged, there is a charge for amount of waste that cannot be recycled
- The sorted waste can then be channeled accordingly; reducing the amount of waste that is incinerated or landfilled
- **Justify:**
  - From R14 – a large proportion of waste from the city (45.68%) can be recycled
  - With more recycling encouraged – decrease the inputs and outputs of the city – hence greater circularity in urban metabolism (UM)
- **Evaluate:**
  - Possible limitations: financial cost in creating necessary infrastructure and processes, low public support/reception to the program (which can be persuaded with use of incentives and disincentives)
  - Benefit: relatively cost effective compared to building more incinerators/landfills esp for a rapidly growing LDC city like Shanghai, longer term sustainable solution
  - Hence, while it may take time to see results, the solution, with the commitment from the govt, will work for Shanghai
- **Soln:** Investing into more efficient incinerators to make better use of the need to incinerate – e.g. investing into a waste-to-energy incinerators
  - **Explain:**
    - Obj: more effective use of incineration – reducing resources needed for energy generation
    - Waste-to-energy incinerators convert the heat energy from burning waste into potential electrical energy. Successful examples of these are Malmo, Sweden. This DC city uses energy from such waste-to-energy plants to fuel almost the entire city
  - **Justify:**
    - From R15 – a large proportion of waste from the city (ard 30%) are disposed using incineration
    - While fulfilling the need to incinerate, there is also an attempt to encourage more circular UM
  - **Evaluate:**
    - Possible limitations: cost (although for a financially growing city like Shanghai, this might not be a big issue), pollution from incineration process
    - Benefit: for an energy-hungry growing city like Shanghai, it offers a cleaner energy source vs coal/fossil fuel, longer term sustainable solution
    - Hence, can work for Shanghai as it helps address another issue of meeting energy demands, alongside waste mgt

*Other possible solutions*

- **Soln:** Education campaigns to encourage reducing overall volume of waste – 3Rs
- **Soln:** Landfills to be used as bio-energy generators
- **Soln:** Formalizing waste collection and sorting

**Examiner Comments:**

- Most candidates did mention two strategies but there was a lack of evaluation
- Most candidates just described or state the strategy but there was no reference to the data to justify choice of strategy
- Some candidates mentioned recycling but did not describe the steps to the solution

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# ANDERSON SERANGOON JUNIOR COLLEGE

## JC2 H2 Geography Preliminary Examinations (2019)

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**H2 GEOGRAPHY**

**9751/01**

**Paper 1 Structured Essay Questions**

**26 August 2019**

**3 hours**

Additional Materials:

Answer Booklet

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**READ THESE INSTRUCTIONS FIRST**

1. Write your name and class in the spaces provided below, and on all the work you hand in.
2. Write in dark blue or black pen on both sides of the paper.
3. You may use an HB pencil for any diagrams or graphs.
4. Do not use staples, paper clips, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.

Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.

You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

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**This question paper consists of 3 printed pages, including this page.**

**[Turn Over]**  
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### Section A – Tropical Environments

Answer **one** question from this section.

- 1 (a) Explain the impacts of the reversal of the Walker Circulation in tropical regions. [12]
- (b) "The shifting of the Inter-Tropical Convergence Zone is solely responsible for variations in rainfall in tropical regions."  
Evaluate the validity of the given statement. [20]
- 2 (a) Explain the factors that influence the formation of karst landforms in the humid tropics. [12]
- (b) To what extent is the release of stored carbon into the atmosphere the most significant impact of tropical deforestation? [20]

### Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a) Explain how the New International Division of Labour (NIDL) may affect the sectors of the economy in developing countries. [12]
- (b) To what extent do transnational corporations bring more positive than negative impacts to countries? [20]
- 4 (a) Explain how Thomas Malthus' theory on population-resource relationships might still be relevant today. [12]
- (b) "One day, poor countries may actually benefit from their natural resources."  
Assess the validity of this statement. [20]

**Section C – Sustainable Development**

Answer **one** question from this section.

- 5 (a)** Explain the challenges faced by countries at low levels of development in mitigating climate change. [12]
- (b)** "Evidence for climate change strongly suggest that human activities have caused climate change today."  
To what extent do you agree with this statement? [20]
- 6 (a)** Explain why countries with fast-growing populations may find it difficult to achieve sustainable urban development. [12]
- (b)** "No other proposed solution is more effective in mitigating traffic congestion than public transport."  
Evaluate the validity of this statement. [20]



**ANDERSON SERANGOON JUNIOR COLLEGE**

**JC2 H2 Geography Preliminary Examinations (2019)**

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**H2 GEOGRAPHY**

**9751/02**

**INSERT**

**17 September 2019**

**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

The Insert contains all the Resources referred to in the questions.

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**This document consists of 13 printed pages, including this page and 1 blank page.**

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**Resource 1 for Question 1**  
**Questionnaire designed and used by students**

**SURVEY**

Name: \_\_\_\_\_

**1. What is your age?**

- 65 -70 years
- 71 – 75 years
- 76 – 80 years
- Above 80 years

**2. Do you live near the Bukit Merah View Food Centre and Market?**

- Yes – it takes me less than 20 minutes to travel here by public transport
- No – it takes me more than 20 minutes to travel here by public transport

**3. Which newly-introduced feature(s) do you appreciate the most? (You may select more than one.)**

- Wider walkways and accessibility ramps
- Slip-resistant flooring
- More fans and extended sheltered seating areas
- Free wi-fi

**4. Please share with us your responses below:**

		Strongly Agree	Agree	Disagree	Strongly Disagree
<b>a.</b>	The newly-introduced elderly-friendly features have adequately met my needs.				
<b>b.</b>	The new elderly-friendly features make me want to come to Bukit Merah View Food Centre and Market more often.				

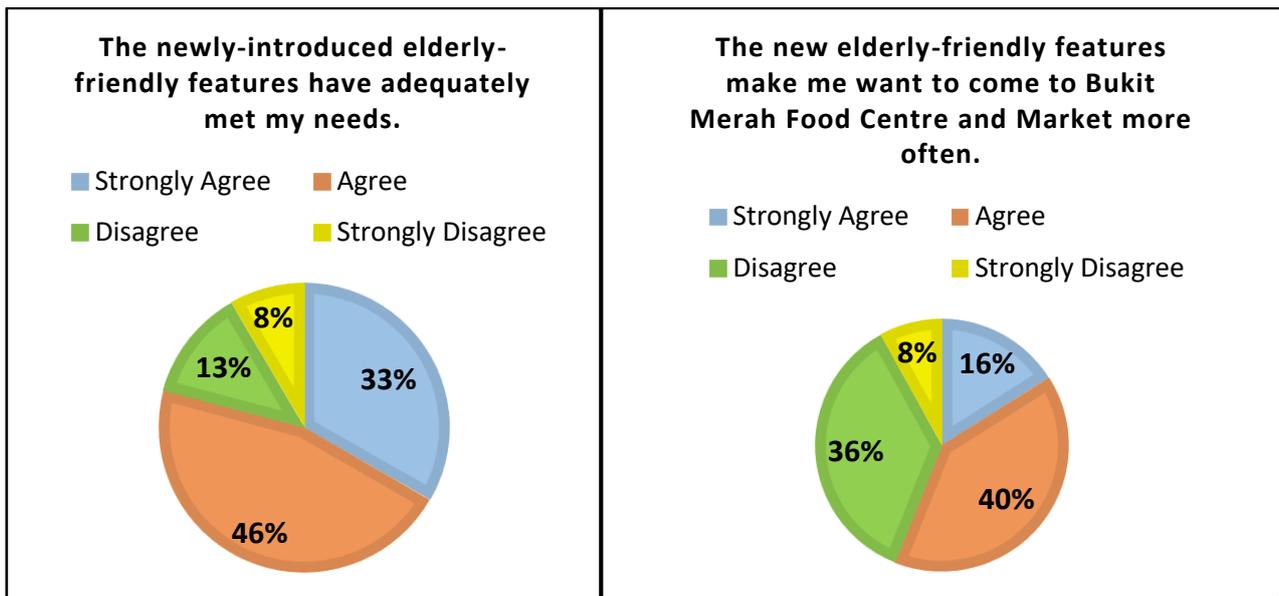
**5. Are there any other elderly-friendly features/improvements that you would like to see at Bukit Merah View Food Centre and Market?**

- No
- Yes – Please share your suggestions with us below:

Thank you for your time.

**Resource 2 for Question 1**  
**Selected results from the survey**

Age group	Total no. of respondents
65-70 years	10
71-75 years	7
76-80 years	5
Above 80 years	2
<b>TOTAL</b>	<b>24</b>



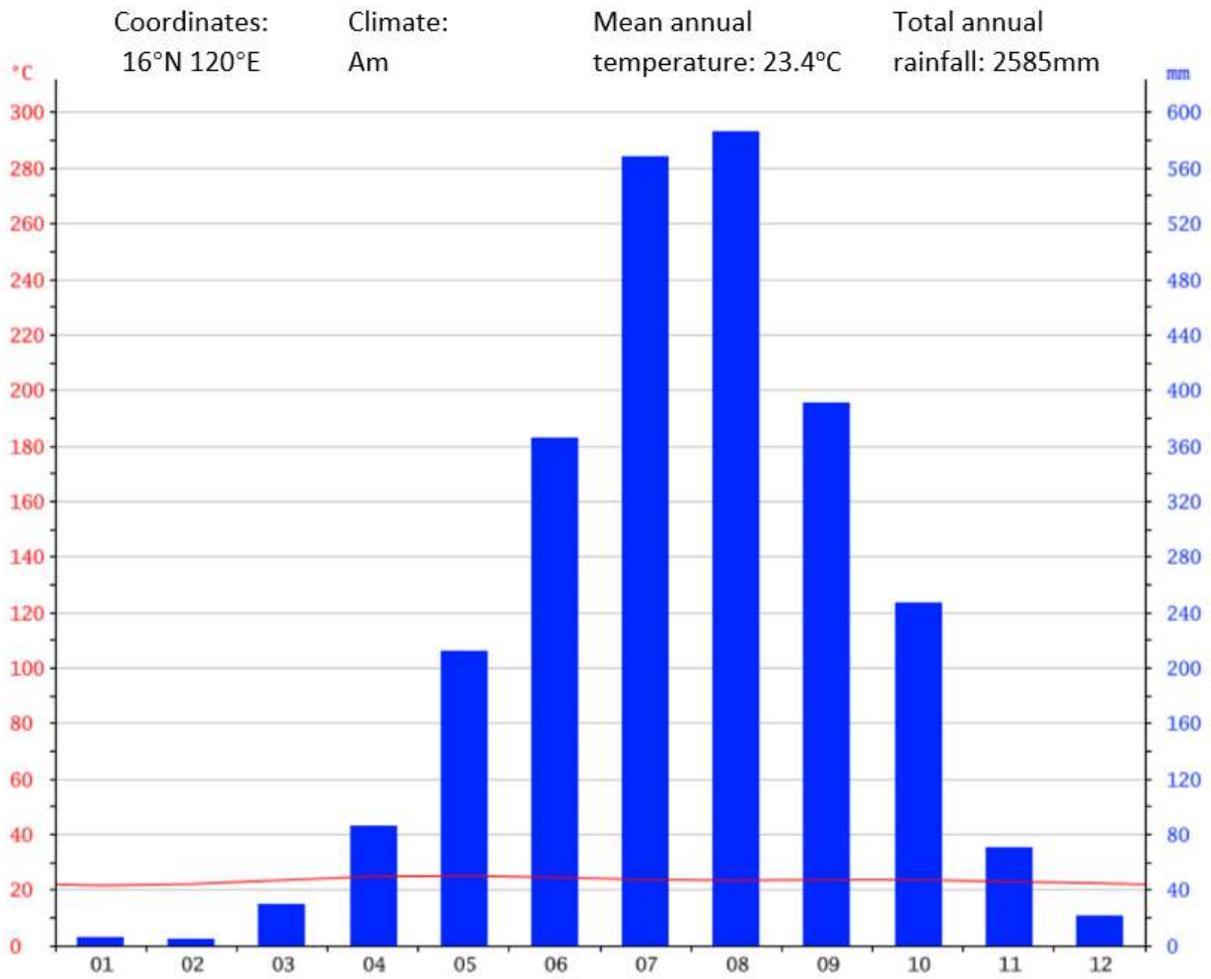
**Are there any other elderly-friendly features/improvements that you would like to see at Bukit Merah View Food Centre and Market?**

**No** – 8 respondents

**Yes** – 16 respondents. Some suggestions include:

- Feeder bus service
- “Reserved for Elderly” seating section in the food centre
- Clearer signboards (such as larger and less cursive fonts)
- Sheltered walkways from bus stop and along main roads

**Resource 3 for Question 2**  
**Climate graph for Itogon, Philippines**



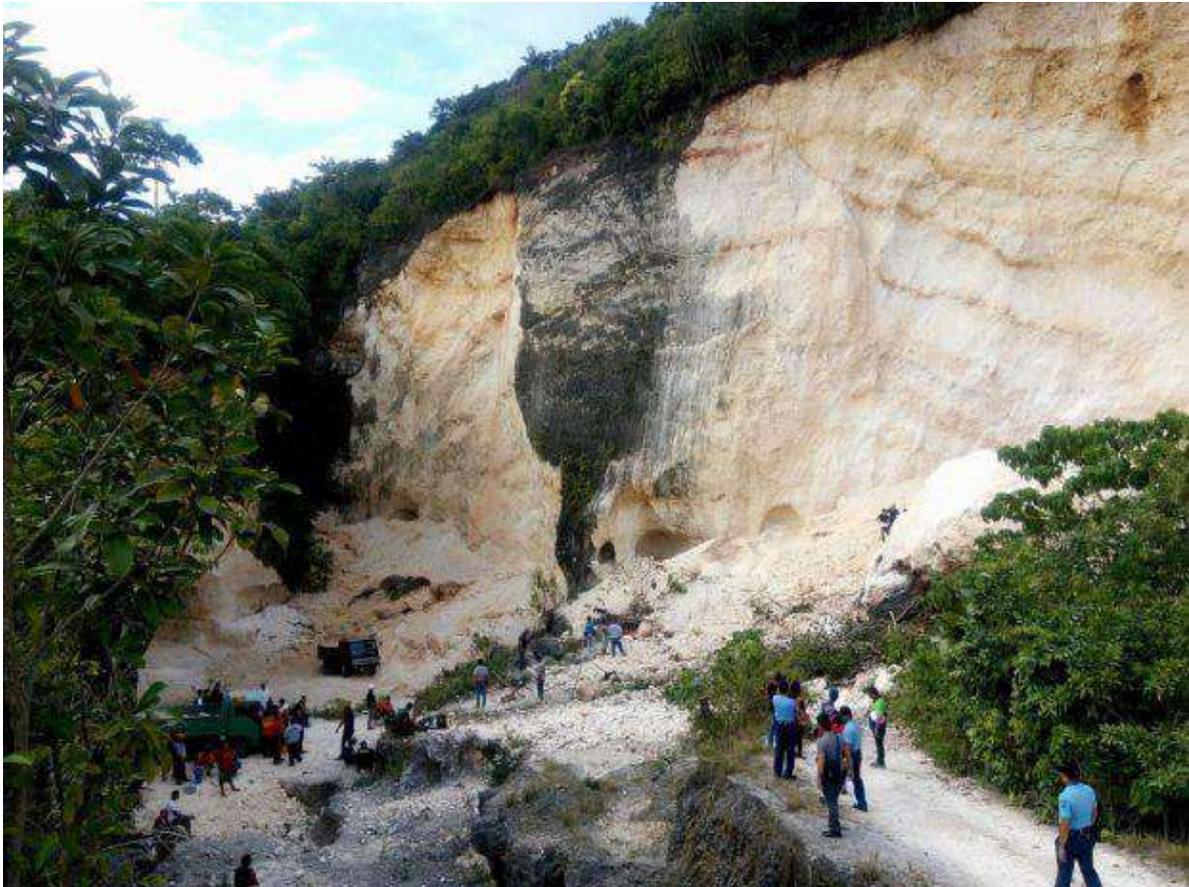
**Resource 4 for Question 2**

**Mass movement event following Typhoon Mangkhut in Itogon, Philippines  
in September 2018**



**Resource 5 for Question 2**

**Mass movement event at a limestone quarry site in Bohol, Philippines in March 2018**



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**Resource 6 for Question 2**  
**Effect of Typhoon Mangkhut that made landfall in the Philippines**

**Typhoon Mangkhut: More than 100 dead and missing**

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**Carmela Fonbuena in Manila and Hannah Ellis-Petersen in Bangkok, The Guardian**

Updated 1922 GMT September 17, 2018

**Benguet province, Philippines** – Almost 100 people are presumed dead after a landslide caused by Typhoon Mangkhut enveloped a small mining town in the Philippines, burying homes and a chapel where dozens of people had taken shelter.

At the height of the storm, dozens of people in Itogon – mostly miners and their families – took refuge in a chapel housed in a former bunkhouse in the belief they would be protected. However, part of a mountain collapsed on top of the building.

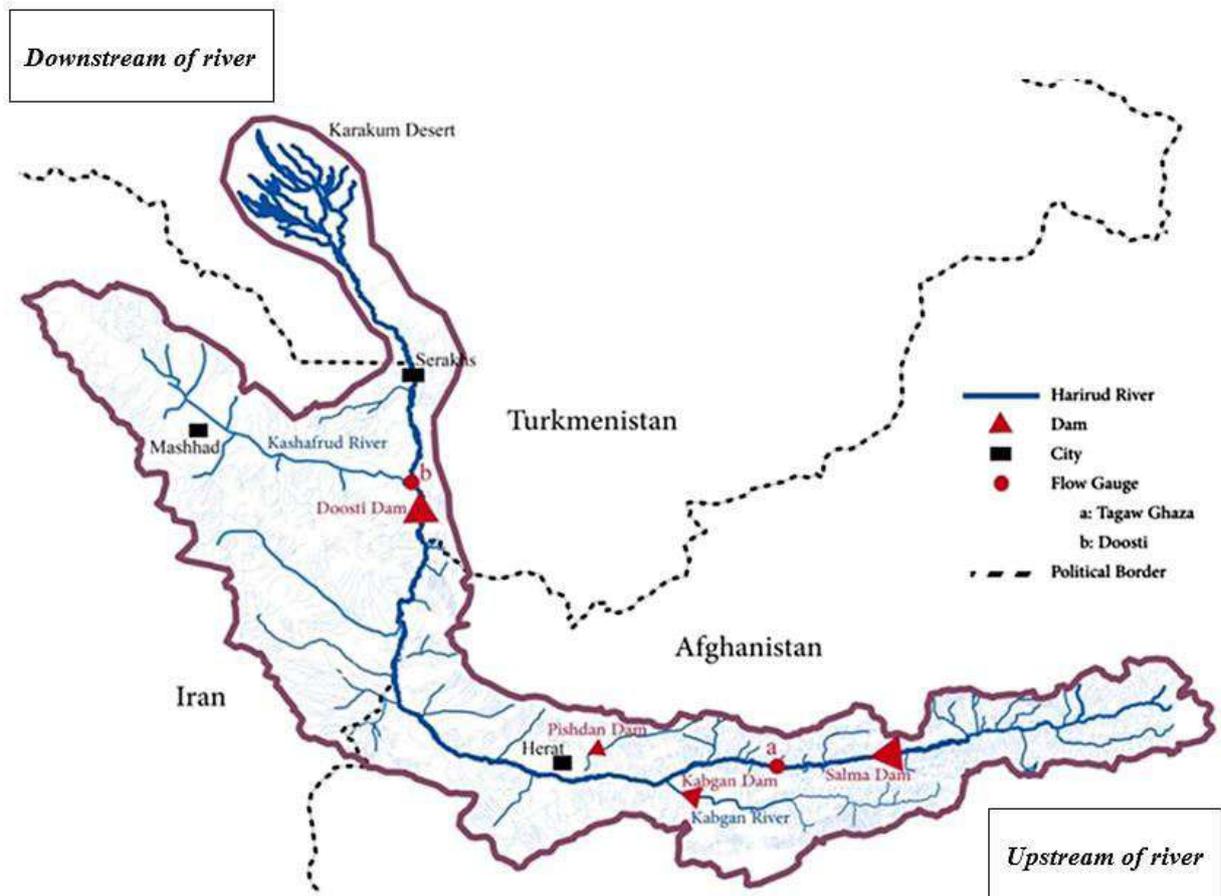
"They were advised to move out because that is a hazardous area during typhoons, it might kill them and it really happened," Lt. Gen. Emmanuel Salamat of the Philippines Armed Forces told CNN Philippines on Monday.

Drone images from the scene provided by the UN Migration Agency showed a scar on the mountain where homes appear to have been wiped out.

**Resource 7 for Question 3**  
**Projected Water Stress in Asia in 2040**



**Resource 8 for Question 3**  
**Dams in the Harirud River Basin**



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**Resource 9 for Question 3**  
**Factsheet about Iran**

<b>Geography of Iran</b>	
<b>Latitude</b>	32.4279° N, 53.6880° E
<b>Precipitation characteristics</b>	Average precipitation per year: 730 mm
<b>Change in precipitation levels from 2017 to 2018</b>	Average precipitation levels fell by 29%
<b>Land Uses</b>	<ul style="list-style-type: none"> <li>• Agricultural land: 30.1%               <ul style="list-style-type: none"> <li>• Arable land (land suitable for growing crops): 10.8%</li> <li>• Crops: 1.2%</li> <li>• Pasture (e.g. for grazing): 18.1%</li> </ul> </li> <li>• Forest: 6.8%</li> <li>• Other (e.g. industry, residential): 63.1%</li> </ul>
<b>People and Society</b>	
<b>Total Population in Iran</b>	83,024,745 <ul style="list-style-type: none"> <li>• 17<sup>th</sup> most populous country in the world as of 2018</li> <li>• As of 2012, more than half of Iran's population is under 35 years old</li> </ul>
<b>Annual population growth (%)</b>	1.24% (census last taken in 2016)
<b>Economy of Iran</b>	
<b>GDP per sector (2017 estimate)</b>	Agriculture: 9.8% (Agriculture consumes 92% of the country's renewable water resources per year)
	Industry: 35.9%
	Services: 54.3%
<b>Major industrial export goods</b>	Petroleum, chemical and petrochemical products, automobiles
<b>Major crops for commercial farming</b>	Wheat, rice, dates (All these crops rely on a mix of irrigation and precipitation to develop)

## Resource 10 for Question 3

## A possible solution to alleviate water scarcity in Iran

# Iran Desalination Capacity to Rise by 300,000 Cubic Meters Per Day by 2021

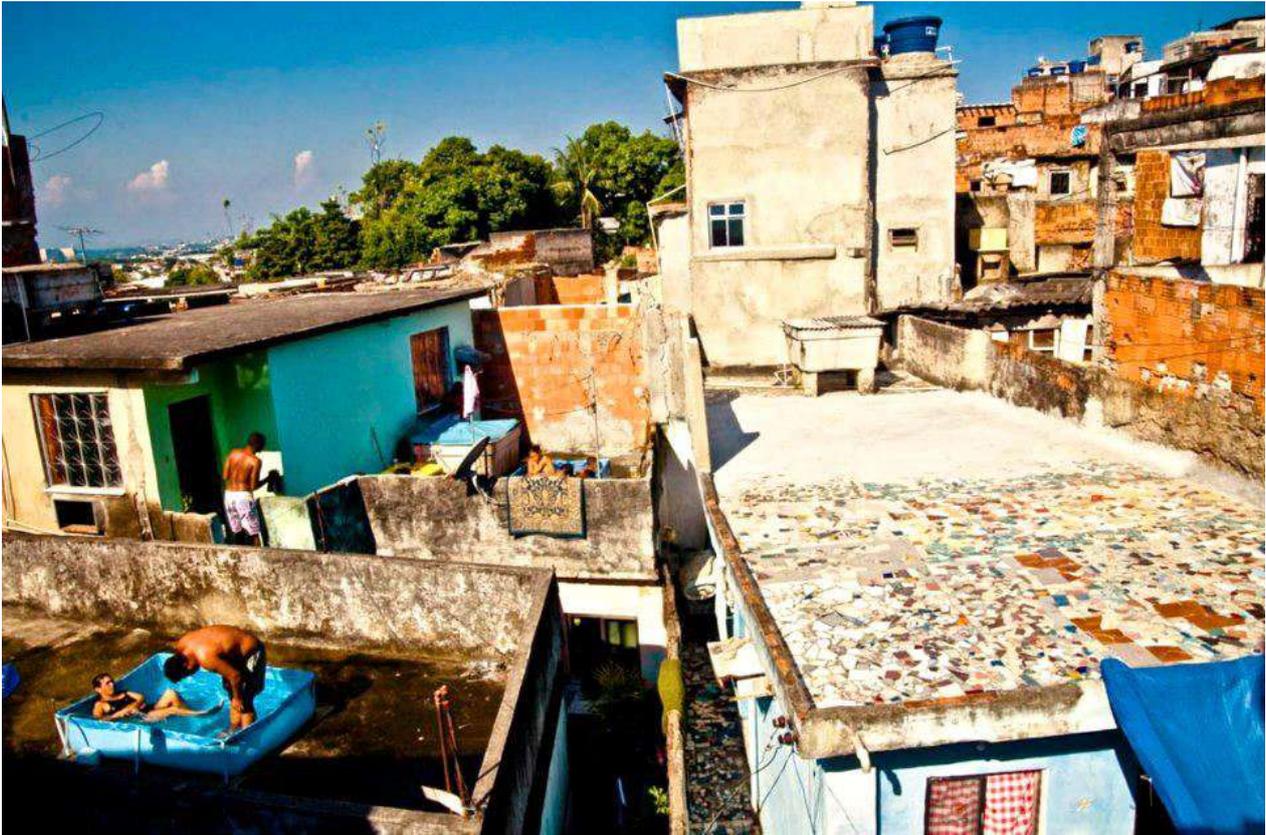


**I**n the past six years, 39 desalination units with a capacity of approximately 174,000 cubic meters per day (63.7 million cubic meters a year), are operating mostly in the southern coasts.

Sixty desalination plants with a capacity of over 242,000 cubic meters per day (88.4 mcm per year) are operating in different regions in Iran, The Energy Ministry news portal reported.

Construction of another 25 desalinating projects is underway, which upon completion by 2021 will add 300,000 cubic meters of water to daily output.

Resource 11 for Question 4  
Photographs of favelas in Rio de Janeiro, Brazil



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## Resource 12 for Question 4

## Locations of favelas and the 2016 Olympic zones and venues in Rio de Janeiro



Maracanã Stadium

**Maracanã Stadium**

- Football stadium
- Venue for the opening and closing ceremonies of the 2016 Summer Olympics

**Site of the Barra Olympic Park**

- A cluster of nine sporting venues in Barra da Tijuca, which includes the Olympic Village (with a total of 3,604 apartments and 31 buildings), and newly-constructed sporting venues such as the Olympic Tennis Centre



Olympic Tennis Centre

**Site of the Copacabana Stadium**

- A temporary structure built to host the Beach Volleyball segment of the Olympics
- Copacabana district has the 11th highest Human Development Index in Rio, and is considered one of the best neighbourhoods in the country.

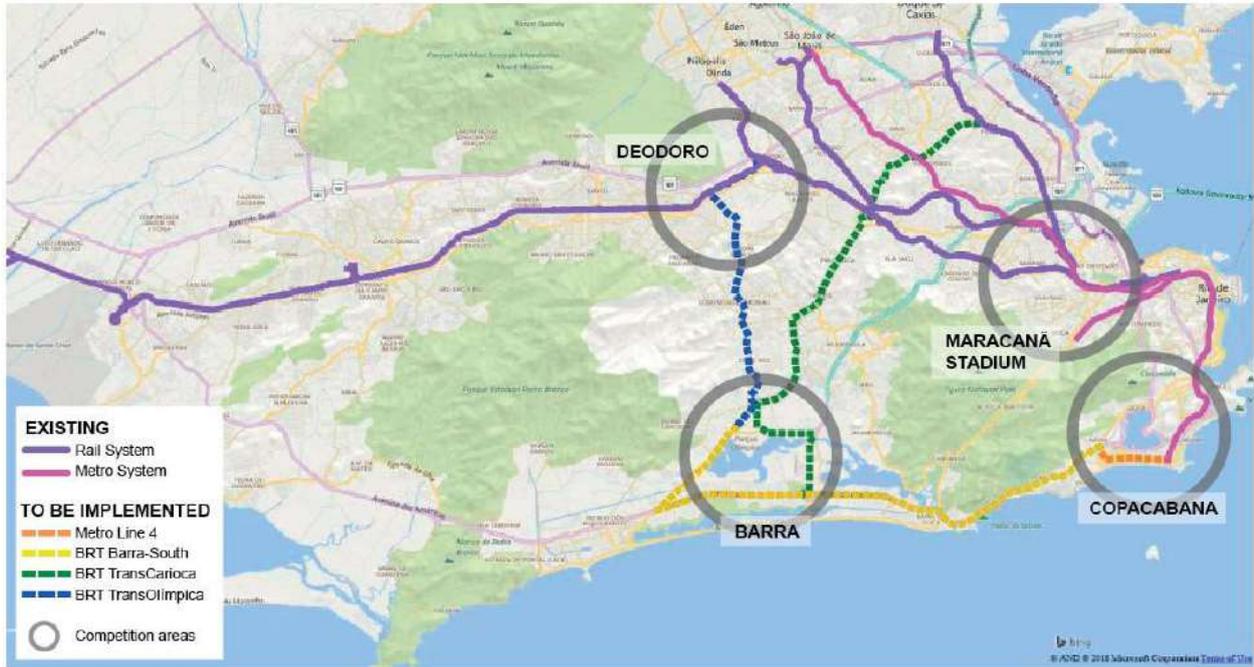


Copacabana Stadium on Copacabana Beach

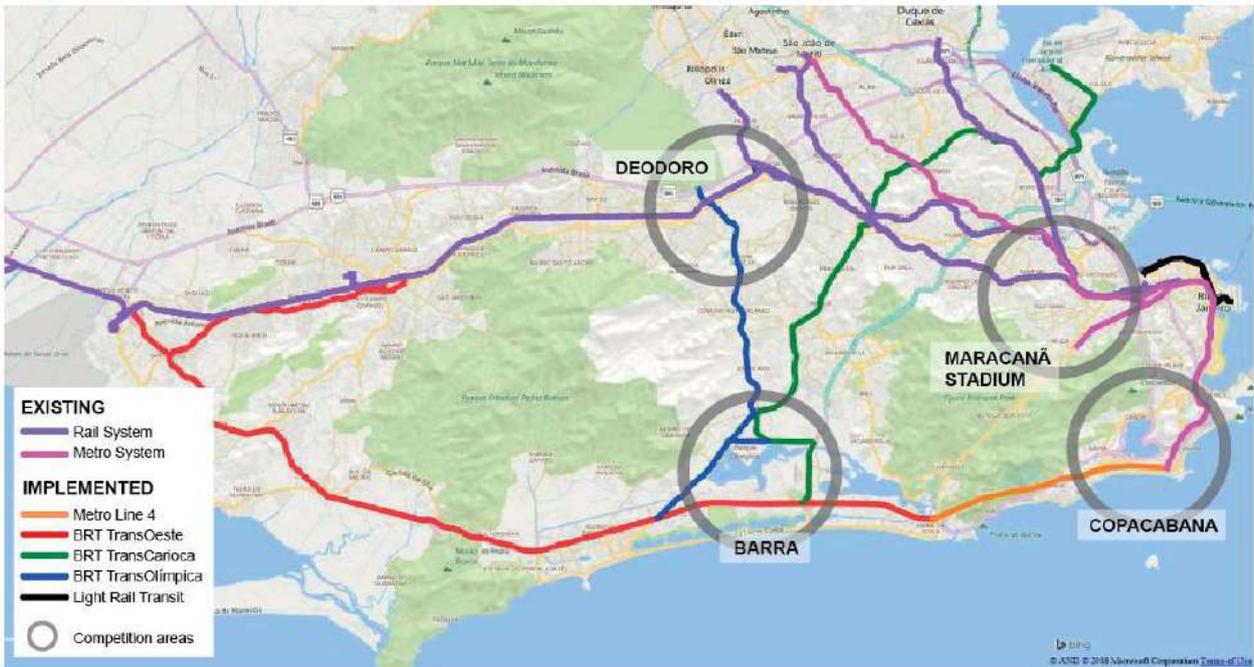
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Resource 13 for Question 4  
 Changes to public transport provision in Rio de Janeiro

PLANNED FOR THE 2016 OLYMPIC GAMES



IMPLEMENTED FOR THE 2016 OLYMPIC GAMES



**Notes:**

- **BRT: Bus Rapid Transit**
- **Metro: Subway system**

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**Resource 14 for Question 4**  
**Commentary on the impacts of the 2016 Olympics on Rio de Janeiro**

A 2019 study by Brazil's Institute for Applied Economic Research (IPEA) concluded that the 2016 Rio Olympics had generally positive economic impacts on the city of Rio de Janeiro. Reportedly, without the Games, the city's gross domestic product (GDP) per capita would have been 7.5% lower in the period leading up to the event (2012 to 2015). However, some had doubts as to the extent to which the 2016 Rio Olympic Games had truly benefitted the city. According to an AP report, the Rio Olympics ended up costing \$13 billion.

The level of impact has also been unequal within the city. While the Games took place in four areas (Barra da Tijuca, Deodoro, Copacabana and Maracanã), 84% of the direct Games-related costs – roughly about US\$2.2 billion – was invested in Barra da Tijuca, an affluent neighbourhood in Rio de Janeiro where the main Olympic Park and the Olympic Village were installed. The consortium that built a large portion of the Olympic Park promised to turn 60 per cent of it to public use after the Games, while the rest of the land was reportedly meant to become high-end condominiums.

Critics also suggested that infrastructure built for the Rio Olympics, such as three new bus-rapid transit lines (BRTs), had come at a high price for some poorer residents. It was calculated that more than 60,000 people in the city lost their homes between 2009 and 2013. In 2009, 275 of 800 of the residents of Vila Autodromo, a favela located near Barra de Tijuca where the Olympic Park was to be built, were ordered to leave. Almost three-quarters of the families removed from their homes were rehoused under the federal government's flagship social housing programme, *Minha Casa Minha Vida*. While some of these residents were moved to housing estates near their original homes, more than 8,600 families had been moved to the city's West Zone, in some cases up to 60km away from the city centre. This has had a massive impact on residents' job opportunities and mental health.

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**Copyright Acknowledgements:**

- Question 2 Resource 3 <https://en.climate-data.org/asia/philippines/benguet/itogon-20187/>
- Question 2 Resource 4 <https://www.msn.com/en-us/news/us/philippines-landslide-dozens-feared-buried-in-itogon-benguet/ar-BBNrhBz>
- Question 2 Resource 5 <https://www.boholchronicle.com.ph/2018/03/06/2>
- Question 2 Resource 6 <https://www.theguardian.com/world/2018/sep/17/mangkhut-leaves-death-destruction-and-chaos-from-philippines-to-china>
- Question 3 Resource 8 <https://link.springer.com/article/10.1007/s10784-018-9418-9>
- Question 3 Resource 9 <https://www.cia.gov/library/publications/the-world-factbook/geos/ir.html>
- Question 3 Resource 10 <https://financialtribune.com/articles/energy/99129/iran-desalination-capacity-to-rise-by-300000-cubic-meters-per-day-by-2021>
- Question 4 Resource 11 <http://catcomm.org/wp-content/uploads/2014/06/leolima3.jpeg>  
[https://st.depositphotos.com/1832225/3599/i/950/depositphotos\\_35995607-stock-photo-brazilian-favela-in-rio-de-jpg](https://st.depositphotos.com/1832225/3599/i/950/depositphotos_35995607-stock-photo-brazilian-favela-in-rio-de-jpg)
- Question 4 Resource 12 [https://theses.uhn.nl/bitstream/handle/123456789/3956/Janssen%2C\\_Anke\\_1.pdf?sequence=1](https://theses.uhn.nl/bitstream/handle/123456789/3956/Janssen%2C_Anke_1.pdf?sequence=1)
- Question 4 Resource 13 [https://collaboration.worldbank.org/content/sites/collaboration-for-development/en/groups/tod-cop/blogs.entry.html/2016/09/07/article\\_rio\\_olympic-NjRq.html](https://collaboration.worldbank.org/content/sites/collaboration-for-development/en/groups/tod-cop/blogs.entry.html/2016/09/07/article_rio_olympic-NjRq.html)
- Question 4 Resource 14 <https://www.olympic.org/news/new-independent-study-confirms-games-provided-significant-economic-benefit-to-rio-de-janeiro>  
<https://www.businessinsider.sg/rio-olympics-financial-disaster-2017-6/>

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[https://www.washingtonpost.com/world/the\\_americas/the-favela-next-to-rios-new-olympic-park-that-fought-to-survive-and-lost/2016/08/01/fc8496ce-55c2-11e6-b652-315ae5d4d4dd\\_story.html](https://www.washingtonpost.com/world/the_americas/the-favela-next-to-rios-new-olympic-park-that-fought-to-survive-and-lost/2016/08/01/fc8496ce-55c2-11e6-b652-315ae5d4d4dd_story.html)

<https://www.independent.co.uk/news/world/americas/rio-2016-olympics-favela-shanty-towns-evicted-brazil-a7168221.html>

<https://www.theguardian.com/world/2015/oct/28/brazil-officials-evicting-families-2016-olympic-games>



## Section A

**Theme 4: Geographical Investigation**

Formatiert: Nicht Hervorheben

**Elderly-friendly features at Bukit Merah View Food Centre and Market in Singapore**

- 1 The Bukit Merah View Food Centre and Market (FCM), located within the Bukit Merah neighbourhood in Singapore, had been recently renovated with new elderly-friendly features, such as wider walkways, slip-resistant flooring, and accessibility ramps.

Formatiert: Nicht Hervorheben

Accordingly, a group of 4 students decided to conduct fieldwork over a Saturday and Sunday at Bukit Merah View FCM, in order to investigate whether these upgrades have adequately met the needs of the elderly living in the Bukit Merah neighbourhood. They developed the following hypothesis:

**The new elderly-friendly features at Bukit Merah View Food Centre and Market have adequately met the needs of the elderly living in Bukit Merah.**

Formatiert: Schriftart: Fett, Nicht Hervorheben

The students chose to focus on elderly residents aged 65 and above who live near Bukit Merah View FCM. The students designed a questionnaire, and conducted a survey with 24 elderly residents. Upon completing their fieldwork, the students analysed their data and produced a report.

Formatiert: Nicht Hervorheben

Resource 1 shows the students' questionnaire. Some of the collected data, together with pie charts that the students created, are shown in Resource 2.

Formatiert: Nicht Hervorheben

- (a) Explain why the students' hypothesis may be appropriate for their investigation. [2]
- (b) With reference to Resource 1, explain **three** ways in which the students' questionnaire may limit the accuracy and/or reliability of their data collection. [6]
- (c) Suggest **two** ways in which the selected results from the survey in Resource 2 may be better represented to help the students understand how elderly residents feel about the new elderly-friendly features in Bukit Merah View FCM. [4]
- (d) ~~With reference to Resource 2, e~~Examine the extent to which the selected results from the survey in Resource 2 can support the students' hypothesis. [5]
- (e) Based on the students' findings in Resource 2, the students hope to better understand how a "feeder bus service" could be implemented to better serve the needs of the elderly residents who frequent Bukit Merah View FCM. [8]
- Explain how the students could go about collecting the necessary information. [8]

Formatiert: Nicht Hervorheben

## Section B

## Theme 1: Tropical Environments

## Mass movements in Philippines

2 Resource 3 shows the climate graph ~~for~~ Itoyon, a small mining town in the Philippines. Resources 4 and 5 are photographs of two different mass movement events that have occurred in the Philippines. ~~Mass movement events are not uncommon in the Philippines.~~ The mass movement event shown in Resource 4 occurred after Typhoon Mangkhut made landfall in the Philippines, in September 2018. Resource 5 shows a mass movement event at a limestone quarry site in Bohol, Philippines, in March 2018. Resource 6 gives information about ~~Typhoon Mangkhut and its~~ effects of Typhoon Mangkhut on Itoyon, a small mining town.

- (a) Describe the climatic characteristics of Itoyon as seen in Resource 3. [3]
- (b) Account for the climatic characteristics of Itoyon as seen in Resource 3. [54]
- (c) Compare the nature of the mass movements seen in Resources 4 and 5. [4]
- (d) ~~Discuss-Explain~~ the usefulness of Resource 6 in understanding the ~~effects severity~~ of the mass movement event following Typhoon Mangkhut as seen in Resource 4. [45]
- (e) Assess the relative importance of ~~climate~~ climatic factors in the occurrence of the mass movement event seen in Resource 4. [9]

## Theme 2: Development, Economy, and Environment

## Management of Water in Iran

3 Resource 7 shows the countries that are projected to ~~be~~ experience water stress ~~by in~~ 2040. Resource 8 shows the dams in the Harirud River Basin, a transboundary river basin ~~which that~~ crosses ~~through~~ Iran, Afghanistan, and Turkmenistan. Resource 9 contains a fact-sheet about Iran. Resource 10 gives an example of a possible solution to ~~manage water~~ alleviate water scarcity in Iran.

- (a) Describe the distribution of countries that are projected to experience water stress ~~by in~~ 2040 as seen in Resource 7. [4]
- (b) Compare the location of dams between the countries in the Harirud River Basin, as seen in Resource 8. [3]
- (c) With reference to Resources 8 and 9, explain why Iran is experiencing water scarcity. [7]
- (d) ~~With reference to~~ Using Resource 9, suggest ~~two~~ reasons why water scarcity is a pressing issue for Iran. [4]
- (e) With reference to Resources 8, 9 and 10, and your own knowledge, ~~assess explain the benefits and limitations of the effectiveness of the solution~~ [7]

Formatiert: Nicht Hervorheben

Kommentar [SN1]: Is this point necessary for understanding the context of the question? (Just to clarify!)

Formatiert: Nicht Hervorheben

Kommentar [NABH2]: Discuss-type of qn requires an evaluation of the resource, which is part of AO3.

We can't have other evaluative/recommendation-type of qns apart from the 9-m qn as there can only be 18m of AO3 in Paper 2.

Hence, the change to explain and change in weightage of marks. 1 mark is transferred to part b.

Kommentar [LWHP3]: Just to clarify, are we asking the students to assess the importance of "climate" or "climatic factors"? I'm asking because I'm just wondering how the students may want to use the tropical cyclone in their response. If they talk about the intense rainfall from the tropical cyclone...then that seems to be "climatic factors" than it is "climate".

Kommentar [SN4]: Agreed with Paul! I prefer 'climatic factors' as well.

Kommentar [NABH5]: Ok. I have changed it accordingly

Formatiert: Nicht unterstrichen

suggested in Resource 10 in alleviating issues of water scarcity in Iran.

**Kommentar [NABH6]:** This should not be an evaluation qn as there can only be evaluation/recommendation qn for 9-mark qns so as to meet the 18% AO3 required for Paper 2. Hence, the change to an explain-type of qn

### Theme 3: Sustainable Development

#### Impact of the 2016 Olympic Games on urban liveability in Rio de Janeiro, Brazil

- 4 Favelas are unregulated low-income neighborhoods unique to cities in Brazil. In 2016, the Summer Olympics was hosted at various locations in Rio de Janeiro, Brazil.

Resource 11 ~~features~~ ~~is a~~ photographs of ~~a~~ favelas in Rio de Janeiro, Brazil. Resource 12 shows ~~the~~ locations of favelas and ~~the~~ 2016 Olympic zones and venues in Rio de Janeiro. Resource 13 depicts changes to public transport provision in Rio de Janeiro that occurred as a result of the 2016 ~~Rio~~ Olympic Games. Resource 14 is a commentary on the impacts of the 2016 ~~Rio~~ Olympics on Rio de Janeiro.

- (a) Describe the characteristics of the favelas seen in Resource 11. [3]
- (b) Explain ~~two~~ ways in which the characteristics of favelas as seen in Resource 11 may impact the liveability of favela residents. [4]
- (c) Describe the distribution of favelas within the planned Olympic zones in Rio de Janeiro, as shown in Resource 12. [3]
- (d) With reference to Resources 12 and 13, explain how the 2016 Olympic Games might have benefitted the city of Rio de Janeiro. [6]
- (e) Using Resources 12 to 14, assess the extent to which ~~the~~ 2016 Olympic Games may have had more negative impacts on the poor than the rich in Rio de Janeiro. [9]

**Formatiert:** Nicht unterstrichen



**Catholic Junior College**  
**JC2 Preliminary Examinations**  
**Higher 2**

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**GEOGRAPHY**

**9751/01**

**Paper 1 Structured Essay Questions**

**21 August 2019**

**3 hours**

Additional Materials: Answer Paper

---

**READ THESE INSTRUCTIONS FIRST**

Write your class and name on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams, graphs or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagram and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, you are to hand in **each question separately**.  
The number of marks is given in brackets [ ] at the end of each question or part question.

**Start each question on a fresh sheet of paper. You will hand in each question separately.**

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## **Section A - Tropical Environments**

Answer **one** question from this section.

- 1(a) Explain the erosional processes that take place in the arid tropics. [12]
- (b) To what extent are erosional processes the dominant process affecting the development of landforms in the tropics? [20]
- 2(a) Explain how the seasonal variation in wind direction influences precipitation patterns during the African monsoon. [12]
- (b) Discuss the extent to which trade winds and monsoon winds affect precipitation characteristics in the tropics. [20]

## **Section B – Development, Economy and Environment.**

Answer **one** question from this section.

- 3(a) Explain the challenges of managing resource extraction in countries heavily dependent on the extractive industry. [12]
- (b) “The views of Malthus, Boserup and Harvey are not relevant to explaining the relationship between populations and resources today.” To what extent do you agree with this statement? [20]
- 4(a) Explain how states can encourage economic development in Less Developed Countries. [12]
- (b) “Countries endowed with resources are doomed to experience economic, environmental and social problems.” To what extent do you agree with this statement? [20]

### Section C – Sustainable Development

Answer **one** question from this section.

- 5(a) Explain the challenges in achieving sustainable development faced by cities in developed countries. [12]
- (b) “Developed Countries will face fewer challenges than Less Developed Countries in coping with global warming.” To what extent do you agree with this statement? [20]
- 6(a) Explain the needs faced by cities in rapidly urbanising countries. [12]
- (b) “Funding is the most important condition for successful management of urban problems.” To what extent do you agree with this statement? [20]

\*\*\*\* END OF PAPER \*\*\*\*



**Catholic Junior College**  
**JC2 Preliminary Examinations**  
**Higher 2**

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**GEOGRAPHY**

**9751/01**

**Paper 1 Structured Essay Questions**

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## ANSWER SCHEME

### Section A - Tropical Environments

Answer **one** question from this section.

- 1(a) Explain the erosional processes that take place in the arid tropics. [12]

*Indicative content*

Students should explain processes of erosion by water (splash erosion, rainwash and rillwash) and by wind (deflation and abrasion) that occurs in the arid tropics.

Better responses would be able to explain why these processes occur within the arid tropics.

- (b) To what extent are erosional processes the dominant process affecting the development of landforms in the tropics? [20]

*Indicative content*

Students should provide a well-evaluated evaluation discussing the extent to which erosional processes are the dominant process affecting the development of landforms in the tropics. This should be weighed against other processes such as weathering, mass movement, tectonic uplift, transportation/depositional processes by wind and climate change. Arguments should be well-exemplified. Overall stand should be consistent and well justified.

Better responses would be able to discuss how the dominant processes would vary according to whether they are landforms in the humid tropics (karst landforms), or landforms in the arid tropics (yardangs, dunes and/or loess).

- 2(a) Explain how the seasonal variation in wind direction influences precipitation patterns during the African monsoon. [12]

*Indicative content*

Students should explain how the seasonal variation in the wind direction would affect wet and dry seasons during the African monsoon.

Better responses would be able to contextualise this in both the West and East African monsoon.

- (b) Discuss the extent to which trade winds and monsoon winds affect precipitation characteristics in the tropics. [20]

*Indicative content*

Students should provide a well-evaluated evaluation discussing the extent to which trade winds and monsoon winds affect precipitation characteristics in the tropics. This should be contrasted with other factors affecting rainfall, such as topography, convectional heating,

ocean currents, continentality effect and climatic anomalies such as El Nino and cyclones. Arguments should be well-exemplified. Overall stand should be consistent and well justified.

Better responses would be able to weigh the relative importance of trade winds and monsoon winds with other factors, and link them to both the humid and arid tropics. They should also draw synoptic links to other topics such as global warming that may cause heavier rainfall in the humid tropics, and drier climates in the arid tropics.

### **Section B – Development, Economy and Environment.**

Answer **one** question from this section.

- 3(a) Explain the challenges of managing natural resource extraction in countries heavily dependent on the extractive industry. [12]

#### *Indicative content*

Responses can include a range of challenges/problems associated with natural resource extraction, such as economic, social and environmental challenges. Challenges are environmental pollution, income inequality, profit repatriation, economic vulnerability to global markets, political conflict, lack of local linkages and so on.

Better responses are able to (i) contextualise explanation to why dependent countries face these challenges, and (ii) explain the root reason for these challenges mentioned above (that could be linked to historical reasons, geographical concentration, lack of skilled labour, complacency and lack of diversification). Dependent countries are those that depend heavily on the extractive industry for economic growth, and tend to be from the poorest parts of the world. Examples are also considered relevant content that can be credited.

- (b) “The views of Malthus, Boserup and Harvey are not relevant to explaining the relationship between populations and resources today.” To what extent do you agree with this statement? [20]

#### *Indicative content*

Responses to acknowledge that these 3 theories have some level of relevance – relationship between resource and population whereby too much consumption can lead to deficits in supply of resources of food, technology and population, and the role of capitalism in causing lack of resources in some places due to uneven distribution of wages and capital. At the same time, these theories have flaws – why has Malthusian doomsday not occurred, is there a limit to technology in stretching the boundaries of the

environment, and is capitalism the cause of all resource scarcity problems or have they led to better outcomes for some countries?

Better responses will include explicit evaluation frames using global/national scale; time period of now vs then and what has changed. Responses in the better levels will also show how the 3 theories are different and each respond to the flaws in the other, as well as rank which theory might be most relevant today and why. Links to the global economy, development theories, tropical environments and sustainable development are possible as synoptic links. Detailed examples can be credited.

- 4(a) Explain how states can encourage economic development in Less Developed Countries. [12]

*Indicative content*

Responses can include a range of state-led strategies, including investing in businesses, starting export processing zones, providing public services like transport networks, telecommunications networks, regulating the economy for stability of investments, reskilling/upskilling, joining trade blocs, or even seeking loans from WB/IMF.

Better responses are able to (i) contextualise explanation to why these strategies can be used for LDCs (reference their comparative advantage in global economy, low level of skills and aspirations for higher-value added work), (ii) specific categories of state action/role instead of piecemeal processes, and (iii) link strategies to type of economic development i.e. employment, wages or capital inflow. Relevant examples will also be credited.

- (b) “Countries endowed with resources are doomed to experience economic, environmental and social problems.” To what extent do you agree with this statement? [20]

*Indicative content*

Responses can include the perspectives of potential economic, social and environmental problems that can occur – profit repatriation, low wages, economic vulnerability, social inequality, displacement, land, air and water pollution; as well as how they can be avoided, or benefit in these areas through strategies.

Better responses are those with points well-evaluated to include (i) exceptions, strategies, advantages, (ii) consolidate key trends that cause types of countries to be “doomed” and key trends that cause types of countries to avoid the curse (e.g. role of government in avoiding these curses can include diversification, regulation of profit repatriation, local linkage regulations, translation of profits or rents to other social development

initiatives especially education to upskill the people). Relevant examples will be credited. Synoptic links can be made across tropical environments, global economy, sustainable development and liveability.

### **Section C – Sustainable Development**

Answer **one** question from this section.

- 5(a) Explain the challenges in achieving sustainable development faced by cities in developed countries. [12]

*Indicative content*

Responses should start from the needs, limitations and trade-offs that sustainable development requires across all 3 dimensions of economy, society and environment. Challenges include having comprehensive range of economic opportunities for all sectors of the population, balancing trade-offs between environment and the economy, meeting the social needs of the aged, youths and disabled, defining what needs are now and in the future and so on.

Better responses are able to (i) contextualise explanation to why developed countries' cities face these challenge (link to higher standards imposed by Rio+ in terms of environmental standards like carbon emissions, ageing population which results in unique needs, deindustrialisation which is an economic problem, technology is advancing so fast that it makes it difficult to predict future limitations), (ii) acknowledge that key to the debates on SD are subjective definition of needs, limitations and trade-offs. Relevant examples will be credited.

- (b) “Developed Countries will face fewer challenges than Less Developed Countries in coping with global warming.” To what extent do you agree with this statement? [20]

*Indicative content*

Responses should cover the perspective that DCs can have fewer challenges because of technology, funding and political organisation, and the challenges that they also face, such as in their geophysical locations, size, higher standards imposed by the international community. Therefore, they may also face equal or worse challenges than LDCs.

Better responses are able to (i) evaluate each point using the evaluative frame of scale, extent, duration etc, (ii) draw trends and conclusions about what makes coping easier or more difficult. Relevant examples will be credited. Synoptic links can be made through tropical environments (floods, climate), global economy (pollutive industries are outsourced).

- 6(a) Explain the needs faced by cities in rapidly urbanising countries. [12]

*Indicative content*

Responses can include a range of needs such as economic, social and environmental. They are, but not limited to, need for employment opportunities, housing needs, waste management needs, transport needs and conservation of the environment.

Better responses are able to (i) contextualise explanation to why rapidly urbanising countries have these needs (LDCs), (ii) undergird explanation by the Brown Agenda that LDCs focus on. Relevant examples will be credited.

- (b) “Funding is the most important condition for successful management of urban problems.” To what extent do you agree with this statement? [20]

*Indicative content*

Responses can address the different conditions influencing successful management of urban problems – housing, transport, waste management, liveability.

Better responses are able to (i) evaluate each condition based on clear criteria such as issue type, context of cities (ii) compare the relative importance of each condition against funding, (iii) rank crucial condition. Relevant examples will be credited. Synoptic links can be drawn to global economy, tropical environments, climate change.

\*\*\*\* END OF PAPER \*\*\*\*

## Generic rubrics for Part A questions

### A H2 Generic Level Descriptors for 12m SEQ sub-part (a)

Level	Marks	Descriptors
4	10–12	Response is consistently analytical and comprises purposeful explanations. Response addresses the question fully using accurate and detailed knowledge. Depth of relevant knowledge and understanding is evident throughout. Response is coherent and use of terminology is accurate throughout.
3	7–9	Response is analytical and explanatory rather than descriptive. There is a clear focus on the question. Response demonstrates relevant knowledge and understanding. The response is coherent and the use of terminology is mostly accurate.
2	4–6	Response includes analysis and explanation but is generally dominated by description. Response reflects understanding of the question and is generally relevant. Some parts of the response may be unclear. Use of terminology is limited.
1	1–3	Response lacks focus on the question. Response is generally fragmentary and lacks a clear structure and organisation. There may be many unsupported, brief or incomplete assertions and/or arguments with some inaccurate use of terminology.
0	0	No creditworthy response.

**Note:** The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.

## Generic rubrics for Part B questions

### B.112 Generic Level Descriptors for 2011 SEQ Sub-part (b)

Level	Marks	Descriptors
<b>5</b>	17–20	Response is perceptive, logical and has strong evaluative elements. Evaluation is relevant and comprehensive. Strong evidence of synoptic thinking where knowledge from different topics is synthesised purposefully. Response fully addresses the demands of the question and features detailed and accurate knowledge reflecting depth of understanding of the subject content. The argument or discussion is coherent and well supported by relevant material. Use of terminology is accurate.
<b>4</b>	13–16	Response displays a sound evaluative element. There is some evidence of synoptic thinking through synthesising knowledge from different topics. Response is generally focussed on the demands of the question and features accurate knowledge, reflecting depth of understanding of the subject content. The argument or discussion is coherent and supported by relevant material. Use of terminology is accurate and appropriate.
<b>3</b>	9–12	Response is broadly evaluative rather than descriptive. Response addresses the question and features accurate knowledge, reflecting some understanding of the subject content. Argument or discussion is mainly coherent and supported by material which is largely relevant. Use of terminology is relevant and mostly accurate.
<b>2</b>	5–8	Response is largely descriptive. Response attempts to provide an argument to address the question. The weakest responses in this level may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Some lapses in use of terminology though generally accurate.
<b>1</b>	1–4	Response lacks focus on the question and may be largely irrelevant to it. Response is fragmentary and lacks clarity. There may also be unsupported assertions and/or arguments with limited or no use of relevant terminology.
<b>0</b>	0	No creditworthy response.

**Note:** The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.



**Catholic Junior College**  
**JC2 Preliminary Examinations**  
**Higher 2**

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**GEOGRAPHY**

**9751/02**

**Paper 2**

**2 September 2019**

**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

This Insert contains all the Photographs, Table and Figures referred to in the questions.

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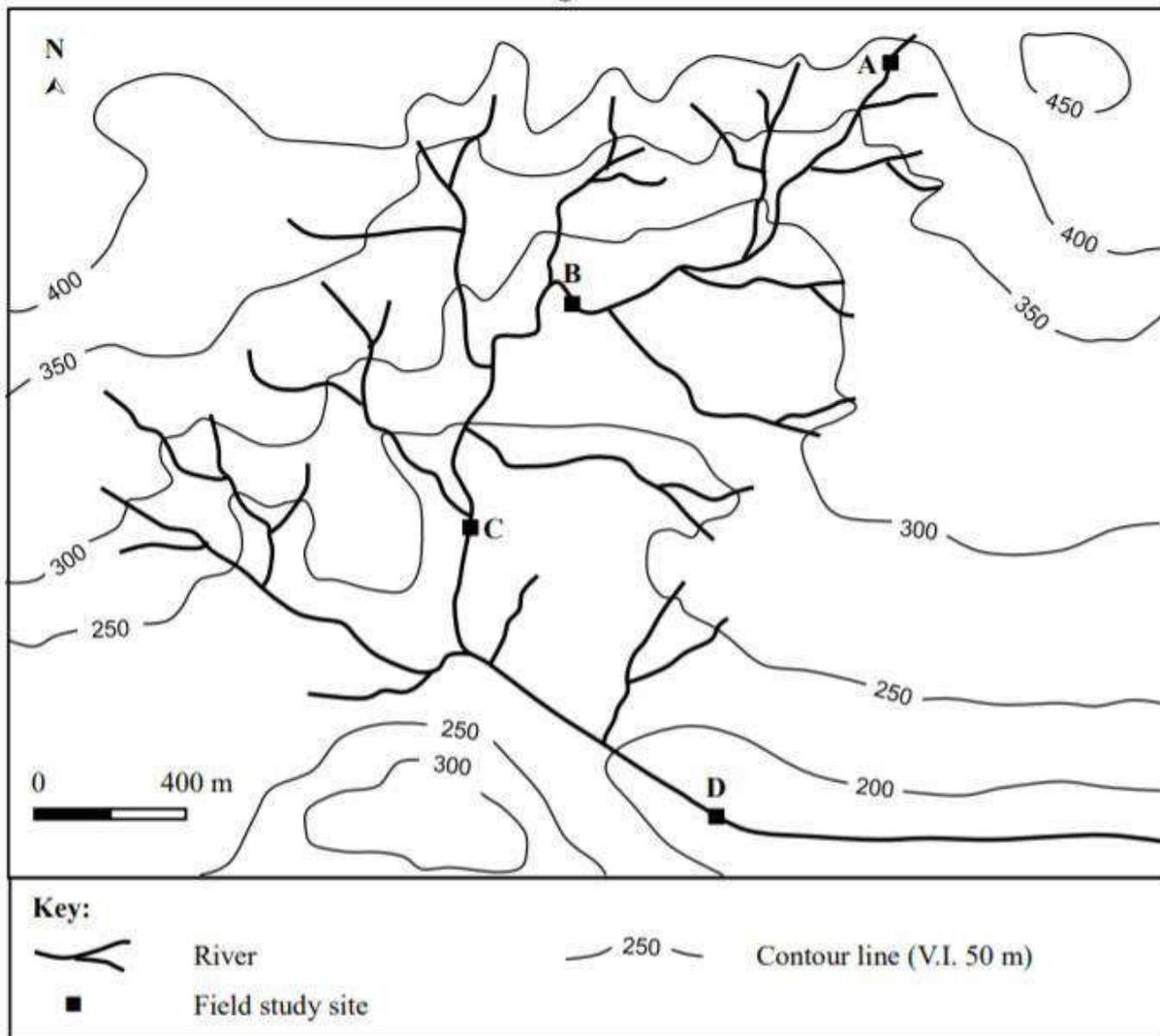
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### Resource 1 for Question 1

Sketch map of the river showing sites A to D



[Source: [http://www.socsc.hku.hk/jcwise/wp-content/uploads/2018/05/Final\\_MRMC\\_SYR\\_Dr-Ng\\_27Apr2018.pdf](http://www.socsc.hku.hk/jcwise/wp-content/uploads/2018/05/Final_MRMC_SYR_Dr-Ng_27Apr2018.pdf)]

## Resource 2 for Question 1

### Photograph at Site C



[Source: Unknown]

## Resource 3 for Question 1

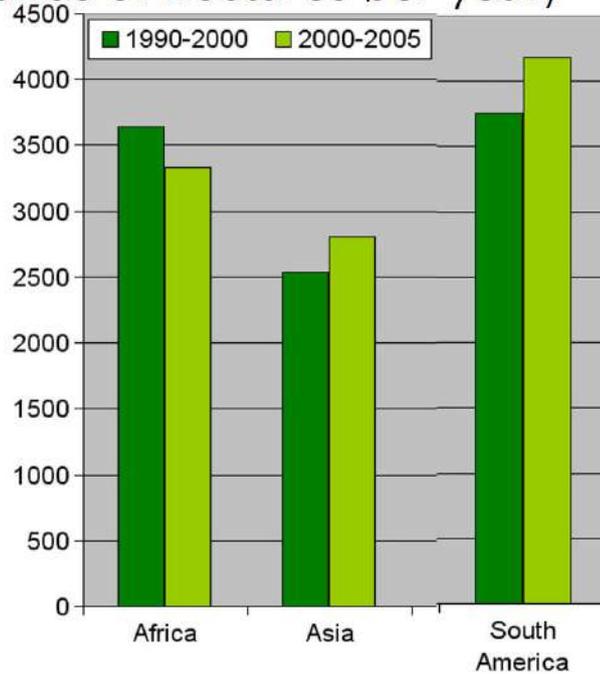
### Data of the river recorded at different sites

	Site A	Site B	Site C	Site D
Mean channel gradient (degrees)	11.0	7.0	4.5	0.4
Mean channel velocity (m/s)	0.06	0.10	0.08	0.88
Mean channel discharge (m <sup>3</sup> /s)	0.003	0.054	0.24	0.55

[Source: Unknown]

**Resource 4 for Question 2**

Tropical Deforestation By Region, 1990 – 2000, and 2000 - 2005 (thousands of hectares per year)

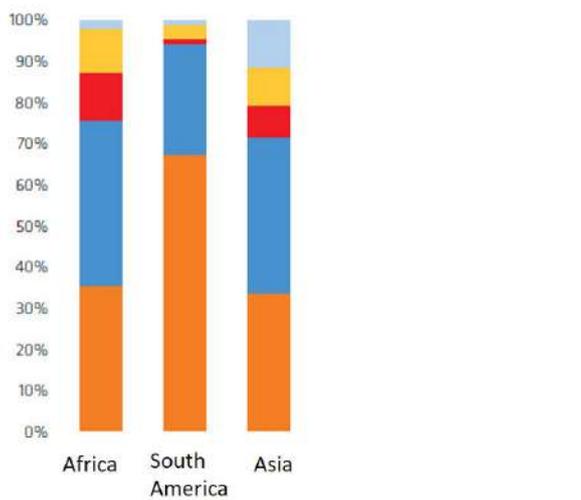


[Source: Adapted from www.mongabay.com]

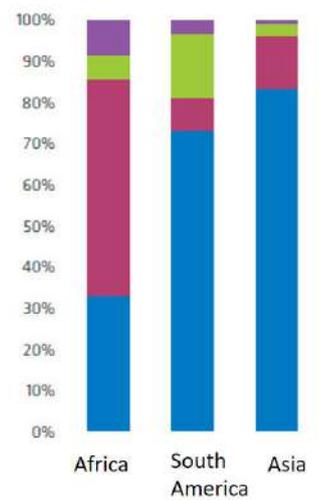
**Resource 5 for Question 2**

**Proportion of deforestation causes from 2000 to 2010**

a) Proportion of deforestation causes



b) Proportion of degradation causes



- Urban expansion
- Infrastructure
- Mining
- Agriculture (local/subsistence)
- Agriculture (commercial)

- Livestock grazing in forest
- Uncontrolled fires
- Fuelwood charcoal
- Timber logging

[Source: Adapted from www.mongabay.com]

## Resource 6 for Question 2

Satellite image of area near the river, Rio Jaciparana, and Buritis Village, Brazil in 2002 and 2012, showing extent of deforestation

2002

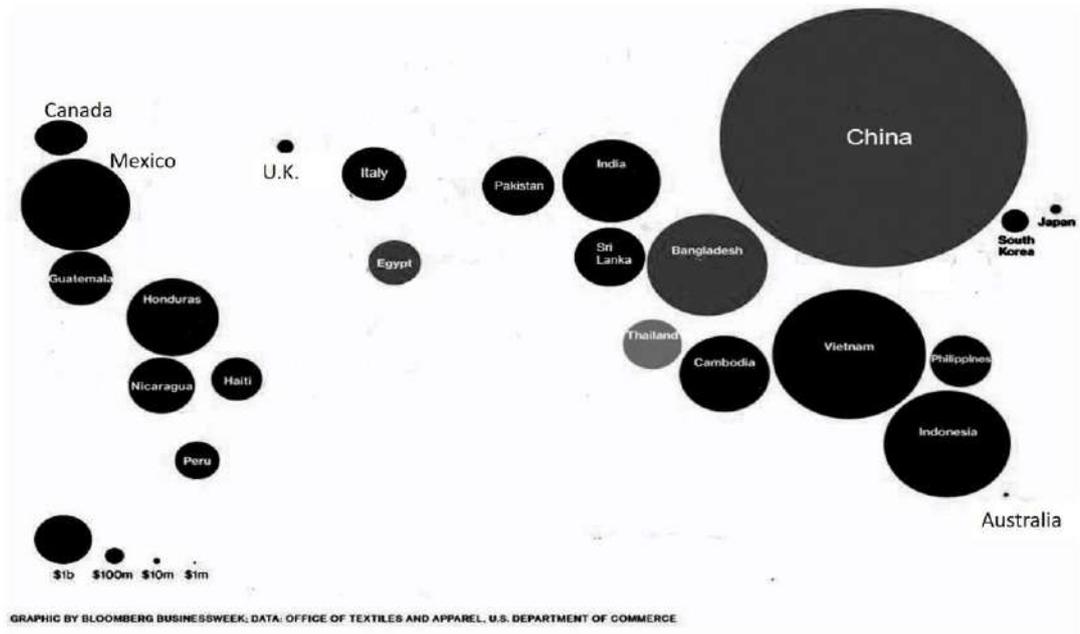
2012



[Source: Adapted from NASA Earth Observatory]

- Green parts show forests
- Brown parts are part of the village or deforested areas

**Resource 7 for Question 3**  
**Global sources of United States of America (USA) imports of apparel**



[Source: Adapted from [www.bloomberg.com](http://www.bloomberg.com)]

**Resource 8 for Question 3**  
**Monthly average wages (US\$) in apparel production for select economies in 2017**

Economy	Wages (US\$)
China	712
Bangladesh	101
Vietnam	234
Italy	2,489
India	400
U.K.	4,319
Hong Kong	1,552

[Source: Adapted from [www.asia.nikkei.com](http://www.asia.nikkei.com) and Y.H. Dennis Wei (2011) *Beyond the GPN-New Regionalism Divide in China: Restructuring the Clothing Industry*]

### Resource 9 for Question 3

Campaign poster by United Students Against Sweatshops (USAS), which was published in an American news website



**H&M** **LOW COST TO CUSTOMERS,  
HIGH COST TO WORKERS.**  
WORKERS SEWING H&M CLOTHING RISK THEIR LIVES  
IN DEATH TRAPS WHILE MAKING POVERTY WAGES.

In the past three years, over 1,800 workers have died in preventable factory fires and collapses in Bangladesh. H&M responded by signing onto the Bangladesh Accord on Fire and Building Safety, a legally binding agreement ensuring safe factory conditions for their workers. But just two years after signing on, H&M has failed to follow through on their part of the agreement. On top of this, workers sewing clothes for H&M don't make living wages. How can a company that made over \$10 billion in profit last year not pay their workers enough to live?

**DON'T LET H&M AVOID RESPONSIBILITY FOR THEIR WORKERS.  
NO MORE BROKEN PROMISES!**

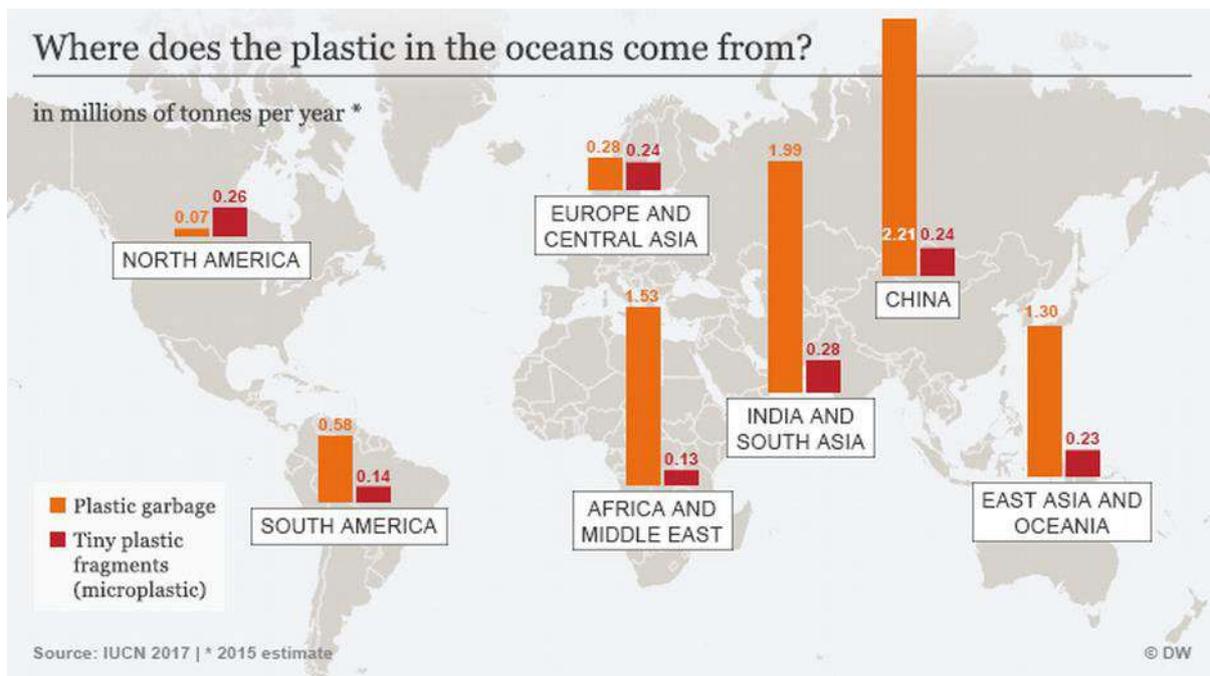
United Students Against Sweatshops. For more information visit [USAS.org](http://usas.org)

\* USAS is the largest anti-sweatshop organisation in the USA

(Source: <http://usas.org/campaigns/>)

### Resource 10 for Question 4

#### Sources of plastic waste around the world



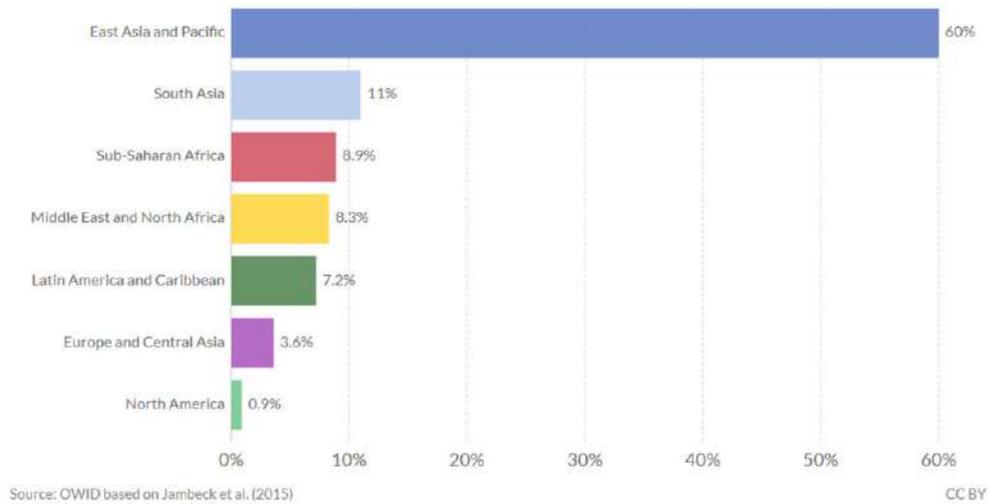
[Source: <https://www.dw.com/en/the-tough-task-of-tackling-the-plastic-problem/a-44046042-0>]

## Resource 11 for Question 4

### Percentage of mismanaged plastic by region

#### Global mismanaged plastic by region, 2010

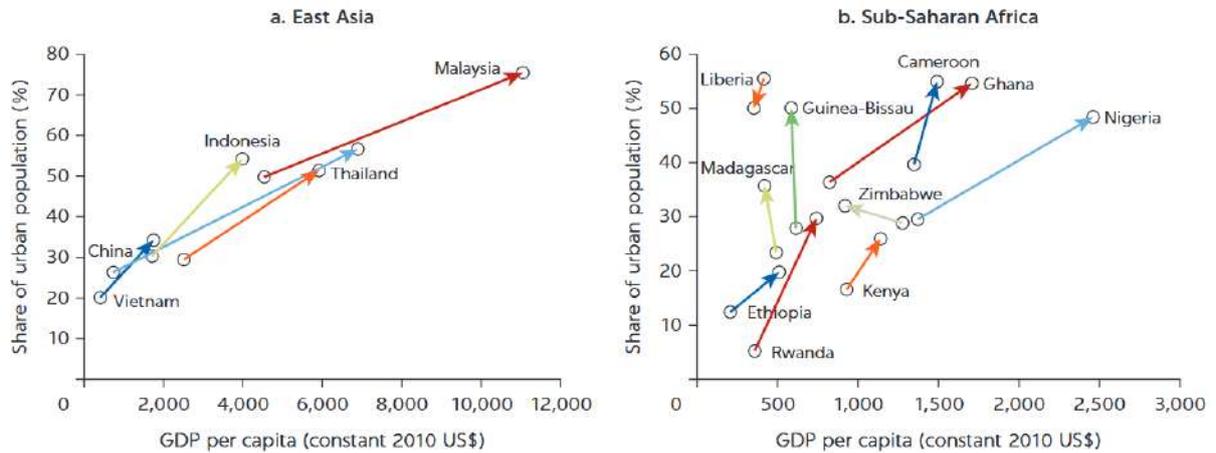
Share of global mismanaged plastic waste by region in 2010. This is measured as the total mismanaged waste by populations within 50km of the coastline, and therefore defined as high risk of entering the oceans. Mismanaged plastic waste is defined as "plastic that is either littered or inadequately disposed. Inadequately disposed waste is not formally managed and includes disposal in dumps or open, uncontrolled landfills, where it is not fully contained. Mismanaged waste could eventually enter the ocean via inland waterways, wastewater outflows, and transport by wind or tides."



[Source: <https://ourworldindata.org/plastic-pollution>]

## Resource 12 for Question 4

### Urbanisation levels of countries in East Asia and Sub-Saharan Africa



Source: Calculations based on World Development Indicators.  
Note: Data correspond to changes between 1990 and 2016.

[Source: <https://www.brookings.edu/blog/africa-in-focus/2019/05/09/figures-of-the-week-unique-challenges-facing-african-urbanization/>]







**Catholic Junior College**  
**JC2 Preliminary Examinations**  
**Higher 2**

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**GEOGRAPHY**

**9751/02**

**Paper 2**

**2 September 2019**

**3 hours**

Additional Materials: Answer Paper  
1 Insert

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**READ THESE INSTRUCTIONS FIRST**

Write your class and name on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams, graphs or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Candidates answer **all** questions.

The Insert contains all the Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagram and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, you are to hand in **each question separately**.  
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**Start each question on a fresh sheet of paper. You will hand in each question separately.**

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## Section A

### Theme 4: Geographical Investigations

#### Flood Risk Investigation in Hong Kong

- 1 A group of Geography students carried out geographical investigation along a river in the New Territories, Hong Kong, in February. They wanted to ascertain the flood risk of the region. They divided themselves into 4 teams of 8 members each to measure the cross-sectional area and river velocity of 4 selected sites along the river. The discharge of each of the 4 sections was calculated by multiplying the cross-sectional area of the river by the river velocity.

The teams were given the following equipment:

- 1 x Table Tennis ball
- 2 x Tape measures
- 2 x Stop watch
- 1 x Meter ruler
- 4 x Range poles

To measure river velocity, the time taken for the table tennis ball to cover a pre-determined distance defined by two range poles at the side of the river was recorded for each site. At the field study site C, the team collecting the data noticed that the table tennis ball was stuck in fallen trees or debris in the river. The data collected was then recorded using a data collection sheet.

To calculate the cross-sectional area, the width and depth of the river at each site had to be measured. The students laid an unweighted tape measure along the river bed to determine the width of the river. Depth measurements were taken at equal distances across the river using the meter ruler. This data was used to plot the river's wetted perimeter and then the cross sectional areas of the two rivers were calculated.

Resource 1 shows a sketch map of the river showing sites A to D where the students were assigned to. Resource 2 shows a photograph of Site C. Resource 3 shows the data of the river recorded at different sites.

- (a) With reference to the preamble and Resource 1, state a suitable hypothesis for the fieldwork investigation and explain its suitability. [3]
- (b) With reference to Resource 2, suggest what safety precautions the teams should take at Site C. [3]
- (c) Explain whether the river velocity data collected in Resource 3 is reliable, and suggest how the data collection could be improved to increase its reliability. [5]
- (d) Suggest two limitations of the data representation method shown in Resource 3 and sketch an appropriate diagram to represent velocity at the 4 sites. [5]
- (e) To what extent has the fieldwork exercise been useful in ascertaining the flood risk along the river in New Territories? [9]

## **Section B**

### **Theme 1: Tropical Environments**

#### **Tropical Deforestation in South America**

- 2** Resource 4 shows tropical deforestation by region from 1990 to 2000 and from 2000 to 2005 (thousands of hectares per year). Resource 5a shows the proportion of deforestation causes and 5b shows proportion of degradation causes from 2000 to 2010. Resource 6 shows a satellite imagery of an area near Rio Jaciparana (a river) and Buritis Village, Brazil, in 2002 and 2012.
- (a) With reference to Resource 4, describe the trends in tropical deforestation in the period 1990 to 2000 and in the period 2000 to 2005. [2]
  - (b) Using Resource 5a and your own knowledge, suggest reasons for the trends described in (a). [4]
  - (c) With reference to Resource 6, explain how and why a storm hydrograph at Rio Jaciparana for 2002 and 2012 might differ. [6]
  - (d) With reference to some of the resources, suggest possible effects of tropical deforestation. [4]
  - (e) Using Resources 5 - 6 and your own knowledge, recommend whether South America should focus on slowing the growth of urban areas to reduce deforestation and degradation. Justify your decision making. [9]

## Theme 2: Development, Economy and Environment

### United States of America's Apparel Industry

- 3** Resource 7 shows the global sources of the United States of America (USA) imports of apparel. Resource 8 shows the monthly average wages (US\$) for the apparel industry for select economies in 2017. Resource 9 shows a campaign poster by United Students Against Sweatshops (USAS), which was published in an American news website.
- (a) With reference to Resource 7, describe the sources of USA's imports of apparel. [4]
- (b) Using Resource 8 and your own knowledge, suggest reasons for the patterns described in (a). [4]
- (c) Suggest how Resources 8 and 9 reflect elements of the Dependency Theory. [5]
- (d) With reference to Resources 8 and 9, and your own knowledge, explain the roles of non-state actors in influencing the global garment industry. [6]
- (e) Using some resources and your own knowledge, suggest how the global shift of manufacturing may impact the USA's economic development. [6]

### **Theme 3 – Sustainable Development**

#### **Urban waste management in the Less Developed World**

- 4** Resource 10 shows the source of plastic waste from different regions of the world. Resource 11 shows global mismanaged plastic by region. Resource 12 shows the change in urbanisation level and change in Gross Domestic Product (GDP) per capita in the developing regions of East Asia and Sub-Saharan Africa.
- (a) With reference to Resource 10, describe the trends in sources of plastic in the oceans. [3]
- (b) With reference to Resources 10, 11 and 12, suggest reasons for the trends described in (a). [6]
- (c) Describe the patterns of change in urbanisation level and GDP per capita in Sub-Saharan Africa in Resource 12. [4]
- (d) Suggest potential urban problems arising from the trends in (c). [4]
- (e) With reference to some resources and your own knowledge, explain why environmental indicators such as plastic waste are insufficient indicators of sustainable urban development in less developed countries. [8]

\*\*\*\* END OF PAPER \*\*\*\*



**Catholic Junior College**  
**JC2 Preliminary Examinations**  
**Higher 2**

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**GEOGRAPHY**

**9751/02**

**Paper 2**

**2 September 2019**

**3 hours**

Additional Materials: Answer Paper  
1 Insert

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**READ THESE INSTRUCTIONS FIRST**

Write your class and name on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams, graphs or rough working.  
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## Section A

### ANSWER SCHEME

#### Theme 4: Geographical Investigations

#### Flood Risk Investigation in Hong Kong

- 1 A group of Geography students carried out geographical investigation along a river in the New Territories, Hong Kong, in February. They wanted to ascertain the flood risk of the region. They divided themselves into 4 teams of 8 members each to measure the cross-sectional area and river velocity of 4 selected sites along the river. The discharge of each of the 4 sections was calculated by multiplying the cross-sectional area of the river by the river velocity.

The teams were given the following equipment:

- 1 x Table Tennis ball
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- 1 x Meter ruler
- 4 x Range poles

To measure river velocity, the time taken for the table tennis ball to cover a pre-determined distance defined by two range poles at the side of the river was recorded for each site. At the field study site C, the team collecting the data noticed that the table tennis ball was stuck in fallen trees or debris in the river. The data collected was then recorded using a data collection sheet.

To calculate the cross-sectional area, the width and depth of the river at each site had to be measured. The students laid an unweighted tape measure along the river bed to determine the width of the river. Depth measurements were taken at equal distances across the river using the meter ruler. This data was used to plot the river's wetted perimeter and then the cross sectional areas of the two rivers were calculated.

Resource 1 shows a sketch map of the river showing sites A to D where the students were assigned to. Resource 2 shows a photograph of Site C. Resource 3 shows the data of the river recorded at different sites.

- (a) With reference to the preamble and Resource 1, state a suitable hypothesis for the fieldwork investigation and explain its suitability. [3]

Point marked (accept any possible answer- One of the following)

Possible hypothesis:

'The flood risk at site A and B is higher than the flood risk at Site C and D.'

'The higher the discharge is, the greater the flood risk.'

- (b) With reference to Resource 2, suggest what safety precautions the teams should take at Site C. [3]

Point marked (full marks to be awarded to responses with at least 2 precautions, 2 marks for well-elaborated answers)

- Students should do a visual check if there are dangerous animals in the river or along the river banks e.g. crocodiles, monitor lizards etc before proceeding to carry out the fieldwork
  - Determine the best section for making wading measurements by noting the potential risk such as slippery rocks, deep segments, pot holes
  - Students collecting data in the river should always probe the stream bed ahead with a rod when moving from bank to bank. Keep your feet spread apart and alignment of legs parallel to the flow for better stability.
  - Always follow safety precautions when entering the stream. If the water is too deep or swift, select another site. Never venture out into the stream alone without another person available to assist you in case of emergency.
  - Determine whether the river stage is rising or falling. Beware of rapid rises in river stage when wading and anticipate and allow for changes in flow conditions at the end of the measurement. It is a good idea to select an object (rock, stump, mark along bank, etc.) that is just above water surface and keep watching it to determine if the river stage is rising or falling.
- (c) Explain whether the river velocity data collected in Resource 3 is reliable, and suggest how the data collection could be improved to increase its reliability. [5]

Point marked (3 marks for explanation and 2 marks for improvement)

Limitations:

Data was collected in February during the dry season, might not reveal accurate discharge data.

Only one measurement was taken for each of the river sites

Measuring tape was unweighted leading to possible inaccuracies in the measurement of river width.

In addition, there were some issues concerning the use of the table tennis ball as a floating device for the measurement of river velocity. This led to it being stuck by debris and rocks found along the river bed.

Improvements made to planning:

- have a contingency plan to come back during the wet season in June/July and if possible during the intermonsoonal months of March and September to do stream measurements so that an average could be obtained across one year (annual Q) apart from noting the peak and low flow periods.
- Alternatively, students can also look for secondary data to find out about the level of discharge during the wet season to reduce the risk of having to collect primary data as discharge levels will be higher.
- To obtain more than one measurement per day instead of just once in the day. Afternoon measurements may record a different reading owing to greater surface evaporation.

Improvements made to the data collection process:

- When measuring the overall river width, it will be better to use a rope, securing the ends of the rope to iron pegs lodged securely into the ground of the river banks. This will allow the rope to be pulled tightly and taut so that the measurement is accurate.
- As there are irregularities in the river beds, students might want to consider adopting irregular intervals for depth measurements instead of regular intervals. This will allow for a more accurate measurement of the wetted perimeter and eventually the cross-sectional area.
- Students might want to consider other floating devices for velocity measurement e.g. food-grade colour dye, dried orange peel. In addition, they should obtain 3 sets of velocity readings in order to obtain the average velocity of river flow.

- (d) Suggest two limitations of the data representation method shown in Resource 3 and sketch an appropriate diagram to represent velocity at the 4 sites. [5]

Point marked

- The data representation method in use is not visually friendly as numbers are presented in table format. There are many numbers in columns and rows making it hard to focus on reading the desired information.
- In addition, the table format does not allow students to see the trend regarding the change in velocity across the 4 sites of the river.
- Better to sketch a line graph to clearly show the change in velocity

across the 4 sites (x-axis shows sites A to D while the Y-axis indicates the velocity).

- (e) To what extent has the fieldwork exercise been useful in ascertaining the flood risk along the river in New Territories? [9]

Levels marked – refer to generic rubrics in syllabus

[Arguments for]

- The data is useful as it gives some idea of the relationship between the river velocity and discharge. As seen from Resource 3, Site D has a higher velocity than any of the other sites and this may represent higher flood risk. Flooding occurs when a river exceeds bankfull discharge. So the velocity will give us an indicator of which river is more likely to exceed bankfull discharge

[Arguments against]

- However, this data is only based on measurements within a few hours of a particular day in February and the results may not be conclusive enough about the flood risks, especially when the data is collected during the dry season of Hong Kong.
- However, this data alone is insufficient to inform us of flood risk as flood risk would also entail the overtopping of bank nature of the catchment area (such as land use patterns, relief, vegetation cover and drainage density), may affect infiltration rates and the amount of water flowing to the river.
- Besides, there are also problems with the way the velocity was calculated. The obstructions in the channel have caused the float to be stuck frequently at River A.
- More information is required such as a flood risk matrix and also the infiltration rates of the different sites in order to determine flood risk in a more comprehensive way.
- A flood risk matrix can be used to determine the flood risks of all sites along the river. This can be done by assessing the land use of Site A to Site D as well as its proximity to the river. If the land use value is high (e.g. expensive housing), and it is close to the river, the flood risk will be high as the damages caused by flooding would be more severe compared to a naturally vegetated area being flooded.

[Conclusion] Hence, the river velocity data is not very accurate and helpful in ascertain flood risk at the two rivers.

## Section B

### Theme 1: Tropical Environments

#### Tropical Deforestation in South America

**2** Resource 4 shows tropical deforestation by region from 1990 to 2000 and from 2000 to 2005 (thousands of hectares per year). Resource 5a shows the proportion of deforestation causes and 5b shows proportion of degradation causes from 2000 to 2010. Resource 6 shows a satellite imagery of an area near Rio Jaciparana (a river) and Buritis Village, Brazil, in 2002 and 2012.

**(a)** With reference to Resource 4, describe the trends in tropical deforestation in the period 1990 to 2000 and in the period 2000 to 2005. [2]

Point-marked (1 mark per trend)

- Both Asia and S America increased in tropical deforestation area (250 thousand hectares and 1000 thousand hectare).
- Africa decreased in tropical deforestation area (500 thousand hectares).
- Ranking of regions remain the same i.e. S America, Africa, Asia.

**(b)** Using Resource 5a and your own knowledge, suggest reasons for the trends described in (a). [4]

Levels marked

Level 2 (3-4m): Response refers to Resource 5a, and shows logical links between the factors and proportion of causes with the trends shown in (a). Highest marks for data shown, explanations of root causes and knowledge of stakeholders,

Level 1 (1-2m): Response shows limited reference to Resource 5a, and shows tenuous links between factors and proportion of causes with the trends shown in (a).

Possible points:

- Urban expansion and agriculture are major reasons for deforestation in Asia, and this can explain the growth in deforestation in Asia. Explain why.
- South America continues to be high because agriculture is aggressively expanding there e.g. cattle ranching and soy plantations, and this is the main cause of deforestation in S.A.
- In Africa, there is a decline possibly because of internationally protected areas that disallow governments to issue licenses for deforestation to companies.

- (c) With reference to Resource 6, explain how and why a storm hydrograph at Rio Jaciparana for 2002 and 2012 might differ. [6]

Point marked

- 2 marks: description of storm hydrographs differences
- 4 marks: explanation of lag time, ascending and descending limb

Possible points:

- You can tell that deforestation has increased in area surrounding Buritis Village.
- **Lag time of storm hydrograph** is shorter due to more overland flow. Overland flow results from less trees for interception, and less infiltration due to lack of roots to create secondary permeability in the soil. Storm water flows on land faster to the Rio Jaciparana and hence, shorter lag time.
- **Peak flow can be higher.** Due to the quick overland flow, discharge reaches the channel all at once, instead of a steady stream of base flow.
- **Bankfull discharge** could be reached faster due to lower capacity of the channel. This is due to the soil erosion that takes place due to overland flow, bringing sediments to the channel and depositing it there.
- **Less baseflow**, due to less infiltration, and less percolation into the subsurface.

- (d) With reference to some of the resources, suggest possible effects of tropical deforestation. [4]

Point marked (maximum of 2 m each point)

- Landslides
- Soil erosion and sedimentation
- Disruption of ecosystems and loss of biodiversity
- Disruption of biogeochemical cycles
- Release of stored carbon

- (e) Using Resources 5 - 6 and your own knowledge, recommend whether South America should focus on slowing the growth of urban areas to reduce deforestation and degradation. Justify your decision making. [9]

Levels marked

- The balanced approach would be to elaborate on the following:
  - Acknowledge that urban expansion is one of the causes, and it should definitely be reduced.
    - There are so many problems associated with deforestation (as per the resources)
    - Acknowledge that S. A remains the highest in terms of deforestation rates.
  - But urban expansion is not the most important reason. **The most important reason is agriculture** as seen in resources 5a and 5b.
  - Governments should target these as they result in large scale clearance of land, and are motivated by profits.
  - Infrastructure is small, but it facilitates deforestation through providing roads into the forests.
  - Elaborate on the other causes of deforestation.
  - **Explain that it is not about simply focusing on the reasons but the stakeholders** e.g. TNC, provincial governments, small scale farmers etc... working with the international community and NGOs.

C H2 Generic Level Descriptors for Open-Ended 9m DRQ on Themes 1, 2 and 3

Level	Marks	Descriptors
3	7-9	<p>Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.</p> <ul style="list-style-type: none"> <li>• Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Makes a decision which clearly addresses different elements of the issue and/or interest of different stakeholders</li> </ul>
2	4-6	<p>A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.</p> <ul style="list-style-type: none"> <li>• Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Shows some attempt to address different elements of the issue and/or views of different stakeholders when making a decision but is not well-developed</li> </ul>
1	1-3	<p>Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response.</p> <ul style="list-style-type: none"> <li>• Provides little or no evaluation</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Evidence of decision-making, if present, is simple and may be flawed</li> </ul>
0	0	No creditworthy response.

## Theme 2: Development, Economy and Environment

### United States of America's Apparel Industry

- 3** Resource 7 shows the global sources of the United States of America (USA) imports of apparel. Resource 8 shows the monthly average wages (US\$) for the apparel industry for select economies in 2017. Resource 9 shows a campaign poster by United Students Against Sweatshops (USAS), which was published in an American news website.

- (a)** With reference to Resource 7, describe the sources of USA's imports of apparel. [4]

Point marked

- 2m: Largest volume of imports of garments come from LDCs such as China (\$5.5 billion) Vietnam (\$2.75 billion), Indonesia (2.25 billion), Bangladesh (1.75 billion) & Mexico (1.75 billion).
- 2m: Concentration of imports from countries situated in Asia (e.g. China, India, Pakistan, Bangladesh, Cambodia, Vietnam, Indonesia) and South America (Mexico, Guatemala, Honduras, El Salvador, Honduras etc.).

- (b)** Using Resource 8 and your own knowledge, suggest reasons for the patterns described in (a). [4]

Point marked (2 marks per point)

- Cheaper labour costs, higher amount of import. Higher labour costs, lower amount of import.
- Quote data.
- Favourable government policy to support export processing zones - e.g infrastructure, lower taxes, good infrastructure
- USA firms outsource and offshore production circuit components

- (c)** Suggest how Resources 8 and 9 reflect elements of the Dependency Theory. [5]

Point marked

- Dependency theory suggests that countries are locked into lower levels of development because of structures that result in exploitation of the LDCs.
- Resource 5 shows low wages especially for Bangladesh and Vietnam, which imply that surplus value (profits) have been extracted from the workers there.

- Resource 6 shows the poor working conditions of the workers, which indicates exploitation as well.
- Profits flow back to the headquarters of many of these TNCs that have either placed their branch plants here or have contracted these Bangladeshi and Vietnamese firms to do their low-end work.
- Bangladesh and Vietnam will also not have the incentive to increase the minimum wage levels and remained locked and dependent on such investments.

- (d) With reference to Resources 9 and 10, and your own knowledge, explain the roles of non-state actors in influencing the global garment industry. [6]

Levels marked

- Level 3 (5-6m) Responses cover all non-state actors and specify the type of influence to production, consumption and location. Clear links are drawn to the type of influence in the global garment industry - location, standards of production (environmental, labour, product), international trade
- Level 2 (3-4m) Responses cover one or both non-state actors. Type of influence and actor is not specified, with little links to garment industry.
- Level 1 (1-2m) Response covers one or both non-state actors, but does not specific type or influence to garment industry at all.
- NSA - Media agencies, watchdogs, standard organisation

- (e) Using some resources and your own knowledge, suggest how the global shift of manufacturing may impact the USA's economic development. [6]

Levels marked

- Level 2 (4-6m): All resources are used and linked to the impact on economic development. Areas of economic development are explicit e.g. loss of jobs, movement to other parts of production circuit, reskilling that leads to higher average wages, deindustrialisation etc. Best responses indicate who in the USA suffer or benefit from the impacts.
- Level 1 (1-3m): Responses are fragmentary and explanations are brief, with no explicit mention of what constitutes development and who suffers/benefits.

## Theme 3 – Sustainable Development

### Urban waste management in the Less Developed World

4 Resource 10 shows the sources of plastic waste from different regions of the world. Resource 11 shows global mismanaged plastic by region. Resource 12 shows the change in urbanisation level and change in Gross Domestic Product (GDP) per capita in the developing regions of East Asia and Sub-Saharan Africa.

(a) With reference to Resource 10, describe the trends in sources of plastic in the oceans. [3]

Point marked

- Plastic garbage is highest for developing countries – South America, Africa and Middle East, Indian and South Asia, China, East Asia and Oceania. Data.
- Lowest in developed regions of N America, Europe and Central Asia. Data.
- Microplastics are generally lower in proportion to plastics, but more for N America. Data.

(b) With reference to Resources 10, 11, and 12 suggest reasons for the trends described in (a). [6]

Point marked (maximum of 3m for each explanation which includes reference to both resources)

- DCs have the technology and proper waste disposal that does not lead to the oceans. Could be exports, incineration or landfills. Elaborate on these strategies.
- N America has more microplastics because normal waste is disposed of “properly”, as per Resource 12, while microplastics could have been broken down by these disposal solutions and inadvertently flow to the sea.
- LDCs may not have the infrastructure or regulation to manage plastic waste, thus resulting in waste being thrown indiscriminately into the sea. Mismanaged waste the most in E Asia and the Pacific in Resource 12.
- LDCs may receive the imported plastic waste from DCs and dump them into the sea.
- Rising economies in China, East Asia and Middle East lead to more consumption and thus more plastic waste is generated.

(c) Describe the patterns of change in urbanisation level and GDP per capita in Sub-Saharan Africa in Resource 12. [4]

Point marked

- East Asia shows positive relationship between urbanisation level and GDP p.c. while SSA shows a little more variation in urbanisation level in GDP p.c. Data.
  - 2m for E Asia
  - 2m for SSA
- (d) Suggest potential urban problems arising from the trends in (c). [4]
- Environmental
  - Economic
  - Transport
  - Social (housing)
- (e) With reference to some resources and your own knowledge, explain why environmental indicators such as plastic waste are insufficient indicators of sustainable urban development in less developed countries. [8]

#### Levels marked

- Level 2 (5-8m): Responses are thoroughly explained and show a keen understanding of SUD, and other dimensions besides environmental dimension.
- Level 1(1-4m): Response lacks explanation and/or do not show a keen understanding of SUD dimensions in LDCs.

#### Possible points:

- Insufficient as it is not holistic in covering all SD dimensions
  - *Elaborate on 2-3 examples of how economic and social dimensions can be measured*
- Even within the environment dimension, plastic waste itself is insufficient
  - *Elaborate on 1-2 examples of other environmental indicators (e.g. pollution index, ecological footprint)*
- The data collection process/methods of obtaining plastic waste data may be problematic
  - *Elaborate on 2-3 difficulties of obtaining such data (e.g. timeliness, lack of proper measuring tools)*

\*\*\*\* END OF PAPER \*\*\*\*

<b>Name:</b>		<b>Index Number:</b>		<b>Class:</b>	
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**DUNMAN HIGH SCHOOL**  
**PRELIMINARY EXAMINATIONS**

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**HIGHER 2 GEOGRAPHY**

**9751/02**

Paper 2 Data Response Questions

INSERT

**Tuesday**

**24 September 2019**

**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

This insert contains all the Resources referred to in the question paper.

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This document consists of **16** printed pages

**[Turn over**

**Resource 1 for Question 1**

**Map of India and Mangalore**



**Site of data collection in Tannirbhavi Beach**

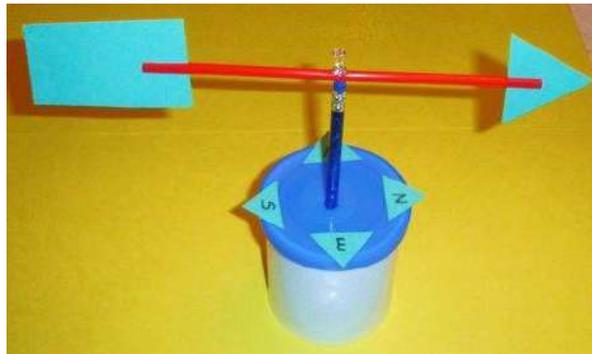


Key:  *Location of site of fieldwork*

Resource 2 for Question 1

Equipment used to collect climatological data

Handmade wind vane



Electronic Rain Gauge  
(March)



Handmade Rain Gauge  
(May)



Compass



**Resource 3 for Question 1**

**Results of the investigation**

	<b>1<sup>st</sup> March</b>		<b>31<sup>st</sup> May</b>	
	<b>Wind direction</b>	<b>Amount of rain in rain gauge</b>	<b>Wind direction</b>	<b>Amount of rain in rain gauge</b>
<b>3am</b>	North	0.5 cm	Southwest	3 cm
<b>9am</b>	North	0 cm	Southwest	5 cm
<b>3pm</b>	Northeast	0 cm	West	20 cm
<b>9pm</b>	North	0.5 cm	West	10 cm

Resource 4 for Question 2

Section of the Brahmaputra River in Tangail, Bangladesh



**Key**

→ Direction of river flow

3 km

**Resource 5A, 5B and 5C for Question 2**

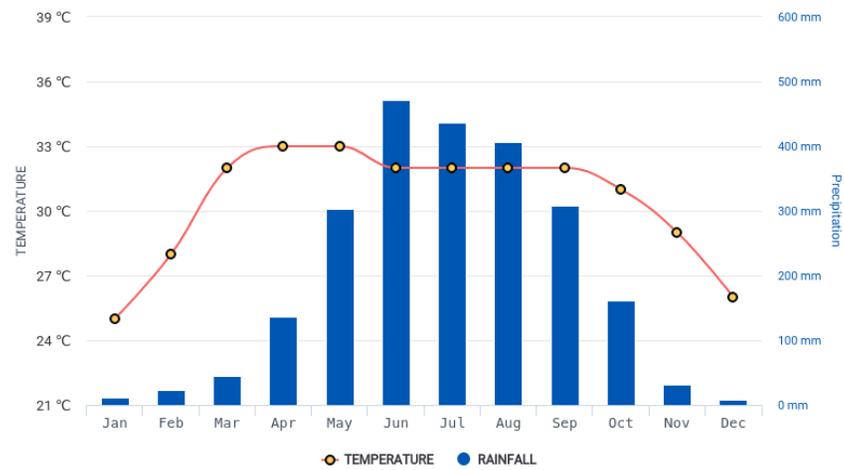
**Resource 5A for Question 2**

**Nature and extent of flooding in Bangladesh**

**Resource 5B for Question 2**

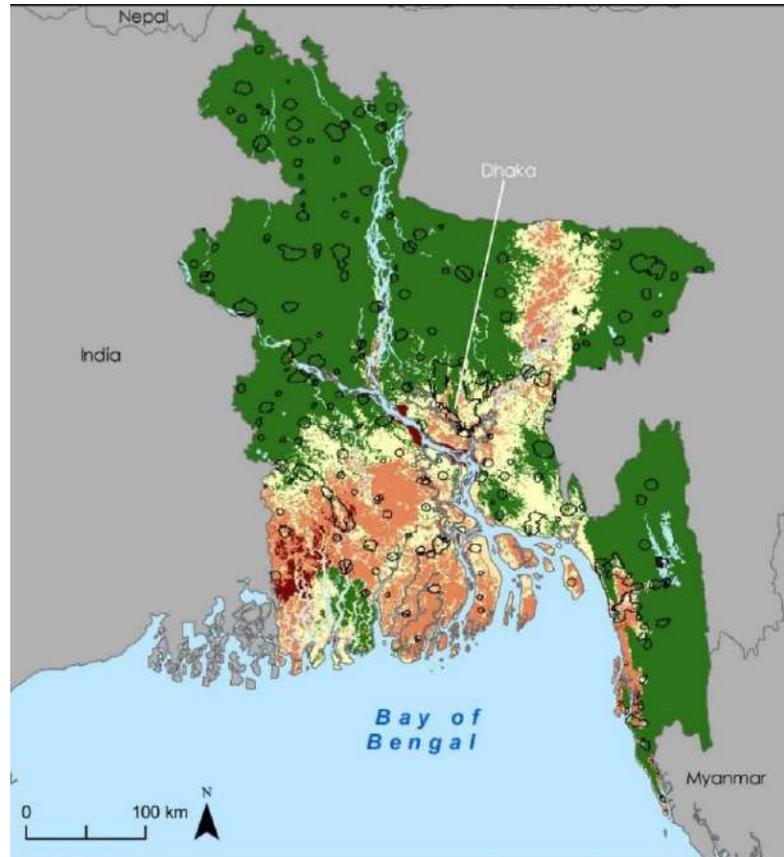
**Climograph of Tangail**

Deforestation in the Himalayas



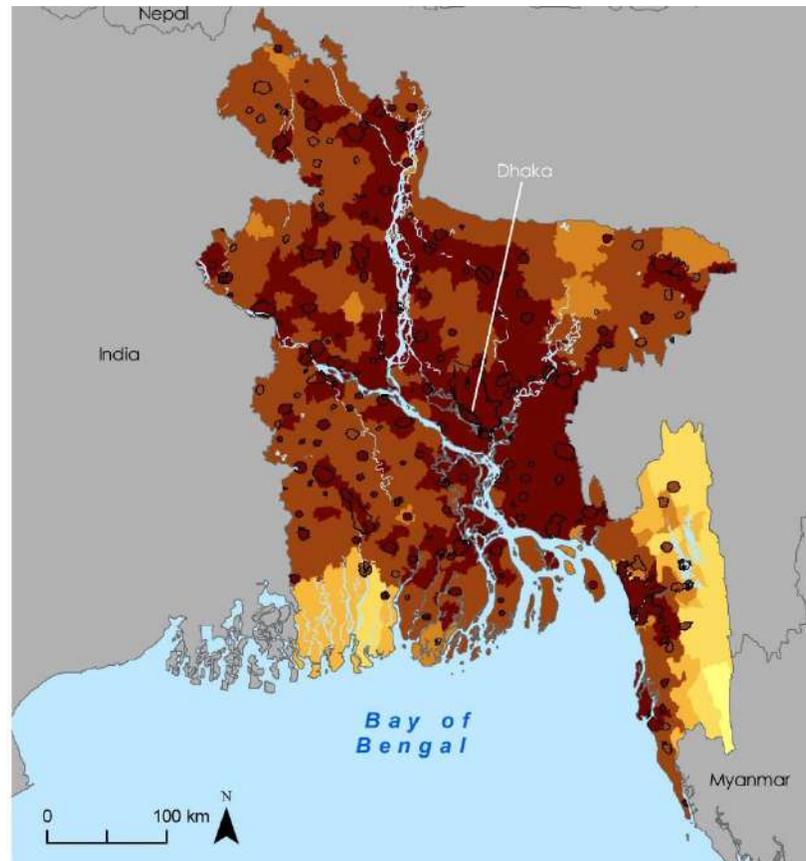
## Resource 5C for Question 2

## Relief map of Bangladesh

Key

## Resource 6 for Question 2

## Population density of Bangladesh (2017)

**Key**

**Resource 7 for Question 2**



*The passage of Tropical Cyclone Mora, a category 1 storm, in 2017.*

*Battered Rohingya settlement. There was reportedly no formal evacuation plan. 500,000 people fled the coastal villages and 3 were killed.*

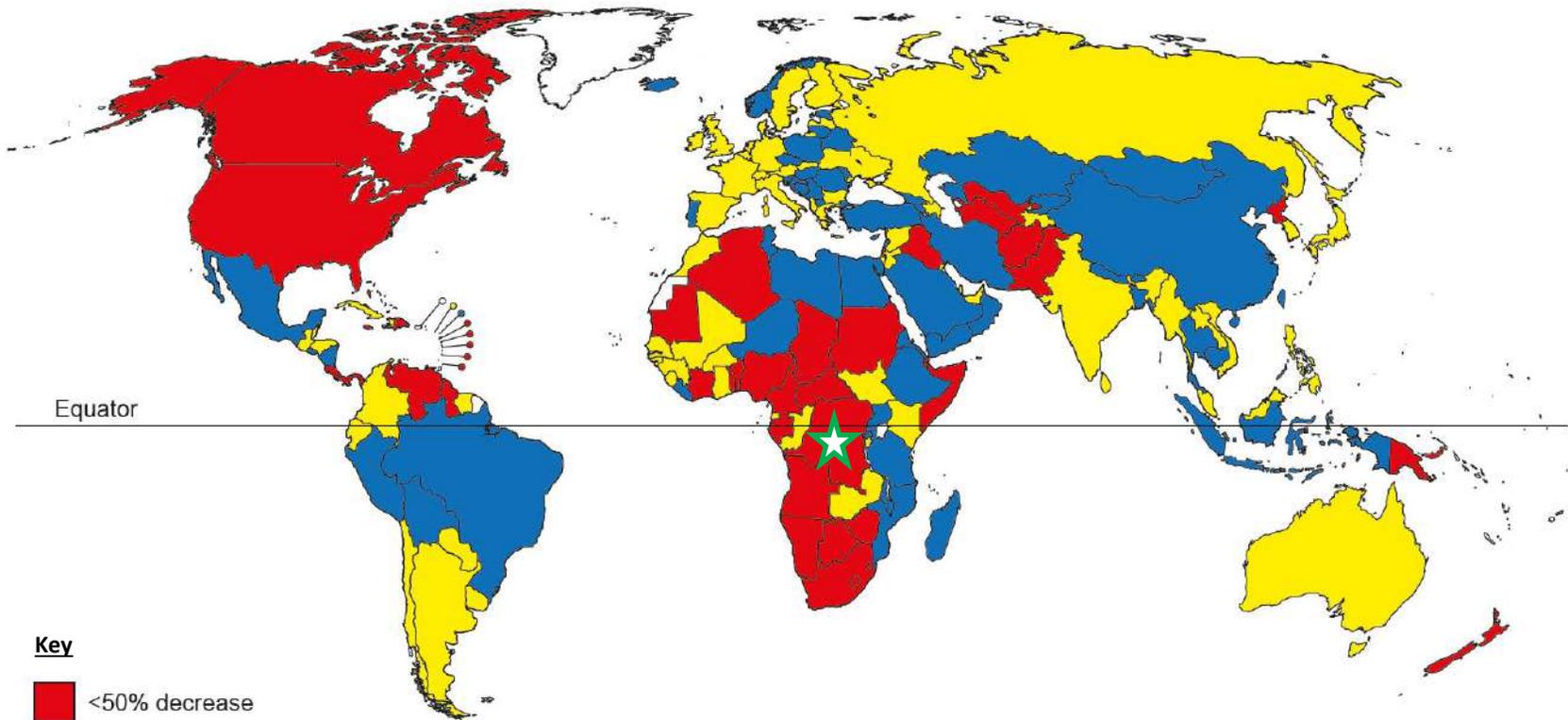


### **Factsheet on the impacts of Tropical Cyclone Mora in Bangladesh (2017)**



**Resource 8 for Question 3**

**Progress towards MDG 4: relative decrease in mortality rate of children under 5 years, 1990-2015**



**Key**

- <50% decrease
- 50–66.5% decrease
- achieved MDG 4 (66.6% decrease or more)
- no data

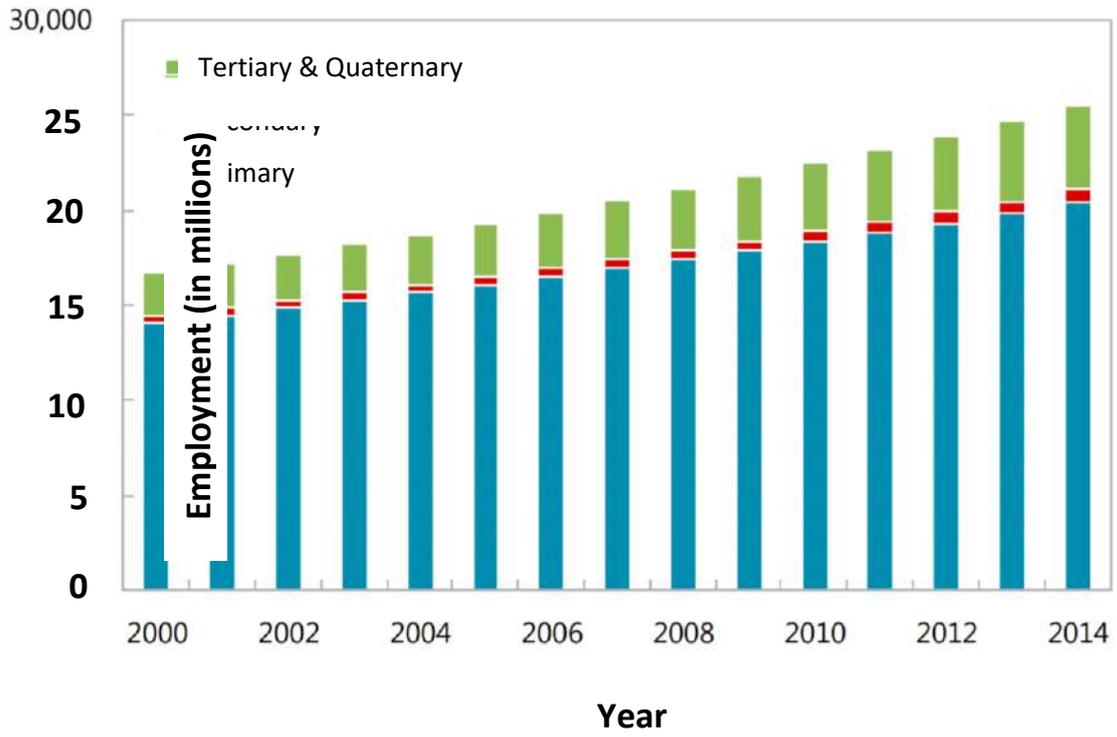
Democratic Republic of Congo

**Resource 9 for Question 3****Economic structure (contribution to GDP\* by sector in percentage) of Democratic Republic of Congo**

Sector	2003	2014
	GDP per capita (USD): \$173.9	GDP per capita (USD): \$487.2
Agriculture	49.0	19.9
Mining	9.0	22.1
Manufacturing	6.0	18.5
Transport and Communications	4.0	11.0
Finance and Business Services	4.0	7.0
Government Services	3.0	5.6
Wholesale and Retail Trade	16.0	11.4
Construction & Electricity	9.0	4.5

*\*GDP refers to the gross domestic product – total value of all the finished goods and services produced within a country's borders*

**Resource 10 for Question 3****Employment by sector (in millions) of Democratic Republic of Congo between 2000 and 2014**



**Resource 11 for Question 3****Impacts of cobalt mining in Democratic Republic of Congo**

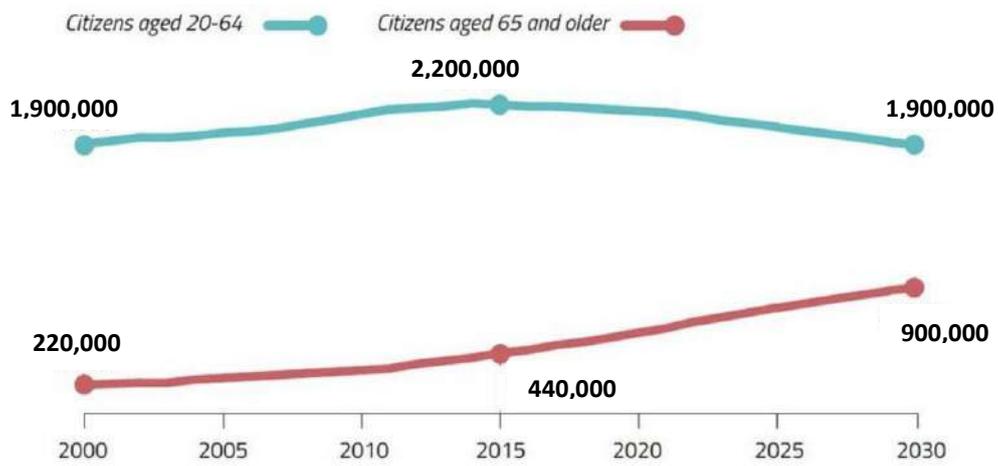
*Scientists have recorded high radioactivity levels in some mining regions in the Democratic Republic of Congo. Mining waste often pollutes rivers and drinking water. The dust from the mining activity is known to cause breathing problems.*



Resource 12A and 12B for Question 4

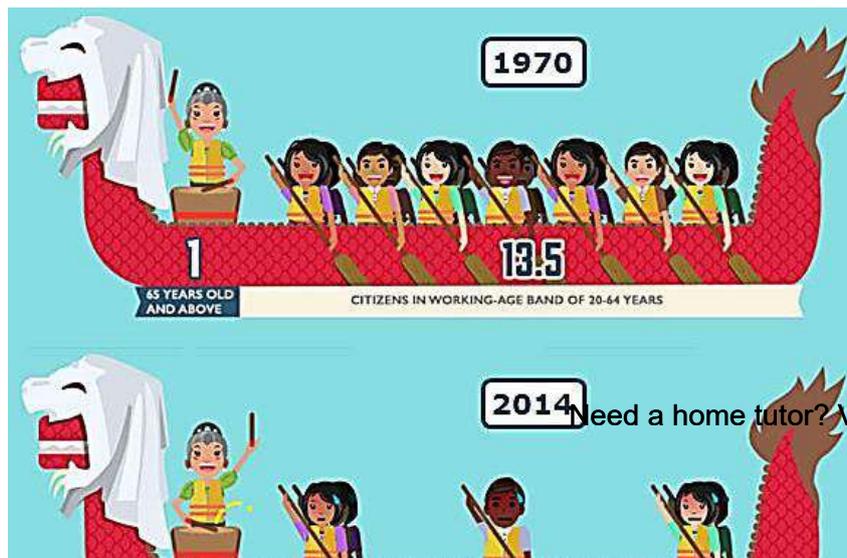
Resource 12A for Question 4

Trends in age profiles of Singapore



Resource 12B for Question 4

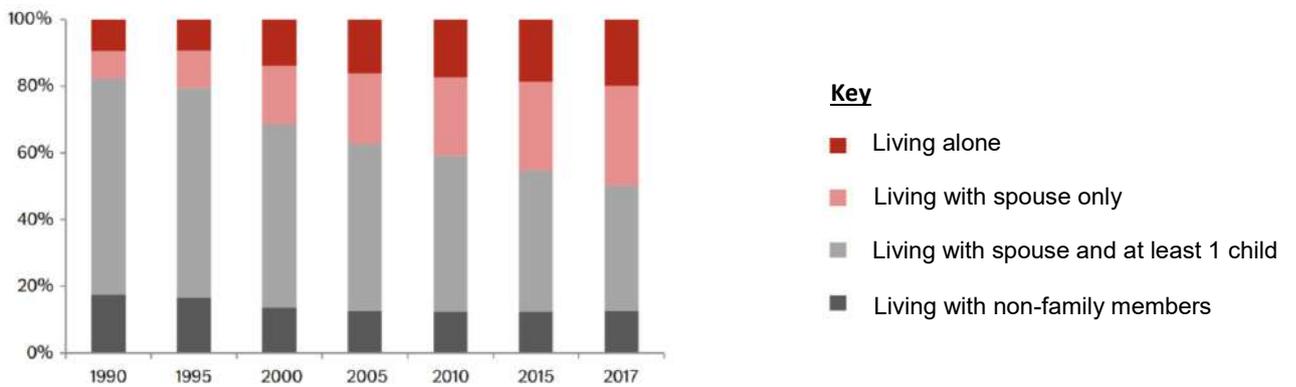
Old-age support ratio of Singapore between 1970 and 2030



Resource 13A and 13B for Question 4

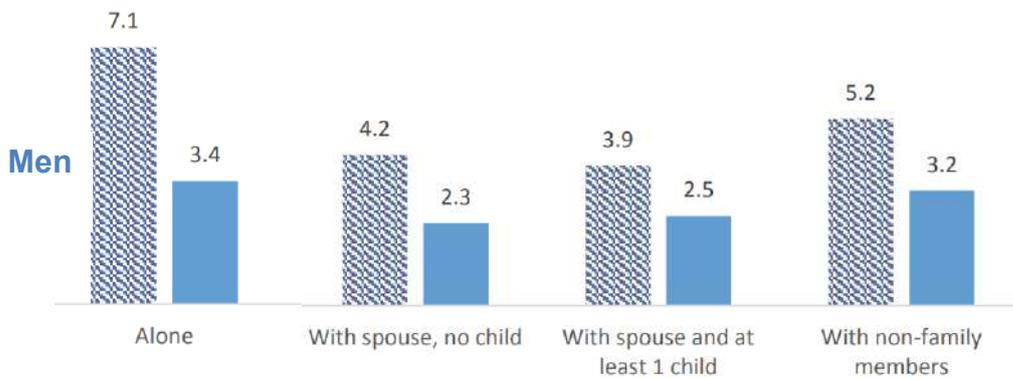
Resource 13A for Question 4

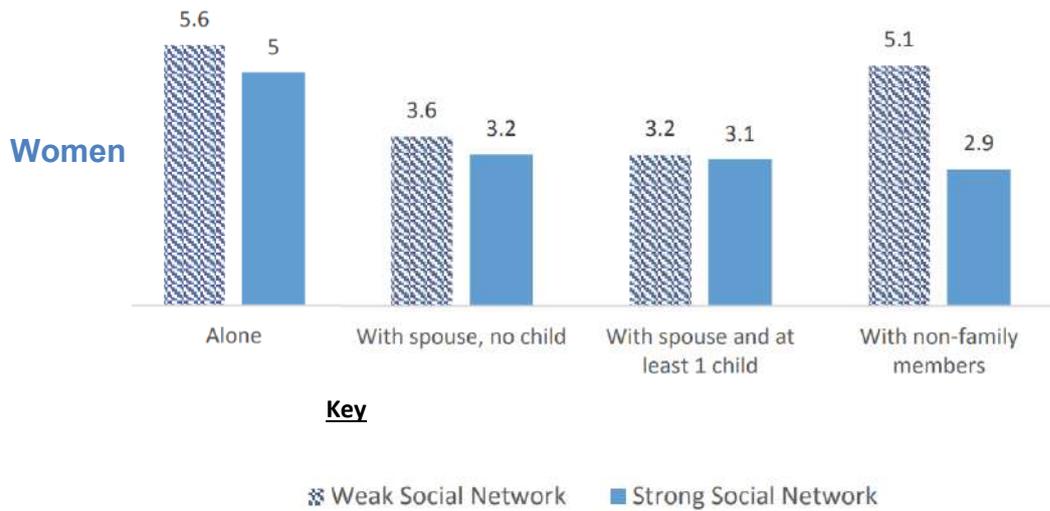
Living arrangement (in percentage) of elderly in Singapore



Resource 13B for Question 4

Average depressive symptom score\* among elderly men and women in Singapore (2017)





*\*The higher the score, the more likely the elderly will experience depression*

#### **Resources 14A and 14B for Question 4**

#### **Resource 14A for Question 4**

#### **Percentage of elderly whose needs (selected) were met in 2017**

	Monetary needs	Spending time with others	Emotional support*
With spouse and child	78.8	29.2	29.0
With non-family members	31.5	14.7	11.8
Alone	56.4	17.9	18.2

*\*High emotional support is one where the elderly feels unconditionally accepted and cared for.*

**Resource 14B for Question 4**

**Factsheet on an upcoming community project in Singapore  
centred on the needs of the elderly**

# ALL-IN-ONE VILLAGE

An integrated development next to a train station in Singapore, which combines healthcare, houses, and shops.

**Studio apartments**  
# Elder-friendly units with anti-slip floorings, retractable racks for easier drying of laundry

**Community park**  
# Includes green spaces and a three-generational playground for young and old

**Community farm** # Residents growing vegetable together

**Elder- and childcare centres**  
# Located next to each other to promote bonding between generations

**Admiralty Medical Centre**  
# 8,500 square metres  
# Offers outpatient consultation, day surgery and rehabilitation

**Hawker Centres**  
# Variety of affordable food stalls

**Enhanced public infrastructure**  
# Ramp access on public transport, longer duration at traffic lights for elderly residents in neighbourhood

Source: HDB

<b>Name:</b>		<b>Index Number:</b>		<b>Class:</b>	
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## DUNMAN HIGH SCHOOL PRELIMINARY EXAMINATIONS Year 6

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**HIGHER 2 GEOGRAPHY**

**9751/02**

**Paper 2 Data Response Questions**

**Tuesday**

**24 September 2019**

**3 hours**

Additional materials: 1 Insert  
World outline map

---

### **READ THESE INSTRUCTIONS FIRST**

Write your name and class clearly on **all** the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use a HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Candidates answer **all** questions.

The Insert contains all Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or in the classroom, even when such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn wherever they serve to illustrate an answer.  
The outline world map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in the brackets [ ] at the end of each question or part question.

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This document consists of **6** printed pages

**[Turn over**

9751/02/2019/Prelim Examinations

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## Section A

### Theme 4: Geographical Investigation

- 1 A student from Mangalore, India, wanted to investigate the impact of wind direction on rainfall in Mangalore. He had to complete his investigation between March and May. He deliberated between two hypotheses:

**Hypothesis 1:** The winds between October and March will bring more rain to Mangalore compared to the winds between April and September.

*Or*

**Hypothesis 2:** Mangalore will experience more rain due to stronger winds in July compared to the weaker winds in March.

The student chose **Hypothesis 1**.

The following set of equipment was given to the student to collect the data:

- 1 handmade wind vane
- 1 compass
- 1 electronic rain gauge

To test his hypothesis, he collected data from Tannirbhavi Beach in Mangalore (Resource 1).

- The wind vane was placed on top of a table.
- The rain gauge was placed on top of the sandy beach. The water in the rain gauge was poured away after each reading was taken.

He headed out for one day in March and May respectively to conduct the fieldwork. He collected the data four times a day at 6 hourly interval. In May, he found that the rain gauge had malfunctioned. He then created a rain gauge to collect rainfall data during a downpour.

Resource 1 shows the map of India and Mangalore, India. It also shows the site at which the student collected the data. Resource 2 shows the equipment used to collect the climatological data. Resource 3 shows the results of the investigation.

(a) With reference to Resource 1 and the information above, explain why the student chose Hypothesis 1 instead of Hypothesis 2. [4]

(b) With reference to Resources 1, 3 and the information above, suggest **two** potential safety issues associated with this fieldwork and explain how each risk could be minimised. [4]

(c) Suggest and justify suitable methods to represent the data in Resource 3. [4]

(d) The teacher informed the student that his investigation lacked reliability and accuracy.

With reference to the resources and the information above, suggest why the investigation lacked reliability and accuracy. [6]

(e) The teacher gave an additional year for the student to complete his investigation.

Explain how the investigation could be improved. [7]

**Section B****Theme 1: Tropical Environments****Channel Characteristics and Flooding in Bangladesh**

- 2** Resource 4 shows a section of the Brahmaputra River in Tangail, Bangladesh, a country at low-level of development. Resource 5A shows the nature and extent of flooding in Bangladesh. Resource 5B shows the climograph of Tangail, Bangladesh. Resource 5C shows a relief map of Bangladesh. Resource 6 shows a map of the population density in Bangladesh in 2017. Resource 7 shows a factsheet on the impacts of Tropical Cyclone Mora in Bangladesh in 2017.
- (a)** With reference to Resource 4, describe the characteristics of the channel. [4]
- (b)** With reference to Resource 5B, identify the time period when the channel characteristics (Resource 4) are observed and explain the development of these characteristics. [6]
- (c)** With reference to Resources 5A, 5B, 5C, 7 and your own knowledge, discuss if flooding in Bangladesh is mainly due to weather events such as Tropical Cyclone Mora. [7]
- (d)** With reference to all the resources and your own knowledge, explain the impacts of flooding in Bangladesh. [8]

**Theme 2: Development, Economy and Environment****Development in Democratic Republic of Congo (DRC)**

**3** Resource 8 shows progress towards Millennium Development Goal (MDG) 4: relative decrease in mortality rate of children under 5 years between 1990 and 2015. Resource 9 shows the economic structure of Democratic Republic of Congo (DRC) in 2003 and 2014. Resource 10 shows the employment by sector of DRC between 2000 and 2014. Resource 11 shows the impacts of cobalt mining in DRC.

**(a)** With reference to Resource 8, describe the distribution of countries which have achieved MDG 4. [4]

**(b)** Suggest reasons for the variation in progress towards MDG 4 shown in Resource 8. [4]

**(c)** With reference to Resources 9 and 10, compare the economic characteristics of Democratic Republic of Congo in 2003 and 2014. [5]

**(d)** With reference to Resource 10, suggest reasons for the employment structure of Democratic Republic of Congo in 2014. [4]

**(e)** Democratic Republic of Congo accounts for 60% of worldwide cobalt production and has 50% of known global cobalt reserves. Global demand for cobalt is expected to rise further.

With reference to Resources 9, 10, 11 and your own knowledge, recommend if Democratic Republic of Congo should continue to develop more cobalt mines to achieve developmental goals such as that seen in Resource 8. [8]

**Theme 3: Sustainable Development****Needs of the Elderly in Singapore**

- 4 The resources show information on selected age profiles in Singapore, a high-income city.

Resource 12A shows the trends in age profiles between 2000 and 2030. Resource 12B shows the old-age support ratio between 1970 and 2030. Resource 13A shows the changes in living arrangement of the elderly between 1990 and 2017. Resource 13B shows the average depressive symptom score of the elderly men and women in 2017. Resource 14A shows the percentage of elderly whose needs (selected) were met in 2017. Resource 14B shows a factsheet on an upcoming community project centred on meeting the needs of the elderly.

- (a) With reference to Resource 12A, describe the changes to Singapore's population aged 20-64 and above 65 between the years 2000 and 2030. [3]
- (b) With reference to Resources 12A, 12B and 13A only, suggest how the changes would affect liveability of the elderly and sustainable urban development in Singapore. [5]
- (c) With reference to Resource 13B, compare the average depressive symptom score between elderly men and women in Singapore in 2017. [5]
- (d) Suggest reasons why the needs of the elderly outlined in Resource 14A are often not met. [3]
- (e) Using the resources and your own knowledge, evaluate the effectiveness of the community project (Resource 14B) in enhancing liveability for the elderly in Singapore. [9]



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## GEOGRAPHY

**9751/01**

**16 September 2019**

**3 hours**

Paper 1 Structured Essay Questions

Additional Materials: Answer Paper  
World Outline Map

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### READ THESE INSTRUCTIONS FIRST

Write your name, civics group and question number on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
Write your answer to each question on a fresh sheet of paper.  
Do not use paper clips, highlighters, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even when such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate your answer.

You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, ensure that all your responses to the questions should be written in the answer booklet provided. You may ask for an additional answer booklet, if required.

The number of marks is given in brackets [ ] at the end of each question or part question.

**Section A – Tropical Environments**

Answer **one** question from this section.

- 1 (a) Distinguish between the drainage basin water balance in the humid and arid tropics. [12]
- (b) To what extent are variations in channel morphology and channel patterns mainly influenced by discharge? [20]
- 2 (a) Explain the factors that affect the formation of karst landscapes in the humid tropics. [12]
- (b) “Landforms in the arid tropics are formed mainly as a result of erosional processes.”  
Discuss the validity of this statement. [20]

**Section B – Development, Economy and Environment**

Answer **one** question from this section.

- 3 (a) Explain the relevance of core-periphery model and dependency theory to understand development in low income countries. [12]
- (b) Assess the success of bottom-up approaches to development. [20]
- 4 (a) Explain the impact of privatising water resources on society and the environment in low income countries. [12]
- (b) “The challenge of managing water resources is largely economic in nature.”  
Evaluate the validity of the statement. [20]

**Section C – Sustainable Development**

Answer **one** question from this section.

- 5 (a)** Explain the key tenets of Sustainable Development according to ‘Our Common Future’. [12]
- (b)** To what extent can human activities influence contemporary climate change? [20]
- 6 (a)** Explain the factors that affect urban liveability in cities with high levels of development. [12]
- (b)** “There are more winners than losers when cities carry out urban reimagining.” To what extent do you agree with the statement? [20]

- **End of Paper** -



EUNOIA JUNIOR COLLEGE  
JC2 Preliminary Examinations 2019  
General Certificate of Education Advanced Level  
Higher 2

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## GEOGRAPHY

**9751/02**

**23 September 2019**

**3 hours**

Additional Materials: Answer Paper  
1 Insert  
World Outline Map

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### READ THESE INSTRUCTIONS FIRST

Write your name, civics group and question number on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
Write your answer to each question on a fresh sheet of paper.  
Do not use paper clips, highlighters, glue or correction fluid.

Candidates answer **all** questions.

The Insert contains all the Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or the classroom, even when such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate your answer.  
The world outline map may be annotated and handed in with relevant answers.

You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

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**Section A****Theme 4: Geographical Investigation**

- 1** A group of 20 Geography students were tasked to undertake a geographical investigation in Stratford, located in the Lower Lea Valley, in London, United Kingdom. Before the London Olympics in 2012, Stratford had one of the most deprived communities in the city. The aim of their investigation was to examine the impact of hosting the flagship event on the residents living in Stratford.

As part of their investigation, the students collected secondary data to obtain key indicators (e.g. unemployment rates) on Stratford and London. For their primary data, they administered 50 questionnaire surveys and conducted 20 qualitative interviews with residents living in Stratford.

Resource 1A shows a map of London and location of Stratford where the Olympic games were hosted. Resource 1B shows a comparison of key indicators of Stratford and London in 2008 and 2018. Resource 2 shows an excerpt of the questionnaire survey and the compiled data from the survey. Resource 3 shows an interview excerpt from 2 respondents on their perceptions of the impact hosting the Olympics games on the community.

- (a)** Suggest a research question for the students' investigation and explain why it is well-defined. [3]
- (b)** Using Resource 1B, 2 and 3, explain how the primary and secondary data collected by the students can address the aim of the investigation. [4]
- (c)** The group concluded that the data collected from the questionnaire survey in Resource 2 may not be completely reliable and/or accurate.
- Explain how Question 5 of the questionnaire survey could be improved. [5]
- (d)** Sketch a graph to represent the compiled data in Resource 2. Justify why you chose the method to represent the data. [4]
- (e)** Using all the resources, evaluate this investigation on the impact of urban reimagining on the residents living in Stratford and suggest how it can be improved and extended. [9]

**Section B****Theme 1: Tropical Environments****Rainfall distribution in Africa**

- 2** Resource 4 shows the distribution of the world's deserts. Resource 5 shows the climographs for 3 locations in Africa: Tombouctou (in Mali), Ouagadougou (in Burkina Faso) and Kisangani (in Zaire). Resource 6 shows the surface wind patterns in the months of January and July over Africa. Resource 7 shows a soil profile found in the arid tropics.
- (a)** Describe the distribution of the world's deserts shown in Resource 4. [4]
- (b)** Explain the reasons for the distribution of the deserts shown in Resource 4. [6]
- (c)** With reference to Resource 5, distinguish the rainfall patterns in the 3 locations. [4]
- (d)** With reference to Resource 5, Resource 6 and your own knowledge, explain how surface wind patterns have caused variations in rainfall received at the three locations. [5]
- (e)** Explain the processes that lead to the characteristics of the soil profile as seen in Resource 7. [6]

**Theme 2: Development, Economy and Environment****Resource Curse in Africa**

- 3** Resource 8 shows the amount of Foreign Direct Investment (FDI) received by African countries from 2000 to 2014. Resource 9 shows the development of the diamond industry in Botswana. Resource 10 shows a table of key indicators of resource-rich countries in Africa.  
Resource 11 shows the variations in strength of the relationship between GDP growth (%) and resource dependence.
- (a)** With reference to Resource 8, describe the trends of the amount of FDI and percentage of GDP received by all African countries from 2000 to 2014. [5]
- (b)** With reference to Resource 9, describe the development and characteristics of the diamond industry in Botswana. [5]
- (c)** With reference to Resource 9 and your own knowledge, explain how the diamond industry in Botswana has contributed to changes in its GDP and HDI. [6]
- (d)** With reference to the resources and your own knowledge, evaluate the extent to which the resource curse can be mitigated for resource-rich countries. [9]

**Theme 3: Sustainable Development****Measures of liveability and needs of the elderly in South Korea**

- 4 The Liveable City Model Project (LCMP) is a core strategic project rolled out by the Korean Government to decentralise the Seoul Metropolitan Area and to promote liveability in other Korean cities.

Resource 12 shows the liveability ranking of selected cities using two different liveability measures: Economist Intelligence Unit (EIU) and Mercer Ranking for Quality Living in 2014. Resource 13 shows an infographic on the elderly in Busan, the second largest city in South Korea. Resource 14 shows the survey findings on extent of which physical and social needs of the elderly living in Busan are met, based on 100 respondents.

- (a) With reference to Resource 12, compare the ranking of cities across the two measures of urban liveability. [3]
- (b) Using Resource 12, suggest possible reasons for the variations in liveability ranking of Seoul based on the two liveability measures in 2014. [4]
- (c) With reference to Resource 13, explain how the strategies implemented could cater to the needs of the elderly in Busan. [6]
- (d) Explain the strengths and limitations of using Resource 14 to represent the survey findings on the extent to which physical and social needs of the elderly living in Busan are met. [6]
- (e) With reference to Resource 14, compare the extent to which the physical and social needs of the elderly living in Busan have been met. [6]

- End of Paper -



EUNOIA JUNIOR COLLEGE  
JC2 Preliminary Examinations 2019  
General Certificate of Education Advanced Level  
Higher 2

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**GEOGRAPHY**

**9751/02**

**23 September 2019**

**3 hours**

Additional Materials

The Insert contains all the resources referred to in the question paper

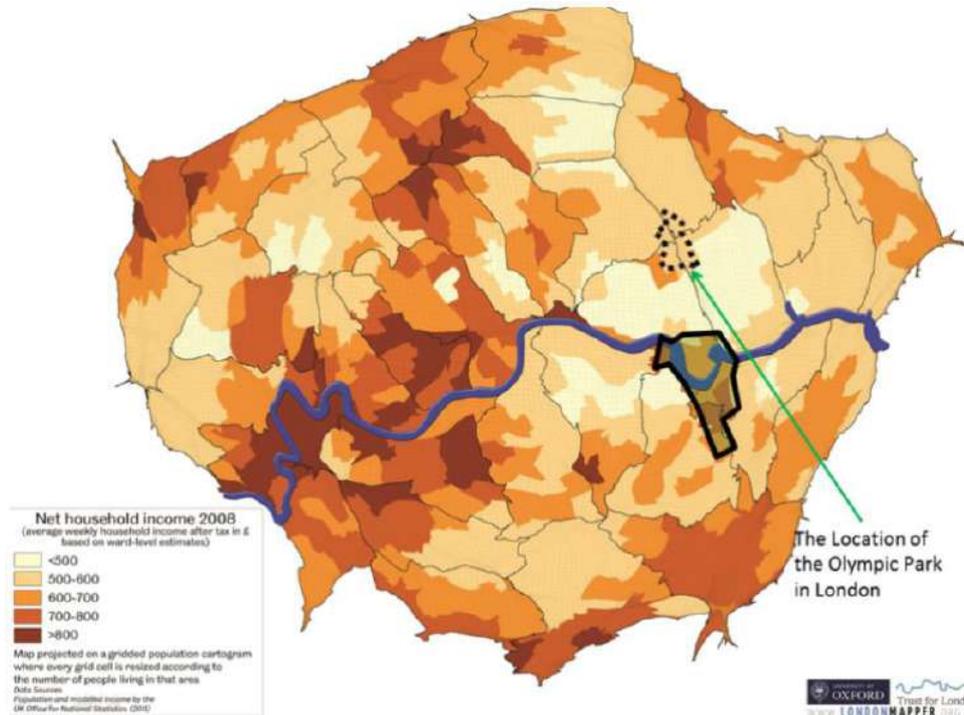
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2

### Resource 1A for Question 1

#### Location of Olympic Park in London



### Resource 1B for Question 1

#### Comparison of Stratford and London based on key indicators in 2008 and 2018

Indicator	Stratford		London Overall	
	2008	2018	2008	2018
Monthly Average rent of a 2 Bedroom flat (GBP)	800	1200	1300	1350
Good education (% of students who qualify for tertiary education)	51	61	67	69
Net household income (GBP per week)	500	600	800	950
Unemployment rate (%)	7.8	5.4	4.5	4.5

\*GBP = Great Britain Pounds

### Resource 2 for Question 1

#### Excerpt of student's questionnaire survey and compiled data

Introduction: Hello! We are doing a Geography Investigation on the impact of hosting the Olympics on the residents living in Stratford.

- 1) Age : \_\_\_\_\_ 2) Gender : \_\_\_\_\_
- 3) Household gross income : \_\_\_\_\_ 4) Education qualifications : \_\_\_\_\_
- 5) Read the following statements and indicate your response accordingly:
- a) The Olympics has created affordable housing for the community in Stratford.
- Agree  
 Disagree
- b) The Olympics has provided well-paying jobs for the community in Stratford.
- Agree  
 Disagree
- c) The Olympics has led to better social inclusion of disadvantaged groups in the Stratford community.
- Agree  
 Disagree

Compiled data	Agree	Disagree
Question 5a	30%	70%
Question 5b	85%	15%
Question 5c	70%	30%

### Resource 3 for Question 1

#### Interview excerpts from selected respondents

**Ken Rosewood:** *In the ten years since I moved to the area I've seen it change dramatically. Mostly for the better - You can let the kids go nuts for a couple of hours in the play spaces, hire a bike for a couple of hours or just grab a picnic and enjoy the peace surrounding the wetlands areas...But not all change is for the better. It no longer feels "East End" anymore. With every shiny new building that's gone up, a little bit of the character that gave Stratford its appeal is disappearing.*

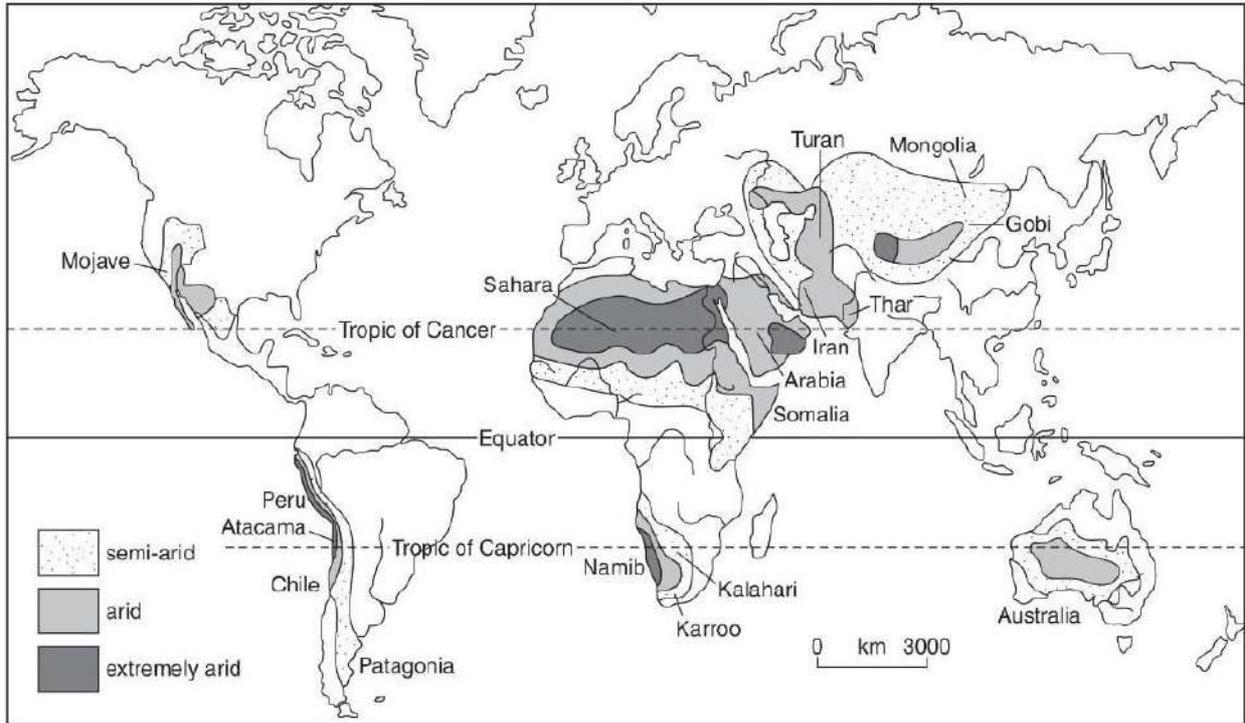
**Ruth Thither:** *House prices have become very silly to put it mildly. If you are on a low income then you won't stand a chance of buying your own home. Today I can buy a cappuccino for £5. This is not Park Lane. Under all the hype there are still very real social*

problems that were here before the regeneration and still remain today that I feel are deliberately being swept under the carpet.

4

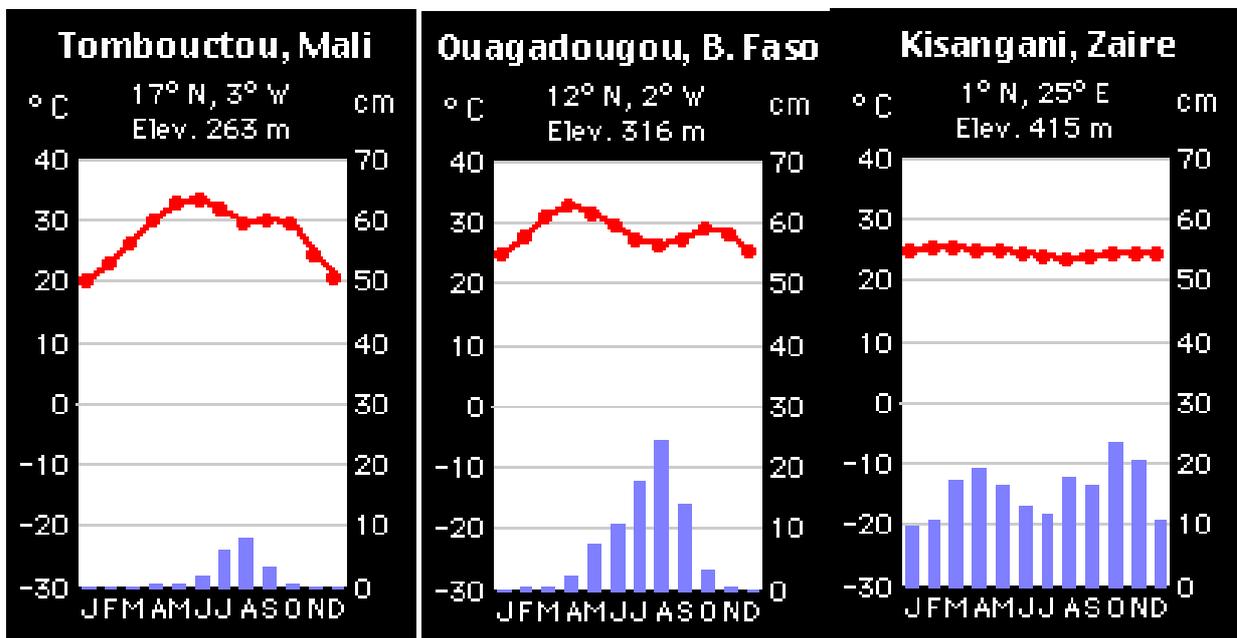
**Resource 4 for Question 2**

**Distribution of World Deserts**



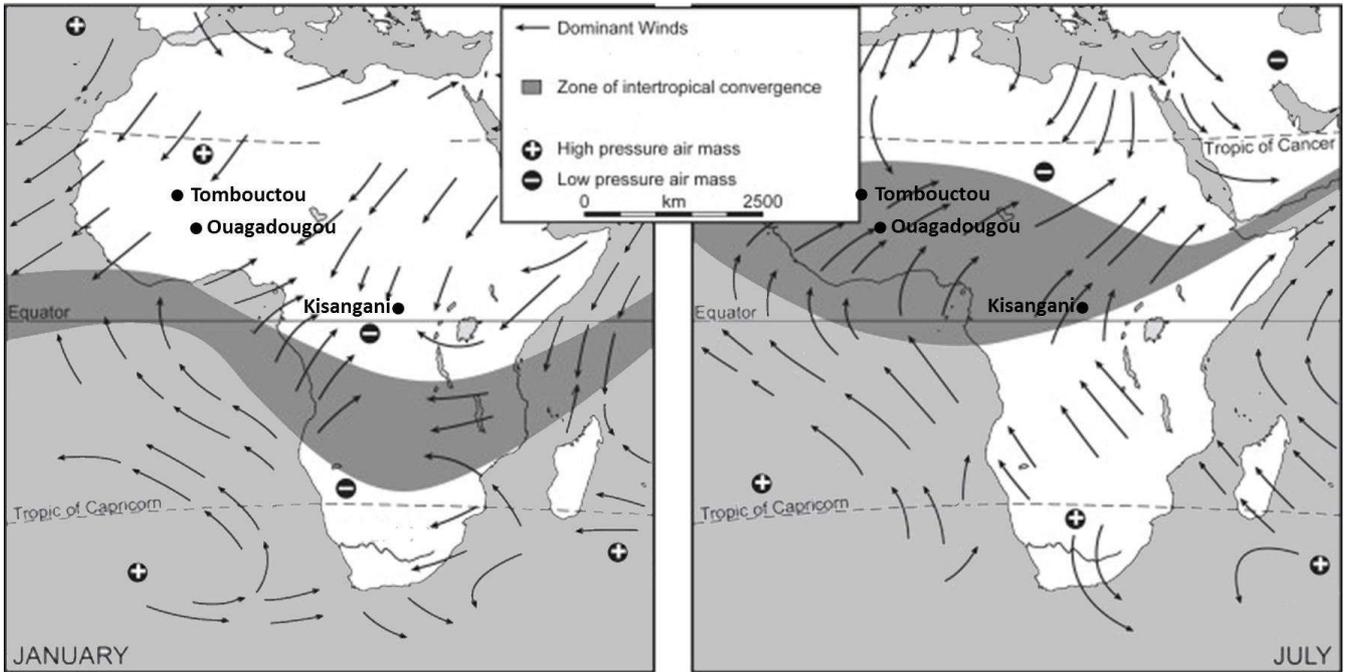
**Resource 5 for Question 2**

**Average monthly precipitation (mm) for Tombouctou, Ouagadougou and Kisangani**



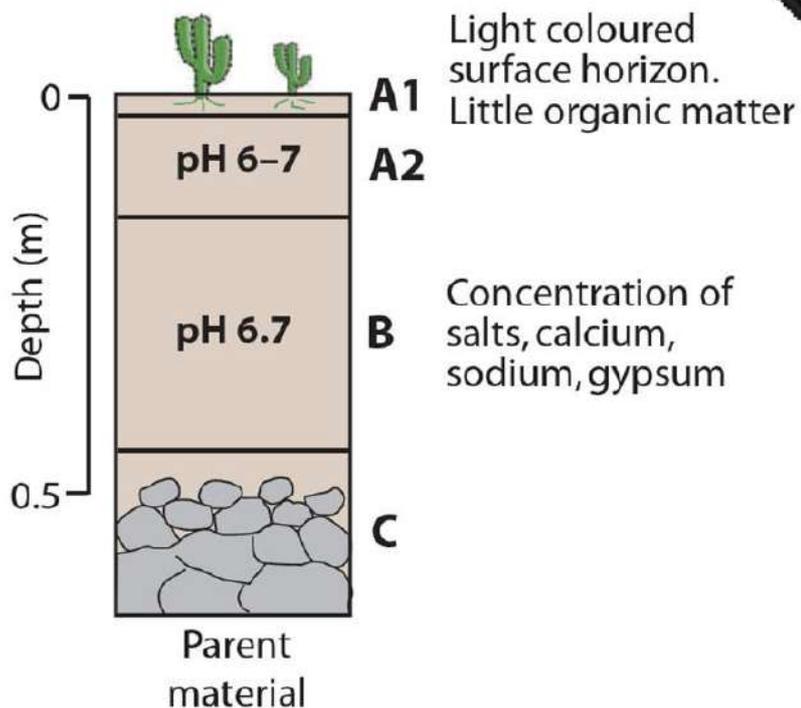
Resource 6 for Question 2

Surface wind patterns in the months of January and July over Africa



Resource 7 for Question 2

Soil profile found in the arid tropics



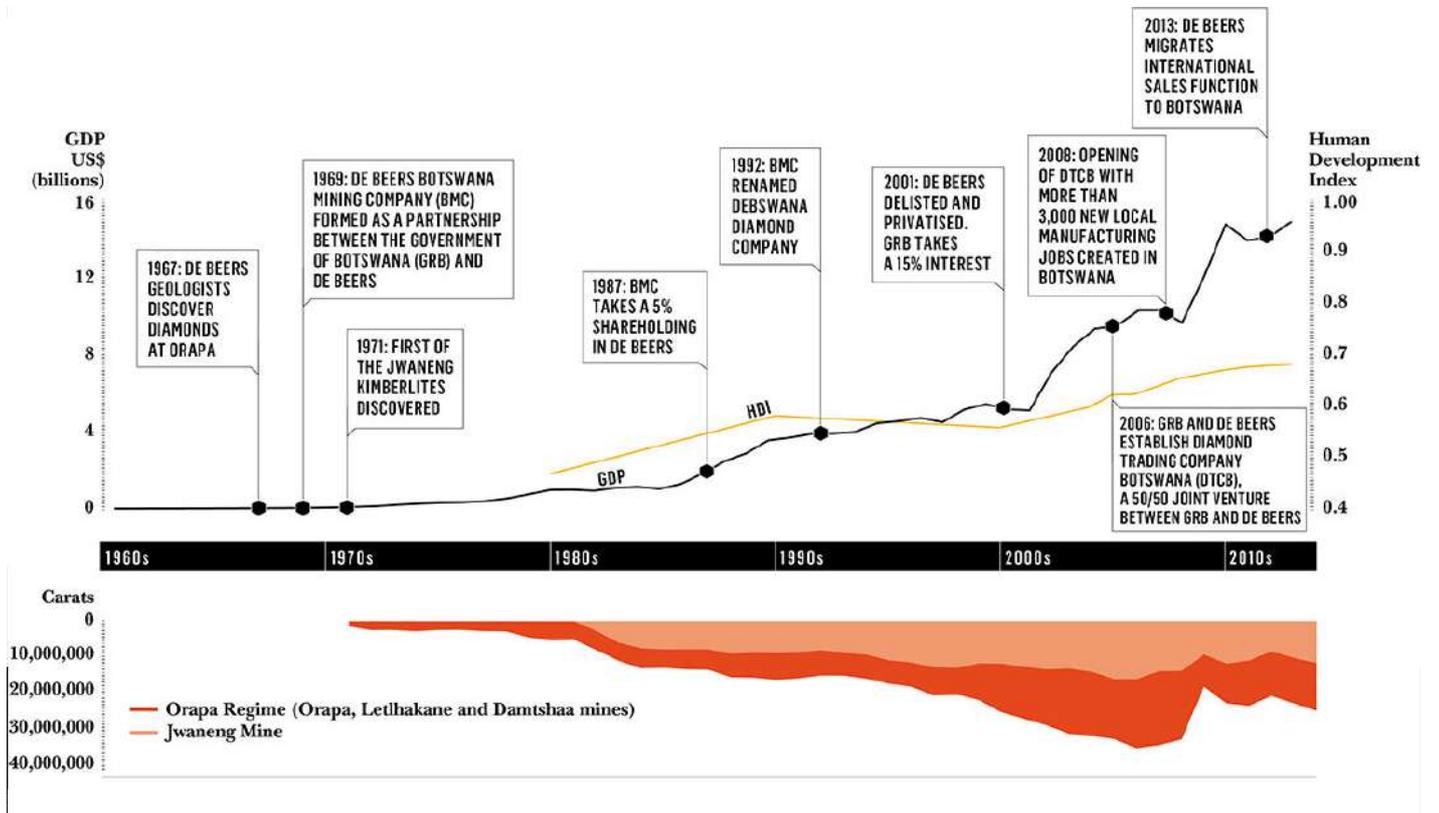
## Resource 8 for Question 3

## Amount of Foreign Direct Investment (FDI) received by African countries



## Resource 9 for Question 3

## Development of Botswana's diamond industry



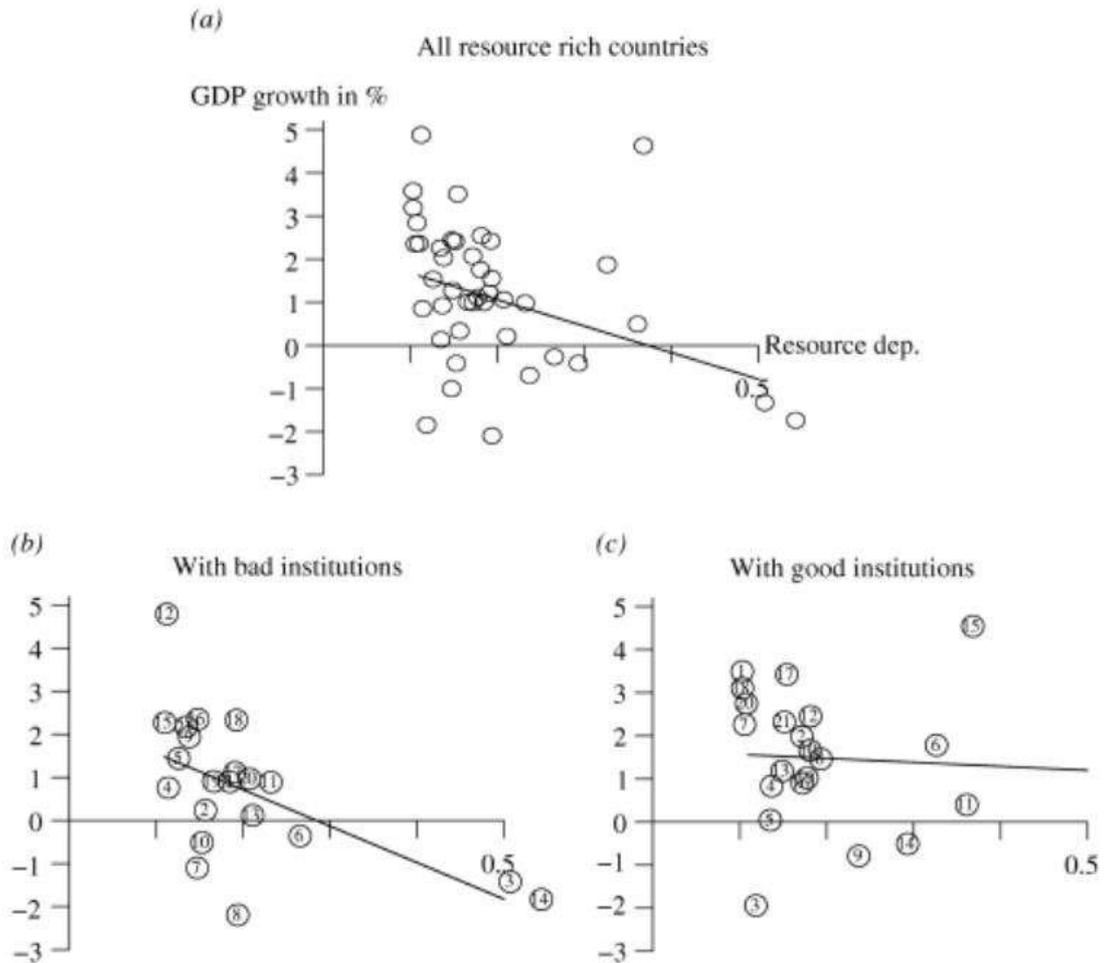
## Resource 10 for Question 3

## Selected indicators for resource-rich countries in Africa

Country	Human Development Index (2017, out of 189)	GDP per capita (2017, USD\$)	Minerals as share of total commodity exports (2015)	Corruption Perceptions Index (2017, out of 180)	Long Term Debt (2004, USD\$)
Botswana	101	7595	85%	34	n/a
Central African Republic	188	418	39%	156	0.9bn
Sierra Leone	184	500	86%	130	1.5bn
Democratic Republic of the Congo (DRC)	176	458	84%	161	10.5bn

## Resource 11 for Question 3

## Variations in the relationship between GDP growth in % and resource dependence



## Resource 12 for Question 4

## Liveability ranking of selected cities in 2014

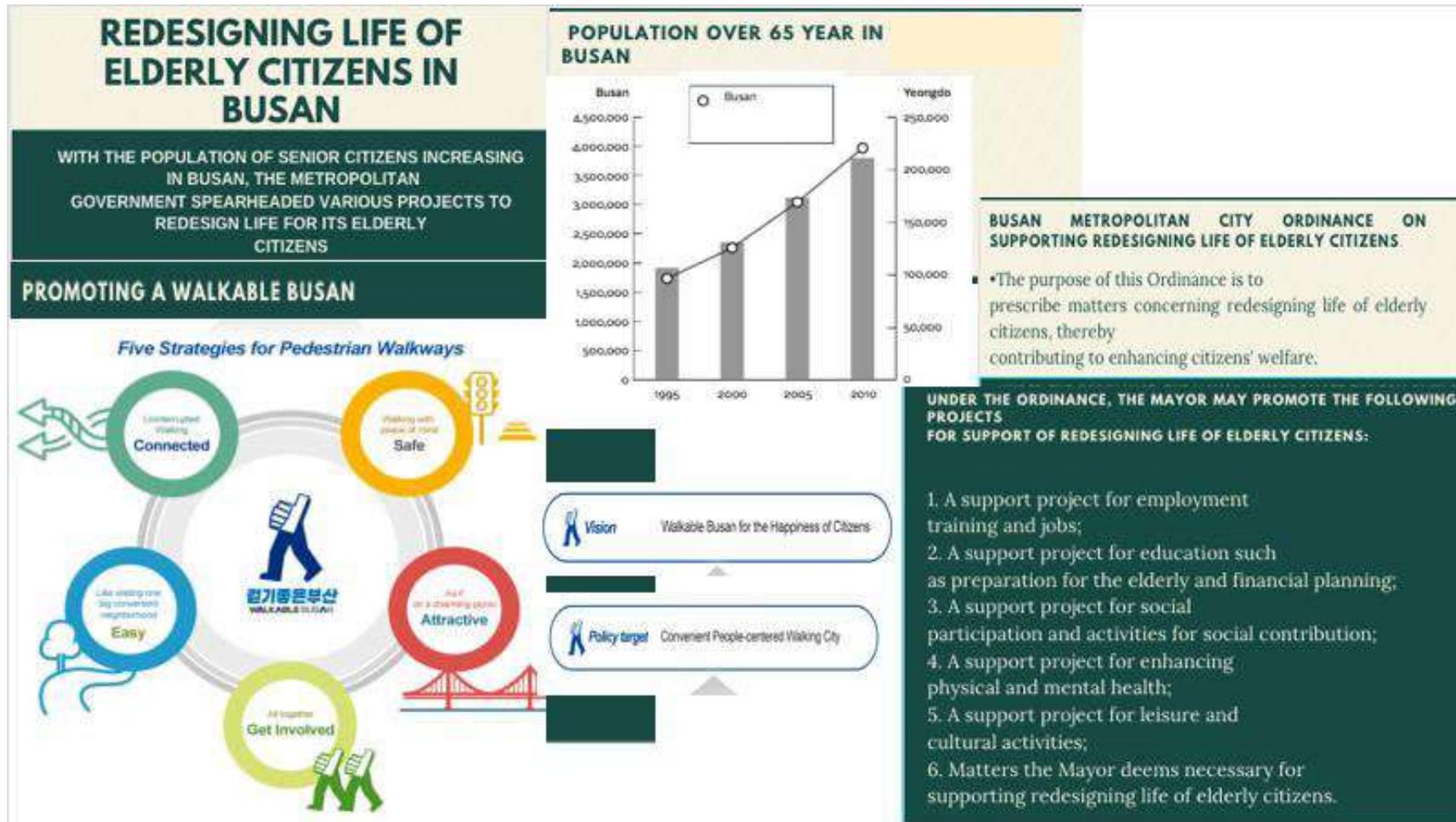
Cities	<u>Economist Intelligence Unit (EIU)*</u>	<u>Mercer Ranking for Quality of Living**</u>
Seoul	58	71
London	55	40
Vienna	1	1
Tokyo	29	44
Vancouver	3	5
Melbourne	5	3

**\*Economic Intelligence Unit:** Announced twice a year in February and August, the Liveability rankings are determined by examining 30 indices in 5 sectors (Social Safety, Medical Service, Culture/Environment, Education, and Infrastructure), and includes 140 cities.

**\*\*Mercer Ranking for Quality of Living:** Announced annually every March by the multinational consulting company Mercer, the Quality of Life rankings are based on a comparison and analysis of 39 items in 10 sectors (Political/Social Environment, Economic Environment, Sociocultural Environment, Medical Service/Health/Hygiene, Educational Environment, Public Service/Transportation, Provision of Respite, Consumables, Residential Environment, and Natural Environment), and includes 221 cities.

Resource 13 for Question 4

Infographic on the elderly in Busan, South Korea

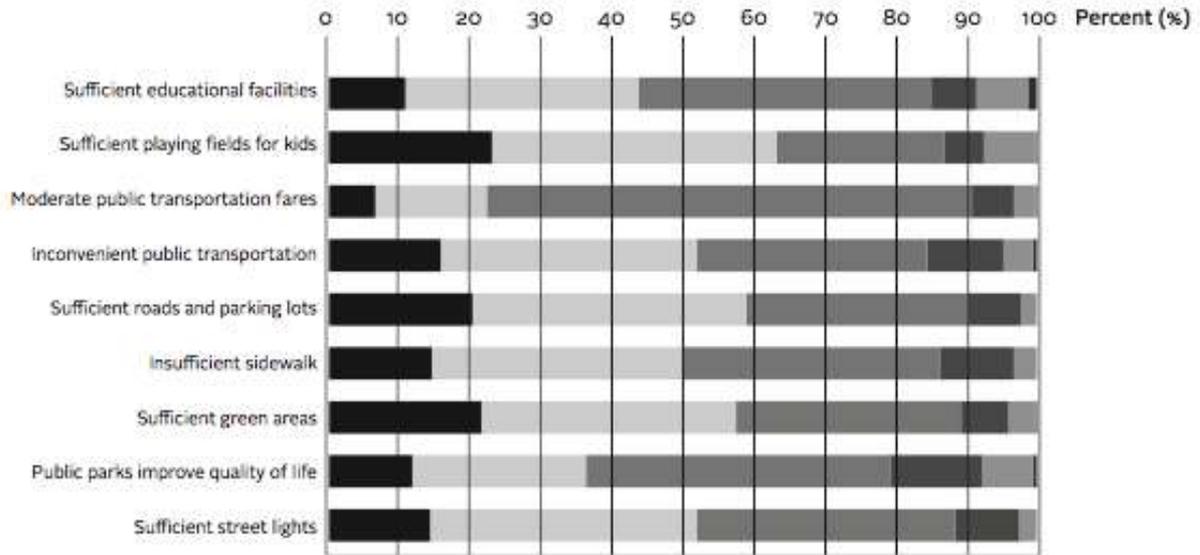


\*Ordinance – a law or an authoritative order

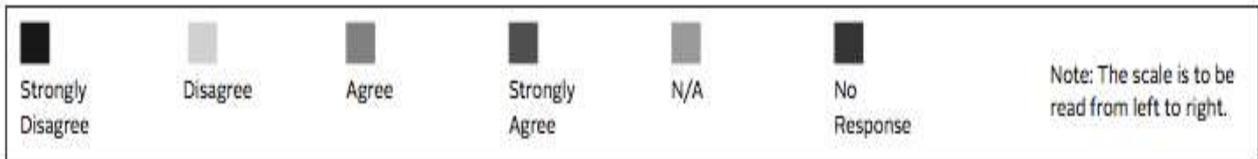
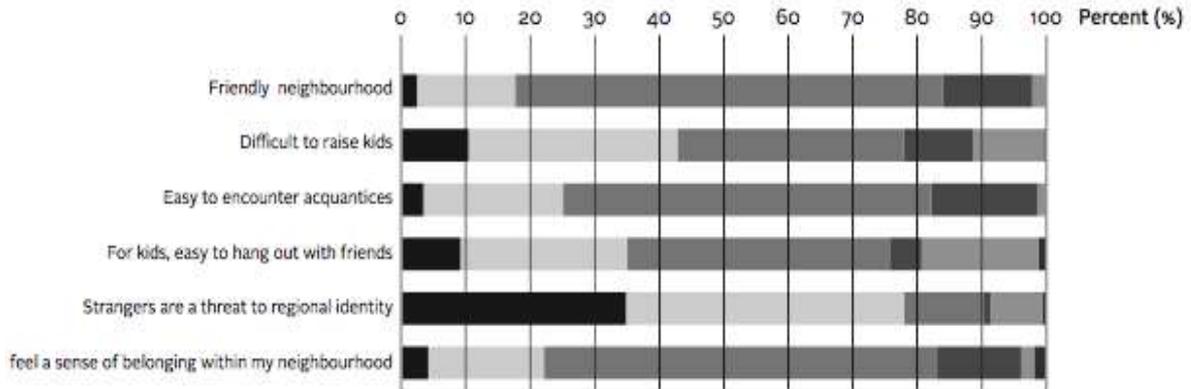
Resource 14 for Question 4

Survey findings on aspects of urban liveability in Busan

**Physical Needs: Provision of Infrastructure**



**Social needs: Neighbourhood Friendliness**



# Marking Scheme for Geography Prelims 2019

## Section A: Tropical Environment [32 marks]

Answer **one** question from this section.

### 1 (a) Distinguish between the drainage basin water balance in the humid and arid tropics. [12]

Drainage Basin Water Balance

$$\text{Precipitation (P)} = \text{streamflow (Q)} + \text{evapo-transpiration (E)} \pm \text{changes in storage (S)}$$

$$P = Q + E \pm S$$

Precipitation is the input into the system. A positive balance will mean that there is surplus and a negative balance would suggest that a deficit is occurring. The water balance of a particular location can be studied using a water budget graph. This shows the relationship between temperature, precipitation and evaporation rates over the year. During the months of the year when precipitation exceeds evapo-transpiration, once the soil has been recharged there will be a water surplus available to supply rivers and streams. When E exceeds P, soil moisture is utilized before a deficit occurs.

Input/Output	Humid tropics	Arid tropics
Precipitation	<ul style="list-style-type: none"> <li>High total annual rainfall - ITCZ</li> <li>High intensity in some cases – thunderstorm development and cumulonimbus cloud formation</li> </ul>	<ul style="list-style-type: none"> <li>Extremely low total annual rainfall – dominance of the sub-tropical high pressure belt</li> <li>Rainfall is rare but when it occurs, it would be of high intensity</li> <li>Seasonal – effect of migration of pressure belts</li> </ul>
Streamflow (Q)	<ul style="list-style-type: none"> <li>Perennial channels – high total annual rainfall without seasonal changes</li> </ul>	<ul style="list-style-type: none"> <li>Mostly ephemeral channels – water flows in streams only it rains and dries up subsequently due to low groundwater flow</li> </ul>
Evapotranspiration (E)	<ul style="list-style-type: none"> <li>Relatively high all year with little seasonal variations – affected to large extent by temperature → low latitude experience high temp and little seasonal changes</li> </ul>	<ul style="list-style-type: none"> <li>High during summer and low during winter – closely linked to seasonal changes in temperature which is caused by the location of the arid tropics at a higher latitude as compared to the humid tropics</li> </ul>
Changes in storage (S)	<ul style="list-style-type: none"> <li>Soil moisture and groundwater storage remain high all year with little variation – related to high total annual rainfall</li> </ul>	<ul style="list-style-type: none"> <li>Soil moisture and groundwater storage are extremely low but any present will be depleted during the dry season. Some groundwater recharge may occur when it rains.</li> </ul>

- (b) **To what extent are variations in channel morphology and channel patterns mainly influenced by discharge?** [20]

**Indicative Content**

Students are to discuss the downstream changes in channel morphology (river cross-sectional channel patterns) and the role of discharge, before moving on to discuss the factors (i.e sediment regime) influencing channel patterns

**Discharge (Q) = Cross sectional area (A) x Velocity (V)**

From the above, it can be established that discharge tends to increase as velocity increase which will lead to changes in channel morphology. The Sediment regime can be defined the key characteristics of **sediment** erosion, transport and deposition.

*Synoptic Links*

- *With 1.2 Deforestation and how it will directly affect the sediment regime of the river due to higher probability of mass movement processes.*
- *With 3.1 Climate change – and how it will directly affect the discharge regime with changing ppt patterns, e.g. greater aridity.*

- 2 (a) Explain the factors that affect the formation of karst landscapes in the humid tropics. [12]

The factors influencing karst landscapes could include the following:

- Climate
- Vegetation
- Geology ( impermeable rock)
- Hydrology

At least 3 factors should be explained in relation to the formation of karst landscapes in the humid tropics. Diagram(s) should be included to enhance the explanation.

- (b) **“Landforms in the arid tropics are formed mainly as a result of erosional processes.”** [20]

**Discuss the validity of this statement**

**Indicative Content**

A higher level of response should take a personal stand on the statement. The response should then explain the stand with strong supporting evidence in the form of specific geomorphic processes and the resultant landforms. Conditions such as impermeable surface and lack of vegetation in the arid tropics that give rise to the aeolian or fluvial processes should be demonstrated. However, the stand should show the understanding that the arid tropics is shaped by various processes over time and space. Credit those who are able to demonstrate this understanding of varied landscapes as a result of the geomorphic processes

**Section B: Development, Economy and Environment [32 marks]**

Answer **one** question from this section.

- 3(a) **Explain the relevance of core-periphery model and dependency theory to understand development in low income countries.** [12]

**Indicative Content:**

**Core-periphery model**

The basic idea of core-periphery models is that some areas develop faster because of human and physical advantages and turn into the core and other areas that lack human and physical advantages become the less important periphery. Core areas are likely to experience greater growth, investment and net migration gain, while the peripheries may well be exploited and suffer from lack of investment.

- **Relevance to LDCs:** A reflection of how certain areas in LDCs receive investments and grow rapidly and extreme large. These developments draw resources (human, capital, raw materials) from the peripheral areas and improvements in infrastructure and overall standard of living take place. This in turn attracts more investments and growth. Examples of such developments include the rise of NIEs, e.g. Singapore where it becomes an attractive location for TNCs' investments, i.e. SPREAD effect.

**Dependency Theory**

Frank suggests that underdevelopment occurs in countries as a result of **the nature of their incorporation into the capitalist system** that limits their development; and that development and underdevelopment are both sides of the same coin, and that **both are the necessary outcomes and manifestation** of the contradictions of the capitalist system. In this perspective, **underdevelopment is seen as the direct outcome and reciprocal of development taking place elsewhere**

- **Relevance to LDCs:**
  - Frank presented Brazil as the clearest case of national and regional underdevelopment, arguing that the expansion of capitalism beginning in the sixteenth century sequentially incorporated urban cores (e.g. Rio De Janeiro, Sao Paulo and their extensive hinterlands into the global economy as exporting nodes

Markers' Comments

Most students were able to explain and distinguish between the theories well. Most of the responses came with accompanying diagrams, especially for CP theory. However, a handful of candidates did not draw the diagram accurately (e.g. mixing up stages 2 and 3, or inaccurately drawing arrows). Some of the diagrams are also

not labelled, making it difficult to see where are the cores/ periphery. Some of the responses were unable to explain backwash (stage 2), and spread (stage 3) effects well. Whilst a handful of students are able to illustrate the application of the theories to low-income countries, A majority of the candidates did not use examples to illuminate the theories. By not doing so, their essays read like general discussions of the theories without context. Few students were able to elucidate the application of the theories across spatial scales (across countries and within countries).

**3(b) Assess the success of bottom-up approaches to development. (Specimen Paper)**

[20]

Indicative Content

Assessment should consider the extent of effectiveness of bottom-up approaches. Candidates should discuss bottom-up approaches using more than one example. Mention could be made that the effectiveness of bottom-up approaches is measured by how the approach contributes to improving the lives of the communities and local environment. The effectiveness of the examples should be discussed in relation to a criterion/criteria.

A higher level response could apply a set of criteria or a criterion consistently to evaluate different examples. Another approach could be to consider the challenges specific to the context of each example and devising different criteria to evaluate.

Possible links to other topics include unintended impacts of actions on the physical processes (Topic 1.1) and/or natural environment and resources (Topic 2.2), aims of sustainability development (Topic 3.1).

**4(a) Explain the impact of privatising water resources on society and the environment in low income countries.**

[12]

There are various impacts related to privatising water resources that can be categorized into economic, social and environmental. Note that examples used for the exemplification should be derived from low income countries

**4(b) “The challenge of managing water resources is largely economic in nature.”**

[20]

**Evaluate the validity of the statement.**

Indicative Content

Responses should include a discussion of the complexity of managing water resources by highlighting the characteristics of water as a flow resource and how it may flow through national boundaries. Candidates would need to be able to weigh the challenges and determine if managing water resources pertains to water being an economic good.

Possible synoptic link to sustainable development (Theme 3.1).

**5(a) Explain the key tenets of Sustainable Development according to ‘Our Common Future’** [12]

**Indicative Content**

*Candidates should make reference to the definition of the Brundtland Report (1987), highlighting the key tenets include needs, trade-offs and limitations.*

Weaker candidates tended to rather vague in their explanation due to the lack of examples of sustainable development from different countries.

**5(b) To what extent can human activities influence contemporary climate change?** [20]

**Indicative Content**

*Key words in the introduction should be defined/unpacked, including “climate change” and “influence”. These may include the burning of fossil fuels, change in land surfaces, deforestation and relate to concepts of “the carbon cycle”, Hockey stick graph and positive feedback mechanisms. In addition, students can also recognize the potential of human action in mitigating climate change (through reforestation, reduction in GHGs) that can influence climate change by mitigating climate change impacts.*

Possible synoptic links:

- (1) Deforestation, Tropical Cyclones, Liveability and Vulnerability

**6(a) Explain the factors that affect urban liveability in cities with high levels of development**

[12]

**Indicative Content:**

The measurement of sustainable urban development allows for an understanding of how cities are performing in terms of meeting their current and future needs. Given the vague nature associated with the concepts of “needs” and “future”, it allows **for an operational study of sustainability** and for policy-makers to understand the need for certain types of policies. Measurements also help **reduce possible gaps between current and ‘desired’ states of urban sustainability**. Measurement of sustainable urban development also **allows for easy comparison across cities**.

Candidates should ideally identify and explain a range of indicators, in recognising the economic, social and environmental dimensions of sustainable urban development. Better candidates would be able to cite empirical evidence (data from different cities) to illustrate the use of the indicators.

**Single SDIs.**

Some possible singular indicators can include **unemployment rates (economic), amount of greenhouse emissions per year (environmental) and life expectancy (social dimension)**.

Candidates should identify the indicator (e.g. unemployment rates) and how it relates to the economic dimension of SUD (for example, a high level of unemployment may suggest that the population does not possess the right skills for the urban economy, OR there are not enough jobs being created in the city – and therefore lack the necessary income to meet their own present and future needs. Alternatively, a low life expectancy – poses possible limitation to the economy suggests that the healthcare system of the city is lacking quality doctors or necessary infrastructure,

**Composite SDIs**

This involves making use of **weighted calculation of several single SDIs to derive a combined measure**. The examples include the Ecological Footprint (EF), Happy Planet Index (HPI) and Genuine Progress Indicator (GPI). Regional measures such as the European Green City Index (EGCI) and China Urban Sustainability Index (CUSI) have also been developed.

**Ecological Footprint (EF)** - *measures how much land and water area a human population requires to produce the resources it consumes and to absorb its waste under prevailing technology and socio-economic conditions. EF is clearly related to the notion of **carrying capacity**. In a sustainable world, society’s demand on nature is in balance with nature’s capacity to meet that demand. Associated concepts would include an **ecological overshoot** when demands on ecological resources exceed supply.*

## Happy Planet Index (HPI)

This index takes the conventional approach to EF of quantifying the amount of resources used further to consider the 'efficiency' with which such ecological inputs are then converted into human development outcomes in terms of life expectancy and experienced well-being. Candidates should recognise both the objective and subjective elements in the HPI. The index highlights that it is possible to live long happy lives with a much smaller ecological footprint than found in the highest-consuming nations, e.g. Costa Rica.

6(b) "There are more winners than losers when cities carry out urban reimagining." To what extent do you agree with the statement? [20]

### Indicative Content

From the examiners' report:

#### Indicative Content

Responses should consider the extent of success of urban reimagining strategies in improved quality of urban living space. Candidates should assess more than one strategy. There should be mention of empirical results to substantiate arguments. The success of the strategies should be discussed in relation to a criterion/criteria.

A higher level response could apply to a set of criteria or a criterion consistently to evaluate different strategies. Another approach could be to consider what had been achieved given the challenges specific to the content.

Possible links to other topics include improving the quality of flood management strategies (Topic 1.2), addressing the Millenium Development Goals (Topic 2.1), the concept of sustainable development (Topic 3.1).

Note that the evaluation should be based on highlighting the different stakeholders in evaluating the strategies of urban reimagining.

### Generic 12m Level Descriptors

<b>Level</b>	<b>Marks</b>	<b>Descriptors</b>
4	10-12	<ul style="list-style-type: none"> <li>• Response is consistently analytical and comprises purposeful explanations.</li> <li>• Response addresses the question fully using accurate and detailed knowledge.</li> <li>• Depth of relevant knowledge and understanding is evident throughout.</li> <li>• Response is coherent and use of terminology is accurate throughout.</li> </ul>
3	7-9	<ul style="list-style-type: none"> <li>• Response is analytical and explanatory rather than descriptive.</li> <li>• There is a clear focus on the question.</li> <li>• Response demonstrates relevant knowledge and understanding.</li> <li>• The response is coherent and the use of terminology is mostly accurate.</li> </ul>
2	4-6	<ul style="list-style-type: none"> <li>• Response includes analysis and explanation but is generally dominated by description.</li> <li>• Response reflects understanding of the question and is generally relevant.</li> <li>• Some parts of the response may be unclear.</li> <li>• Use of terminology is limited.</li> </ul>
1	1-3	<ul style="list-style-type: none"> <li>• Response lacks focus on the question.</li> <li>• Response is generally fragmentary and lacks a clear structure and organisation.</li> <li>• There may be many unsupported, brief or incomplete assertions and/or arguments with some inaccurate use of terminology.</li> </ul>

### 20m Level Descriptors

<b>Level</b>	<b>Marks</b>	<b>Descriptors</b>
5	17-20	Response is perceptive, logical and has strong evaluative elements. Evaluation is relevant and comprehensive. Strong evidence of synoptic thinking where knowledge from different topics is synthesised purposefully. Use of detailed and accurate knowledge reflecting depth of understanding of the subject content.
4	13-16	Response displays a sound evaluative element. There is some evidence of synoptic thinking through synthesising knowledge from different topics. Response is generally focused on the demands of the question and features accurate knowledge, reflecting depth of understanding of the subject content. The argument or discussion is coherent and supported by relevant material. Use of terminology is accurate and appropriate.
3	9-12	Response is broadly evaluative rather than descriptive. Response addresses the questions and features accurate knowledge, reflecting some understanding of the subject content. Argument or discussion is mainly coherent and supported by material which is largely relevant. Use of terminology is relevant and mostly accurate.
2	5-8	Response is largely descriptive. Response attempts to provide an argument to address the question. The weakest responses in this level may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Some lapses in use of terminology though generally accurate.
1	1-4	Response lacks focus on the question and may be largely irrelevant to it. Response is fragmentary and lacks clarity. There may be also be unsupported assertions and/or arguments with limited or no use of relevant terminology.

# Paper 2 Suggested Marking Scheme

## Section A

### Theme 4: Geographical Investigations

- 1 A group of 20 Geography students were tasked to undertake a geographical investigation in Stratford, located in the Lower Lea Valley, in London, United Kingdom. Before the London Olympics in 2012, Stratford had one of the most deprived communities in the city. The aim of their investigation was to examine the impact of hosting the flagship event on the residents living in Stratford.

As part of their investigation, the students collected secondary data to obtain key indicators (e.g. unemployment rates) on Stratford and London. For their primary data, they administered 50 questionnaire surveys and conducted 20 qualitative interviews with residents living in Stratford.

Resource 1A shows a map of London and location of Stratford where the Olympic games were hosted. Resource 1B shows a comparison of key indicators of Stratford and London in 2008 and 2018. Resource 2 shows an excerpt of the questionnaire survey and the compiled data from the survey. Resource 3 shows an interview excerpt from 2 respondents on their perceptions of the impact hosting the Olympics games on the community.

- (a) Suggest a research question for the students' investigation and explain why it is well- [3]  
defined.

***RQ: What is the impact of hosting the Olympic Games on residents living in Stratford, London?***

**Clearly defined** – to be able to identify the different variables in the hypothesis and their relationship

**Identifying Variables:** Perceptions (Before and After hosting) and hosting the Olympic Games

**Independent variable:** Hosting of the Olympics

**Dependent Variable:** Perceptions (Before and After hosting)

- (b) Using Resource 1B, 2 and 3, explain how the primary and secondary data collected by the students can address the aim of the investigation. [4]

Stage 2 of the GI process requires students to establish the data needed to examine the question/hypothesis posed.

Resource 1B: Comparisons of various indicators over time (2008 and 2018) and across space (Stratford vs London)

Resource 2: Quantitative data on perceptions (Agree vs Disagree)

Resource 3: Qualitative data, opinions.

- (c) The group concluded that the data collected from the questionnaire survey in Resource 2 may not be completely reliable and/or accurate. [5]

Explain how Question 5 of the questionnaire survey could be improved.

- Greater range of responses (e.g. SA, A, D, SD) beyond the dichotomy of “Agree and “Disagree”
- Subjective terms “affordable” and “well-paying” are ambiguous and may mean differently to different respondents->using quantitative numbers that are more objective.
- Target groups in the question stems need to be clarified, e.g. “community in Stratford”, “disadvantaged groups” -> to identify these target groups more precisely.

- (d) Sketch a graph to represent the compiled data in Resource 2. Justify why you chose the method to represent the data. [4]

Comparative Bar Graph – to have correct labels and data represented –(3)

Justification of Method:

Ease of comparison between different sets of data on the same axis. –(1)

Refer to:

<https://sites.google.com/site/skillsq229/home> for a list of data representation methods and when to use them!

- (e) Using all the resources, evaluate this investigation on the impact of urban reimaging on the residents living in Stratford and suggest how it can be improved and extended. [9]

When given a 9m evaluative question in the DRQ, these are the indicative skills you would need, see suggested structure to respond to the guiding questions:

- 1) How has the data collected/presented helped the students to address the

hypothesis? – Interpretation and Corroboration of data required

- (e.g. Resource 2 shows that 70 percent of residents disagreeing that the Olympics has created affordable housing for the community, also seen in Resource 1B showing that rent of a 2Bedroom flat has increased by 50% over span of 10 years or with Resource 3 “house prices have become very silly” and “you won’t stand of buying your own home”
- e.g 85% agreed that they have well-paying jobs, corroborating with increasing net household income in Resource 1B.
- Better safety and better social inclusion...

2) What are the strengths and limitations?

(e.g. think in terms of its hypothesis/research question, sampling strategy, risk assessment, data collection methods, data representation techniques)

- Strengths – both qualitative and quantitative data collected that allows for corroboration
- Strengths – various aspects of economic indicators (rental, unemployment) and social indicators (safety, inclusion)
- Weaknesses- Related to the construct of quantitative questions
- Weaknesses- interviews are anecdotal from interviews – subjective opinions and not representative

3) How do you improve on the limitations?

(e.g. think of increasing sample size or using systematic sampling for better representativeness, removing sources of error: operator, equipment, systematic errors to improve reliability of methods and accuracy of data, repeat experiment on different days, time, seasons for greater validity and usefulness)

- Increase sample size of surveys (currently 50) to increase **representativeness**
- Clarification and quantification of terms used in surveys -> to increase **accuracy and reliability**
- Provision of qualitative questions – to better understand how respondents respond and the context
- How were these respondents chosen?

4) How do your extend your research?

(e.g. think in terms of research scope i.e. impact of urban reimaging include economic aspects, social aspects and environmental aspects.)

- Extend it across space – for analysis of how impact of other urban reimaging projects can be investigated
- Extend it across time – what is the value of conducting it over a longitudinal time scal (e.g. beyond 10, 20, 30 year horizon)
- Extend/segment across social groups within Stratford (youths, families, elderly etc)

Level	Marks	Descriptors
3	7–9	Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the question. Includes logical and well-developed evaluation, which may include perceptive insights for the strongest responses. Reflects strong critical thinking skills and a good understanding of the requirements of the question.
2	4–6	Response demonstrates good knowledge and understanding of geographical

## Section B

### Theme 1: Tropical Environments

#### Rainfall distribution in Africa

**2** Resource 4 shows the distribution of the world's deserts. Resource 5 shows the climographs for 3 locations in Africa: Tombouctou (in Mali), Ouagadougou (in Burkina Faso) and Kisangani (in Zaire). Resource 6 shows the surface wind patterns in the months of January and July over Africa. Resource 7 shows a soil profile found in the arid tropics.

- (a) Describe the distribution of the world's deserts shown in Resource 4. [4]
- Most deserts located along 30 degrees N/S or Tropic of Cancer/Capricorn
  - Inland locations (e.g. Mongolia, Sahara) (Continentality)
  - Western coasts of continents (e.g. Atacama, Mojave, Namib, Australian)
  - Extremely arid regions are surrounded by arid and semi-arid regions (there must be differentiation of areas between semi-arid, arid and extremely arid regions)

Note this question does not require any explanation. No evidence of topography and hence would not be accepted "leeward side" of mountains.

- (b) Explain the reasons for the distribution of the deserts shown in Resource 4. [6]
- Presence of SHTP – Area of high pressure that prevents uplifting of air
  - Continentality – far away from source of water and moist onshore winds would have lost its moisture
  - Cold Currents - Presence of cold ocean currents along the **western coast of continents** tends to stabilise the air over the **coast**. This prevents cloud formation and rainfall

Overall, due to “atmospheric stability” which inhibits condensation of air parcels. Where  $ELR < ALR$

- (c) With reference to Resource 5, distinguish the rainfall patterns in the 3 locations. [4]

[Amount of Rainfall] 20cm in Tombouctou, compared to 80cm in Ouagadougou and 195mm in Kisangani.

[Seasonality of Rainfall] – Presence of seasons (distinct wet and dry seasons in Tombouctou, with wet desons during High sun period JJA 80%) of rainfall received), but rainfall received throughout the year for Kisangani.

- (d) With reference to Resource 5, Resource 6 and your own knowledge, explain how surface wind patterns have caused variations in rainfall received at the three locations. [5]

Kisangani – presence of ITCZ mostly throughout the year – area of low pressure due to intense heating and hence convergence of winds (moisture from the Gulf of Guinea during January and Indian Ocean in July)

Ouagadougou- Influence of West African Monsoons. SW monsoon during July brings moisture laden winds from Gulf of Guinea due to pressure difference (low pressure over African Continent compared to the water body due to lower specific heat capacity). NE monsoon would be dry as it blows offshore and across Sahara desert.

Tombouctou – Receive little amounts of rain (20cm) due to the northward incursion of the ITCZ during JJA, moisture of Gulf of Guinea. Mostly dry throughout the rest of the year, because of NE Dry Harmattan winds (monsoons).

- (e) Explain the processes that lead to the characteristics of the soil profile as seen in Resource 7. [6]

Characteristics:

- 1) Thin layer of soil 0.5 m and little soil horizon development – little amount of regolith and hence little chemical weathering
- 2) Little Organic Matter/Light coloured surface hotizon – little decomposition of leaf litter, organic material –
- 3) Concentration of salts in B Horizon (Calcification and Salinisation) due to upward movement of water – capillary action, eluviation of salts
- 4) Slightly acidic pH – Desert soils tend to be alkaline, but can have pH ranging from 6-7.9

## Theme 2: Development, Economy and Environment

### Resource Curse in Africa

- 3** Resource 8 shows the amount of Foreign Direct Investment (FDI) received by African countries from 2000 to 2014. Resource 9 shows the development of the diamond industry in Botswana. Resource 10 shows a table of key indicators of resource-rich countries in Africa.  
Resource 11 shows the variations in strength of the relationship between GDP growth (%) and resource dependence.

- (a)** With reference to Resource 8, describe trends of the amount of FDI and percentage of GDP received by all African countries from 2000 to 2014. [5]

[Overall Trend] FDI increases for all African countries from 2000-2014. [Cite Data]

Trends for amount of FDI – for both resource rich and resource poor countries.

Percentage of GDP received – for both resource rich and resource poor countries

- (b)** With reference to Resource 9, describe the development and characteristics of the diamond industry in Botswana. [5]

[Public-private partnership]

[Nature of jobs]

[Amount of diamonds extracted]

Note that development of the industry does not mean the increase in GDP or HDI.

- (c)** With reference to Resource 9 and your own knowledge, explain how the diamond industry in Botswana has contributed to changes in its GDP and HDI. [6]

[GDP] from the export of diamonds, public-private ownership and the provision of higher skilled jobs (e.g. manufacturing and sales function jobs)

[HDI] note that GDP constitutes HDI and that HDI also includes life expectancy and mean years of schooling. It is logical to explain that the provision of jobs from the diamond industry led to higher pay and thus greater purchasing power.

- (d) With reference to the resources and your own knowledge, evaluate the extent to which the resource curse can be mitigated for resource-rich countries. [9]

Note that candidates would need to make use of all the resources to come to a reasoned argument about whether the resource curse can be mitigated. This would require a comparison of Botswana's data alongside other resource-rich countries, as well as the interpretation of the scatter plots that shows the importance of good institutions in mitigating the resource curse.

### **Theme 3: Sustainable Development**

#### **Measures of liveability and needs of the elderly in South Korea**

- 4 The Liveable City Model Project (LCMP) is a core strategic project rolled out by the Korean Government to decentralise the Seoul Metropolitan Area and to promote liveability in other Korean cities.

Resource 12 shows the liveability ranking of selected cities using two different liveability measures: Economist Intelligence Unit (EIU) and Mercer Ranking for Quality Living in 2014. Resource 13 shows an infographic on the elderly in Busan, the second largest city in South Korea. Resource 14 shows the survey findings on extent of which physical and social needs of the elderly living in Busan are met, based on 100 respondents.

- (a) With reference to Resource 12, compare the ranking of cities across the two measures of urban liveability. [3]  
-Vienna remains the top-ranking city across the two measures.

-Cities such as Seoul, Tokyo, and Vancouver are ranked higher under the Mercer Ranking as compared to the Economist Intelligence Unit (EIU) ranking, with Tokyo being ranked 15 positions higher in the Mercer Ranking compared to the EIU ranking, whilst Seoul and Vancouver has a difference of 13 and 2 in positions respectively.

-Cities such as London, and Melbourne are ranked lower under the Mercer ranking, with London being ranked 15 positions lower in the Mercer ranking, compared to Melbourne's decrease in 2 positions across EIU and Mercer.

- (b) Using Resource 12, suggest possible reasons for the variations in liveability ranking of Seoul based on the two liveability measures in 2014. [4]  
-Seoul's ranking under the EIU measure is 58, whereas for Mercer, it is ranked 71<sup>st</sup>. This might be due to the following reasons:

ANY 2:

[Number of indicators used within each measure] / [Number of dimensions measured]

- EIU uses 30 indices to measure 5 sectors in terms of social safety, medical service, culture/environment, education, and infrastructure. On the other hand, Mercer ranking measures 39 items across 10 sectors which includes dimensions that are not covered in the EIU, such as political/social Environment, hygiene, provision of respite, consumables, and natural environment.
- This means that for cities that have done better in the Mercer Ranking (for e.g Tokyo), they might have done better in the various dimensions that are not captured by the EIU. For instance, Tokyo might have good political climate or natural environment that is being taken into account for Mercer ranking.

[Number of cities ranked]

- EIU only ranks 140 cities, whereas Mercer ranks 221 cities.
- This might affect the variations in ranking because the cities are ranked relative to each other. When there are lesser cities on the list, there are lesser cities to compete against.

[Timeframe of ranking]

- EIU announced their rankings twice a year (February and August), whereas Mercer releases their rankings yearly in March.
- The difference in timeframe in measuring will result in variations in liveability ranking because the cities might have improved or regress on a particular dimension over a period of time. For instance, transport infrastructures might have been improved over the course of a year or few months, or there might be political events and changes which will affect the survey results.

- (c) With reference to Resource 13, explain how the strategies implemented could cater to the needs of the elderly in Busan. [6]  
Students should link each strategy to specific needs of the elderly:

ANY 3 with accompanying explanation  
(2 marks per strategy+ explanation):

[Pedestrian Walkways / walkability to enhance physical access]

-Physical access

[Busan metropolitan city Ordinance support for employment training and jobs, and financial planning]

-Financial access

[Busan metropolitan city Ordinance support for enhancing physical and mental health]

-Social access

[Busan metropolitan city Ordinance support for social participation/ leisure and cultural activities]  
-Social access

- (d) Explain the strengths and limitations of using Resource 14 to represent the survey findings on the extent to which physical and social needs of the elderly living in Busan are met. [6]

Explain the strengths and limitations of using Resource 14 to represent the survey findings on the extent to which physical and social needs of the elderly living in Busan are met.

Type of bar graph: Stacked bar chart

1m for identification, 1m for explanation.

Full marks will not be awarded if both strengths and limitations are not addressed.

Strengths

[Readability]

-Able to visually compare physical vs social needs across two graphs. The needs are also further categorised into different aspects for easy comparison.

-Able to pick out areas in greatest need of improvement across the different categories.

[Functionality]

-Spectrum of responses includes no response / N/A to more accurately represent the opinions or lack of knowledge of respondents pertaining to the different needs of elderly so as to enable further analysis.

-Lines indicating percentages allow us to accurately read the proportion of responses across different categories.

Limitations

[Readability]

-Colours should be more differentiated across the different responses (on the likert scale) so as to enhance readability.

-Shading choices are counter-intuitive: with strongly disagree being the darkest, no response being the second darkest, and strongly agree being the third darkest.

[Classification issues]

-Some categories does not directly apply to needs of elderly, such as “for kids, easy to hang out with friends”, “strangers are a threat to regional identity”.

-For the chart on social needs, all the categories are phrased positively except for “strangers are a threat to regional identity”, and “difficult to raise kids”. Similarly, for the chart on physical needs, “inconvenient public transportation”, “insufficient sidewalk” are phrased negatively. This might confuse the respondent when s/he is doing the survey, and therefore resulting in inaccurate results.

- (e) With reference to Resource 14, compare the extent to which the physical and social needs of the elderly living in Busan have been met. [6]

With reference to Resource 14, compare the extent to which the physical and social needs of the elderly living in Busan have been met.

(1m for identification, 1m for explanation)

[Overall comparison between physical and social needs]

- Overall, social needs are met to a greater extent compared to physical needs.
- Across all the categories, Busan fared well with the exception of 'difficult to raise kids'. Busan residents think that it is a place which is difficult to raise kids (with more than 46% of the respondents who strongly agree/ agree as compared to 42% who disagree). However, the differences are rather small (2%).
- This is as opposed to physical needs, whereby there are three categories reflecting that the residents' needs are not met. For "sufficient playing fields for kids, more than 60% of the respondents disagree. For "sufficient green areas" 57% of the residents disagree, and for "sufficient roads and parking lots", 59% disagree.

[Comparison within physical needs]

- In terms of physical needs, there are greatest satisfaction in the realm of infrastructure and transport, as compared to areas like education and social spaces.
- Most of the respondents (almost 70%) agree that public transportation fares are moderate, and slightly more than half of the respondents disagree that public transportation is inconvenient. 53% of the respondents also agree that public parks improve the quality of life.
- Whereas only 30% agree that there are sufficient educational facilities.

[Comparison within social needs]

- In terms of social needs, there are greatest satisfaction in terms of being a friendly neighbourhood, with 18% disagreeing.
- In terms of social networks and conviviality (i.e. deeper interactions and connections), Busan fared slightly lower. For instance, around 22% of the respondents disagree that they feel a sense of belonging within the neighbourhood, and around 24% disagree that it is easy to encounter acquaintances.



**HWA CHONG INSTITUTION**  
**JC2 Preliminary Examination**  
**Higher 2**

**CANDIDATE NAME**

**CT GROUP**

**CENTRE NUMBER**

**INDEX NUMBER**

**GEOGRAPHY**

**9751/01**

Paper 1 Structured Essay Questions

**16 September 2019**

**3 hours**

Additional Materials: Answer Paper  
World outline map

**READ THESE INSTRUCTIONS FIRST**

Write your name and CT class clearly on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

Submit your answers in **three separate sets**:

1. Section A
2. Section B
3. Section C

If you have not attempted any of the questions, you are to indicate this in the answer booklet.

### Section A – Tropical Environments

Answer **one** question from this section.

- 1 (a) Explain the main soil forming processes in the tropics. [12]
- (b) To what extent is climate the most important factor in weathering and mass movement processes in the tropics? [20]
- 2 (a) Explain the main processes involved in landform formation in the arid tropics. [12]
- (b) 'Geology is the main determinant of the nature of landforms in the arid tropics'. How far do you agree with this statement? [20]

### Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a) Explain the relevance of bottom-up development with reference to countries at low levels of development. [12]
- (b) To what extent can the Millennium Development Goals (MDGs) effectively measure development? [20]
- 4 (a) Explain how the nature of water scarcity might differ between countries at low and high levels of development. [12]
- (b) To what extent can governments effectively manage water resources today? [20]

[Turn over

**Section C – Sustainable Development**

Answer **one** question from this section.

- 5 (a)** Explain how sustainable development involves the concept of 'needs' in countries at low levels of development. **[12]**
- (b)** To what extent can the political and economic challenges in attaining sustainable development be overcome? **[20]**
- 6 (a)** Explain the relationship between urban liveability and youths in countries at high levels of development. **[12]**
- (b)** To what extent can countries achieve sustainable urban development and liveability? **[20]**

----- End of paper -----

# 2019 C2 Prelims H2 GEOGRAPHY PAPER 1

## Suggested Answers

- 1 (a) Explain the main soil forming processes in the tropics.

[12]

In the humid tropics the main process is eluviation due to the high amounts of rainfall and the possible subsequent illuviation of minerals and humus in the lower layers of the soil. In the arid tropics, eluviation can occur with rainfall events but capillary action is more significant.

**Calcification** is a process whereby capillary action results in increasing concentrations of calcium in the soil (Fig. 1). Calcification is typical of low-rainfall areas where potential evapotranspiration is greater than precipitation, so the movement of soil solution is upwards through the soil through capillary action. Water is drawn to the drying surface by capillary action and leaching is generally absent, apart from when occasional storms occur. Thus, although there may be some leaching, it is insufficient to remove all the calcium which then accumulates in the B horizon. Calcium carbonates and other solutes therefore remain in the soil and over time there will be an increase in its concentration due to capillary action. In extreme cases where evapotranspiration is intense, calcium may form a crust on the surface. This may be toxic to plant growth.

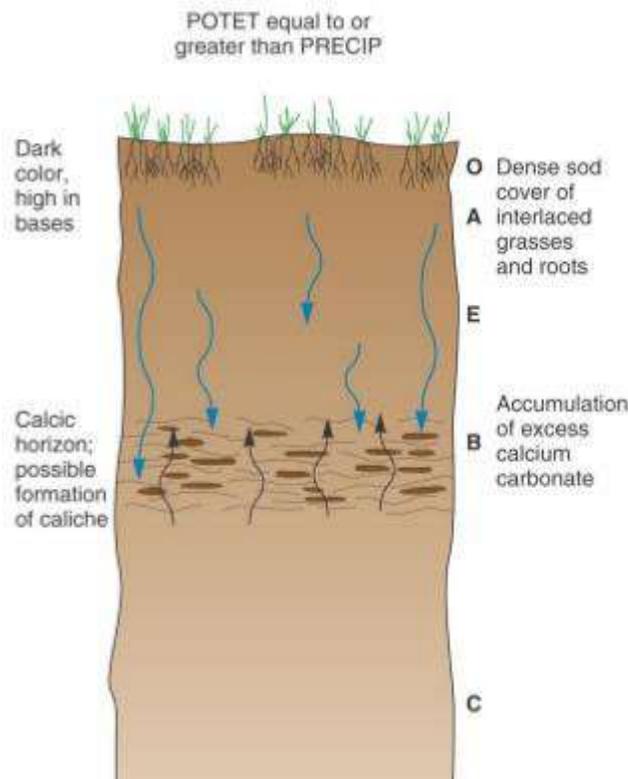


Fig. 1: Calcification

**Salinisation** is the accumulation of soluble salts of sodium, magnesium and calcium in soil to the extent that soil fertility is severely reduced. It occurs when potential evapotranspiration is greater than precipitation in places where the water table is near to the surface (Fig. 2). Capillary rise of water from a water table that is saline and close to the surface will result in the salinization of the ground. As moisture is evaporated from the surface, salts are drawn upwards in solution by capillary action. This process is therefore found in dry climates. Further evaporation results in the deposition of salt as a hard crust on the surface which has low permeability and this reduces the amount of moisture and other nutrients that can enter the soil.

**Laterisation** is the process of accumulation of sesquioxides (an oxide with three atoms of oxygen and two metal atoms) in the soil, to form **laterite** (Fig. 3), a reddish-clayey material. Laterite is commonly found in soils of tropical and subtropical environments due to high temperatures and heavy precipitation, which result in the rapid weathering of rocks and minerals, especially oxidation. Movements of large amounts of water through the soil cause eluviation and leaching to occur, resulting in a soil layer that is rich in iron oxide.

Lateritic soils may contain clay minerals; but they tend to be silica-poor, for silica is leached out by waters passing through the soil. Typical laterite is porous and claylike. It contains the iron oxide minerals such as hematite ( $Fe_2O_3$ ) and abundant gibbsite ( $Al_2O_3 \cdot 3H_2O$ ).

Almost all of the by-products of weathering, very simple small compounds or nutrient ions, are translocated out of the soil profile by leaching if not taken up by plants for nutrition. The two exceptions to this process are iron and aluminium compounds (less soluble).

A laterite horizon is formed under the surface when iron and aluminium oxides are concentrated there by groundwater flow. This layer can be up to 1.5m thick. Iron oxides thus give tropical rainforest soils their unique reddish colouring.

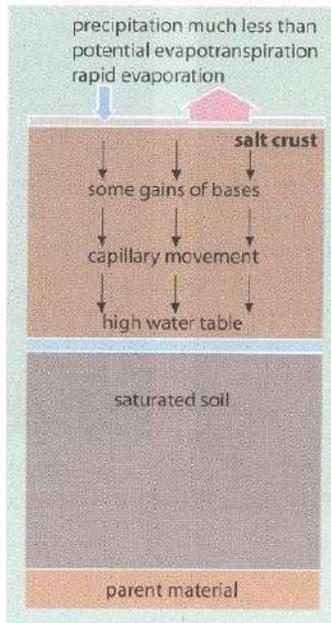


Fig. 2 Salinisation

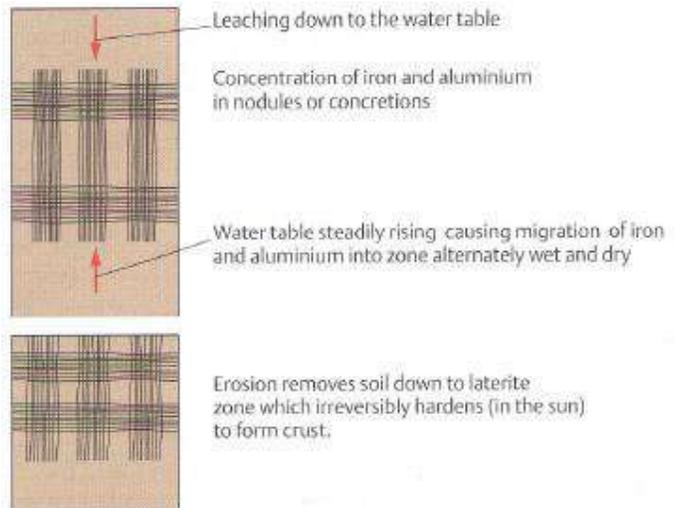


Fig. 3 Laterisation

(b) To what extent is climate the most important factor in weathering and mass movement processes in the tropics? [20]

**Climate is important to weathering**

- Refer to Peltier's diagram which reflects the relationship between mean annual temperature and rainfall in affecting weathering processes
  - Chemical weathering in general is stronger in areas with high mean annual temps and rainfall
  - Physical (or mechanical) weathering is strong in with moderate rainfall low mean annual temp

areas and

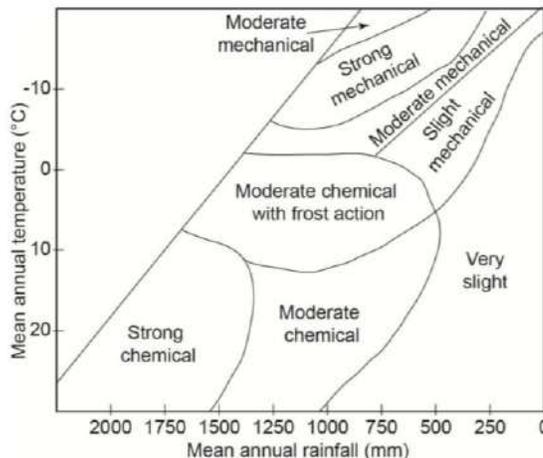


Fig. 1 Peltier's diagram

- Van Hoff's rule which states that for every 10°C increase in temperature, the rate of weathering increases 2-3 times – except for carbonation as CO<sup>2</sup> dissolves for effectively at lower temperatures
- Examples of specific processes:
  - Freeze-thaw action is most effective at low mean annual temps and moderate pptn
  - Thermal weathering – most effective in areas with large diurnal temp ranges
  - Carbonation rates can be high in humid tropical areas due to the sheer amount of water flowing through the joints of the limestone rock even though CO<sup>2</sup> might dissolve more slowly as compared to areas with lower temperatures

#### **Other factors that are important to weathering**

- Gradient – steeper the gradient, less infiltration, less weathering
- Vegetation – is strongly linked to climate. Forests are:
  - Associated with biological weathering causing root wedging and CW due to the presence of organic acids
- Grain size – smaller grain size, greater surface area esp for CW
- Geology - jointing – spaces present for infiltration of water for CW
- Geology – mineral composition – calcium carbonate in limestone makes it susceptible to carbonation and feldspars and mica can undergo hydrolysis to form kaolinite and iron

#### **Climate is important to mass movement processes**

- MM occurs when shear stress > shear strength
- The supply of water determines shear strength and shear stress – some water content increases the cohesion between particles and increases shear strength while too much water decreases shear strength as water acts as a lubricant as well as increases shear stress due to the weight
  - This relationship between water and MM affects the type of mass movement e.g. flows such as mudflows occur due to high water content (water supply can be caused by

#### **Other factors that are important to mass movement**

- Geology – joints and failure planes – reduces shear strength, link to slides such as slump and rock slide
- Density of vegetation – dense vegetation increases shear strength due to cohesion of soil and reduces occurrence MM. Vegetation can also increase shear stress by adding weight to the slope.
- Gradient – steep gradient increases shear stress
- Shocks – earthquakes and other shocks applied to slopes can increase shear stress
- Human activity – slopes can be steepened by road cuts which increases shear stress

#### **Conclusion**

- Climate is the most important factor in generally determining the nature/type of weathering and mass movement.
- However in very specific situations, a combination of factors can become the main determinant of a MM event e.g. Vajont Dam landslide → the construction of the dam caused the channel level to rise and saturate areas that had bedding planes that were inclined towards the canyon. Thus the saturation of the ground reduced shear strength and caused a major landslide to occur as massive amounts of rocks and soil moved over the failure planes into the lake. Hence this MM event was due to a combination of human activity and geology.

2 (a) Explain the main processes involved in landform formation in the arid tropics.

[12]

#### **Main landform formation processes in the arid tropics**

- Weathering – thermal weathering and salt crystal growth
- Erosion
  - Fluvial – rilling and gullyng,

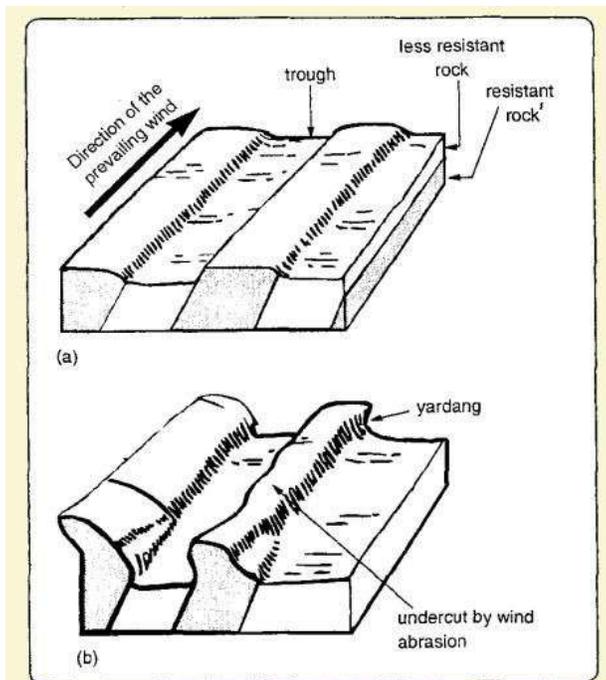
- Aeolian – deflation, abrasion
- Transportation
  - Aeolian – saltation, reptation, suspension and creep
- Deposition
  - Aeolian – sedimentation, accretion and encroachment

(b) 'Geology is the main determinant of the nature of landforms in the arid tropics'.  
How far do you agree with this statement?

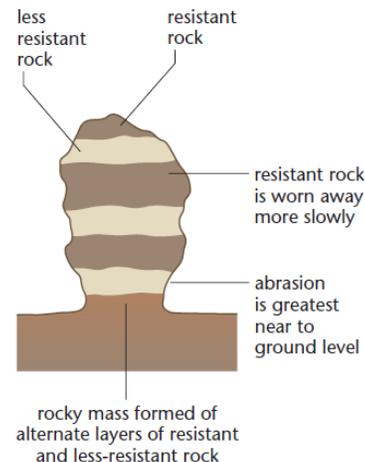
[20]

### Geology is the main determinant of landforms in arid areas

- Alternating layers of resistant and less resistant rock and their dip
  - Vertical alignment – yardangs
  - Horizontal alignment - a type of yardang called zeugen or rock pedestal
- Grain size
  - Grain size is another factor governing dune profile. The sand in transport becomes coarser and more poorly sorted as wind speed and rates of mass transport increase toward the dune crest. These patterns reflect changes in the competence of the wind, which is capable of transporting larger grains and a wider range of grain sizes as its speed increases in space and time.
  - A coarse-grained sand dune has a greater difference in threshold velocity between the crest area and its lower levels than a finer-grained sand dune of a similar profile. A coarse-grained sand dune will have much longer periods of erosion taking place only at or near the crest, thus lowering the dune profile. This explains why all dunes composed of coarse grains such as whaleback and "zibar" are flat and low.



Yardang development



Zeugen

### Other factors determine the landforms in arid areas

- Sand supply and wind direction – Transverse dunes require abundant sand supply and unidirectional winds while star dunes also require abundant sand supply but are formed with multi-directional winds
- Climate – in general, the arid climate causes the dominance of certain processes such as rilling and gullying and aeolian processes to occur which in turn shape the landforms
- Wind velocity – the higher the wind velocity, the larger amount and size of sand grains that can be transported. This can affect the supply of sediments for loess formation as well as the amount of sediments carried in saltation and subsequently causing abrasion.
- Permeability – the lower permeability of surfaces in arid areas, the more surface runoff and erosion

occurs

- Height at which erosional processes occur the greatest – about 1-2 m for abrasion. Results in the erosion at the base of bedrock and narrowing of the base

## Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a) Explain the relevance of bottom-up development with reference to countries at low levels of development.

[12]

### Relevance of bottom – up development to LDCs

- High inclusivity and participatory levels from locals
- ‘Development from below’, hence closely related to specific sociocultural, historical and institutional conditions, as locals will know what is best to develop for their communities
- E.g. Chambamontera, Peru where the locals do not have access to electrical mains as the government is unwilling to pay high costs just to expand the electricity grid to a small population. A group of villagers collaborated with a charity, Practical Aid, and made use of the abundant rainfall levels to produce electricity through installing nearly 50 microhydro schemes, therefore increasing their quality of life.
- Relatively less expensive and less detrimental to the environment where locals are more aware of the conditions of their surroundings and thus choosing a more appropriate technology
- Small scale and links to sustainability and improved human development
- E.g. wells and hand pumps installed in Africa by a UK NGO, Water Aid, cost only 22 pounds each, providing clean water and eliminating the need for women and children to travel long distances to collect water

- (b) To what extent can the Millennium Development Goals (MDGs) effectively measure development? [20]

The eight **Millennium Development Goals (MDGs)** – which range from halving extreme poverty rates to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015 – form a blueprint agreed to by all the world's countries and all the world's leading development institutions.

### Indicative content:

*Students should examine how the MDGs utilizes development indicators to measure (and incentivize) progress, and evaluate its relevance as a framework especially for developing countries, and perhaps less so for developed countries. They should demonstrate an understanding of what development entails, and how the MDGs were a movement away from a narrow understanding of development as economic growth. In the assessment of the robustness of the MDGs, some comparison could be made with other measures of development. Some awareness of the challenges of data collection, the difficulties of comparisons across different countries (e.g. different cultural contexts/ developmental focus) and the shift towards sustainable development and the SDGs.*

- 4 (a) Explain how the nature of water scarcity might differ between countries at low and high levels of development. [12]

Water scarcity is the lack of sufficient available water resources to meet the demands of water usage within a region. It is defined as a gap between available supply and expressed demand of freshwater in a specified domain, under prevailing institutional arrangements (e.g. resource ‘pricing’ and retail charging arrangements) and infrastructural conditions (UNFAO).

Water scarcity = an excess of water demand over available supply

Scarcity is signaled by unsatisfied demand, tensions between users, competition for water, over-extraction of groundwater and insufficient flows to the natural environment.

The nature of water scarcity refers to the causes leading to either (or both) absolute scarcity, or relative scarcity in different developmental contexts.

Water scarcity can be defined as the point at which the aggregate impact of all users impinges on the supply or quality of water under prevailing institutional arrangements to the extent that the demand by all sectors, including the environment, cannot be satisfied fully.

Water scarcity is a relative concept and can occur at any level of supply or demand. Scarcity may be a social construct (a product of affluence, expectations and customary behaviour) or the consequence of altered supply patterns - stemming from climate change for example. *Absolute water scarcity* is the result of inadequate natural water resources to supply a region's demand.

According to the United Nations Development Programme, *relative (or socio-economic) scarcity* is found more often to be the cause of countries or regions experiencing water scarcity, as most countries or regions have enough water to meet household, industrial, agricultural, and environmental needs, but lack the means to provide it in an accessible manner.

(b) To what extent can governments effectively manage water resources today? [20]

Even though conflicts over water may arise as a result of various underlying factors, they ultimately revolve around the basic issues of limited water quantity, water quality and timing of water flow. While water cooperation tends to cover a broad spectrum of water issues including water quantity, quality, economic development, hydropower and joint management, most water conflicts tend to relate to water quantity and infrastructure. Conflict over water sources involve but are not limited to the international scale.

Indicative content:

*Students should assess the effectiveness of governments in managing water resources at both the urban and national scale as well as internationally, and make clear what "effective management" entails e.g. balance competing interests over water, manage water scarcity, ensure equitable water distribution, distribute costs and benefits of water initiatives equitably, make accessible reliable sources of information concerning water. Some awareness of the challenges faced by LDCs and their vulnerability in the face of climate change.*

### Section C – Sustainable Development

Answer **one** question from this section.

5 (a) Explain how sustainable development involves the concept of 'needs' in countries at low levels of development. [12]

- Define SD : SD is development that meets the needs of the present without compromising the ability of future generations to meet their own needs
- SD also involves meeting the goals within the three dimensions of the economy, society and environment.
- One of the main concerns in SD is the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given
- The consideration of meeting the needs of the world's poor is important in the context of SD because the unsustainable development of LDCs will threaten development on a global scale. However, if needs are met, LDCs hold vast potential in contributing to SD in LDCs and DCs:
  - Meeting **essential needs** requires not only a new era of economic growth for nations in which the majority are poor, but an assurance that those poor get their fair share of the resources required to sustain that growth. Such equity would be aided by political systems that secure effective citizen participation in decision making and by greater democracy in international decision making.
  - Rapidly growing populations can increase the pressure on resources and slow any rise in

living standards; thus sustainable development can only be pursued if population size and growth are in harmony with the changing productive potential of the ecosystem.

- Meeting essential needs of countries at low levels of development include:

**Jobs** : The most basic of all needs is for employment. Between 1985 and 2000 the labour force in developing countries will increase by nearly 800 million, and new livelihood opportunities will have to be generated for 60 million persons every year.

- The pace and pattern of economic development have to generate sustainable work opportunities on this scale and at a level of productivity that would enable poor households to meet minimum consumption standards.

**Food** : more food is required to feed people and to tackle undernourishment.

- Annual increases of 5.0 per cent in calories and 5.8 per cent in proteins are needed in Africa; of 3.4 and 4.0 per cent, respectively, in Latin America; and of 3.5 and 4.5 per cent in Asia.
- Foodgrains and starchy roots are the primary sources of calories, while proteins are obtained primarily from products like milk, meat, fish, pulses, and oil-seeds.

**Energy** : Energy consumption patterns need to change.

- LDCs need fuelwood and coal as sources of energy. The minimum requirements for cooking fuel in most developing countries appear to be on the order of 250 kilogrammes of coal equivalent per capita per year. Though, this is a fraction of the household energy consumption in industrial countries, corrective action is needed to preserve the ecological base.

**Housing, water supply, sanitation, and health care** : Deficiencies in these areas are often visible manifestations of environmental stress.

- In LDCs, the failure to meet these key needs is one of the major causes of many communicable diseases such as malaria, gastro-intestinal infestations, cholera, and typhoid.
- Population growth and the drift into cities threaten to make these problems worse.
- Planners must find ways of relying more on supporting community initiatives and self-help efforts and on effectively using low-cost technologies

- (b) To what extent can the political and economic challenges in attaining sustainable development be overcome? [20]

The main political and economic challenges in attaining SD can be exemplified by the two international conferences: Rio de Janeiro 1992 UNCED and Rio de Janeiro 2012 UNCSD

### **Rio de Janeiro 1992 - UN Conference on Environment and Development (aka Rio Earth Summit)**

#### 1. Rio Declaration

Political:

- Even though USA agreed to the Rio Declaration, it still insisted on issuing a press release to explain how it interpreted key phrases differently e.g. stressing that "Development" is not right but "a goal we hold"
- Contradiction in some of the principles. For example, the second principle defended the sovereignty of countries, but also required nations to ensure that activities within their jurisdiction do not cause damage to the environments of other states.

Economic:

The third principle stated that development must meet the needs of the present and future

generations. However, in many cases, this will require a drastic change in industries, such as a forfeiting of high emission heavy industries, and the abolishment of a consumerist culture. This will come as a blow to the business of affected industries, and they will do their best to stop this. E.g. GM and Ford lobbied against the new EPA fuel consumption standard.

## 2. Agenda 21

Political:

- Political motives have obstructed the inclusion/implementation of SD principles. Some issues were excluded at the insistence of lobby groups and national delegations, while the language was blurred to avoid offence in other instances
- OPEC opposed mentions of fuel efficiency, alternative energy sources etc
- TNCs were portrayed in a favourable light
- Diplomatic compromise to maintain friendly relations between states was prioritised over feasible policies
- Agreements between countries that goes against Agenda 21

Economic:

- LDCs : Require large amounts of funding in order to support plans like infrastructural development for sanitary systems, education, economic restructuring to reduce focus on the export industry etc. EIAs may also add to the existing red tape in project management
- DCs: Changes to energy sources may lead to unemployment in areas that rely heavily on fossil fuels

## 3. UN Framework Convention on Climate Change (UNFCCC)

Political:

- Political negotiations have failed to obtain meaningful global commitments to greenhouse gas reductions
- UNFCCC is an inefficient system for enacting international policies as the framework system includes over 190 countries and negotiations are governed by consensus.
- Each country promotes its own agenda, thus it is difficult to come to an agreement
  - Countries have met 20 times since 1992, yet carbon emissions have yet to improve.
  - Kyoto Protocol - Carbon emissions trading to allow countries who have excess credits to put out in the market for trade (countries like US refused to ratify it)
  - 2016 Paris Agreement – one of the more successful attempts at in recent years – about 90% of nations have ratified it
  - At COP 21 in Paris, on 12 December 2015, Parties to the UNFCCC reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future. The Paris Agreement builds upon the Convention and – for the first time – brings all nations into a common cause to undertake take ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so.

Economic:

- Reluctance by countries to sacrifice economic development for environmental outcomes
- Canada withdrew from the Kyoto Protocol in 2011 out of a desire to not force its citizens to pay penalties that would result in wealth transfers out of Canada
- Especially when some countries do not agree to certain conventions, it can easily influence other countries to do the same because they do not want to miss out on the economic gains

Evaluation for Rio Earth Summit

Challenges in inclusion of environmental value in economic analysis - hard for economic development and environmental conservation to go hand-in-hand

## Rio de Janeiro 2012 - UN Conference on Sustainable Development (aka Rio +20)

### 1. The Future We Want: Green economy (DCs)

## Political:

- Shift to green economy requires high political will and commitment to implement measures accordingly. For example sustainable public procurement, sustainable land use and urban policy, integrated management of freshwater, monitoring and accountability measures; and awareness and education campaigns.
- Questions on the definition of the green economy - how it should be left for countries to interpret it and implement measures, instead of it being a top-down definition imposed by the UN

## Economic:

- Concerns over the impact of binding climate targets with Emission Trading Schemes and legislation on protection of biodiversity, waste management and air quality may result in economic growth and thus development being sacrificed
- Market-based instruments like subsidies and greening of tax systems may result in certain areas being underserved/value because they are impossible to sell on the market such as Public goods. These may be non-rivalrous or non-excludable, which makes it difficult for a firm to sell the product or service

## 2. The Future we want: Green Economy (LDCs)

## Political:

- LDCs said that this agenda is a screen for a new wave of green protectionism to be ushered in from DCs
- DCs hostile to foreign trade attempt to block imports on ecological grounds, achieving traditional protectionist goals via non-traditional means
- Green protectionism discriminates against 'brown' goods that do not conform with green regulations and standards, and typically recognises LDCs as standard-takers and DCs as standard-makers

## Economic:

- LDCs want to avoid the increasing financial burden of a green economy as they lack natural reserves
- Transition to a green economy requires substantial additional public expenditure as sustainable financing needs to be ensured across sectors, including agriculture, forestry, energy, health and education, as well as across economic segments, such as small and medium-sized enterprises, infrastructure and innovation
- However, DCs are unable to provide such funding and assistance
- LDCs oppose the integration of social and environmental costs in economic decision-making eg. using taxes to internalise social and environmental costs will increase the price of goods relative to other countries', reducing competitiveness and affecting domestic consumption

**Overall evaluation**

- Challenges both in the political and economic spheres abound in attempts to achieve SD
- However, some headway has been made in various fields such as improvements made in the development of alternative energy technology and the push for the development of the green economy
- Alternative energy (solar power and micro hydropower projects) is used extensively even in remote areas in LDCs and can prove to be sustainable, providing such communities with energy and job opportunities.

6 (a) Explain the relationship between urban liveability and youths in countries at high levels of development.

[12]

- Liveability reflects the wellbeing of a community and comprises the many characteristics that make a location a place where people want to live, work and invest now and in the future. Such characteristics include safety, economic opportunities and welfare, health, convenience, mobility, and recreation.
- Strong, direct relationship between urban liveability and youths in countries at high levels of development. For a city to be liveable in the context of youths, their needs must be met to ensure their well-being physically, emotionally and financially.

- Being young in the city has certain distinctive features as youths experience urban spaces differently from adults
- While there may be greater educational support for youths, they might be neglected in urban policies and planning
- Hence they may value urban liveability that is egalitarian, open and inclusive
- Certain urban – based difficulties and benefits young people experience are not found elsewhere and liveability is a combination of the impact of environmental stressors with socio – cultural influences on urban behavior, dwelling and everyday life
- For countries at high levels of development, certain components of urban liveability might impact more on young people’s lives e.g. space and place, affordability and accessibility and control and freedom

Factors that help determine the liveability of youths in DC cities include:

- **Social and cultural attributes** e.g. gender, race, educational status
- **Economic based factors** e.g. personal/ household income, education fees, salaries, workplace discrimination
- **Political components** e.g. right to vote, citizenship, curfews, control of public space
- **Health and well-being**
  - is threatened by lifestyles that are associated with lower levels of physical activity, less time spent exploring the natural environment, poor eating habits, harmful levels of alcohol consumption, illicit drug use, prescription drug dependency and misuse, rising levels of obesity, non-fatal chronic illness, increasing stress levels and mental health challenges. Programmes need to be in place to address the challenges of such issues.
- **Quality of basic education and opportunities for tertiary education**
  - This is linked to the greater demands for skills and know-how in the context of a knowledge-based economy
- **Employment**
  - Youths require access to employment to gain financial independence and access to housing
- **Participation in urban governance**
  - Youths are often seen as being beneficiaries of government programs and interventions, rather than as agents of change. However, young people wield immense power in creating change and possess the potential to address challenges and gain opportunities through participatory urban governance
- **Public spaces**
  - Need for such spaces for recreation and freedom of expression
  - In the urban context, youths are often seen to be infringing on shared spaces and hence the development spaces that are designed for their specific needs e.g. \*SCAPE Singapore
- **Involvement in the environment**
  - Greater exposure to current affairs enable youths to understand their roles and position in the ongoing debates on sustainable development and climate change.
  - Many youths understand the need for immediate action for the benefit of the current and future generations and some are involved in programmes and events dedicated to the cause of climate change
- Range of examples from some cities needed to illustrate the direct and close relationship between liveability and youths

(b) To what extent can countries achieve sustainable urban development and liveability?

[20]

### **Sustainable Urban Development**

- SUD is a process of integration and evolution among the subsystems making up a city (economic, social, physical and environmental), which aim to provide the local population a stable level of wellbeing in the long term, without compromising the possibilities of development of surrounding areas and controlling the harmful effects of development on the environment.
- Sustainable urban development is therefore a fundamental contribution to economic growth and social progress. It will ensure good quality of life for the population; it will provide job opportunities, good housing, and access to resources, energy and social services.
- SUD can be achieved by managing certain urban issues:
  - Non-hazardous solid waste management – linear vs circular urban metabolism and ecological

footprint of cities

- Slum management – the provision of physical and social infrastructure to raise the quality of life in especially the LDC cities. Such strategies are coupled with providing the people access to employment opportunities as well as spaces for recreation and leisure
- Traffic congestion management – the development of integrated urban places designed to bring people, activities, buildings, and public spaces together, with easy walking and cycling connection between them and near-excellent transit service to the rest of the city. It means inclusive access for all to local and citywide opportunities and resources by the most efficient and healthful combination of mobility modes, at the lowest financial and environmental costs.
- Grappling with limited land space in cities and tradeoffs – e.g. in the case of Singapore, having more parks and open spaces means that more of us will live in high-rise housing. Allocating more land for industries could mean loss of waterfront and heritage areas. Having more roads and a smoother drive to work may result in smoggier air and more noise pollution. Land use plans need to cater to multiple needs e.g. to facilitate economic growth by providing more industrial land for petro-chemical and aeronautical industries, hotel and tourism projects, as well as an expanding financial sector. These are then balanced with social considerations for achieving a high quality living environment to meet rising aspirations such as more variety of good quality housing, more greenery and more leisure choices.
- A discussion of a range of management strategies is needed and how some are limited by the delicate balance of the three dimensions of SD as well as the multiple stakeholders involved in the issues.

### **Liveability**

- Need to appreciate the meaning and scope of urban liveability e.g. how it varies for different development levels and for different groups of people
- Students need to point out the subjective nature of urban liveability, such as that its nature varies between various groups in the city and the nature and perception of the various stakeholders
- Links could be made to sustainability E.g. for some cities, additional evaluations are based on proximity, access and sustainability.
- For others, they may also need to look into particular challenges posed by their own dense and rapid urbanization (e.g. Singapore) and how it works to make the living and working environment more liveable for the whole population
- Range of examples (and counter examples) is important in the evaluation of how to address issues of liveability for different groups of people e.g. elderly and youths



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**GEOGRAPHY**

**9751/02**

Data Response Questions

**20 September 2019**

**INSERT**

**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

This Insert contains all the Resources referred to in the questions.

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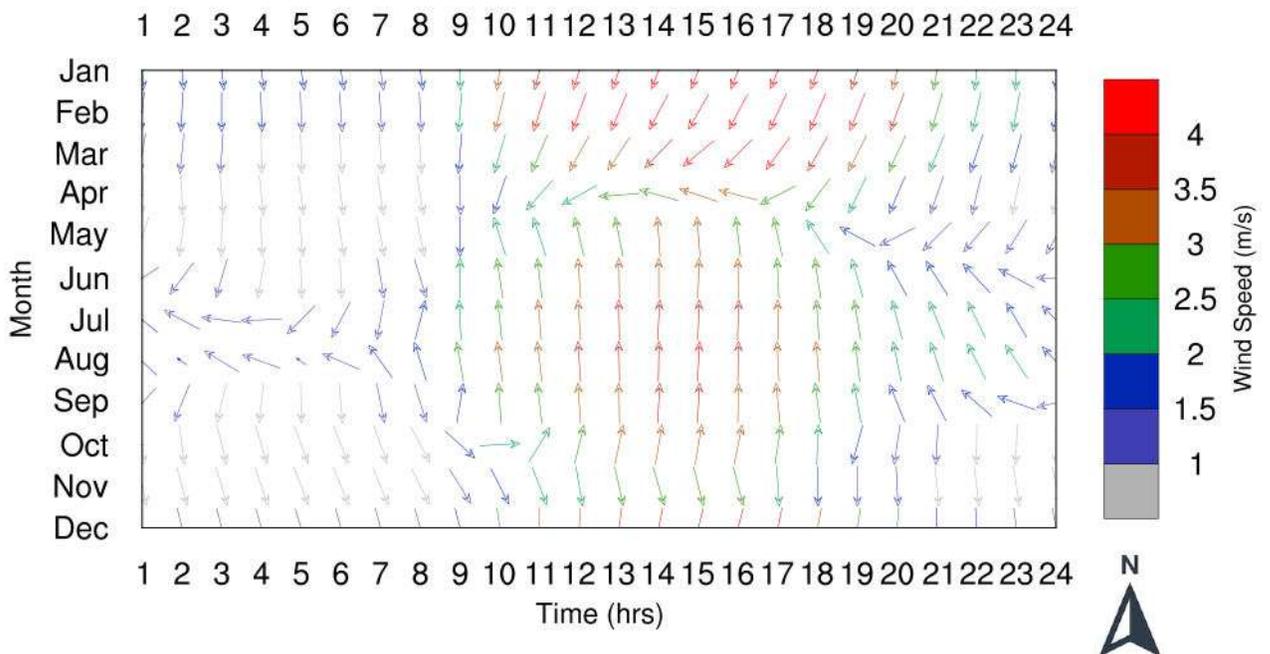
This document consists of **9** printed pages.

**[Turn over**

**Resource 1 for Question 1**  
**Map of spatial distribution of total annual rainfall in Singapore**  
 taken from the NEA website



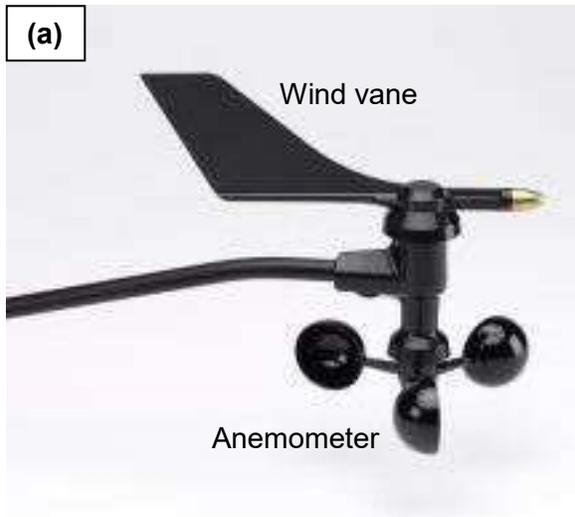
**Resource 2 for Question 1**  
**Average hourly variation of surface wind speed (m/s) and direction for each month in Singapore**  
 from data recorded by the students



[Turn over

## Resource 3 for Question 1

- (a) Data logger with wind vane and anemometer to measure wind direction and speed, and (b) a handmade rain gauge using a plastic bottle



[Turn over

**Resource 4 for Question 2**  
**Deforestation in Riau Province, Sumatra, Indonesia in February 2014**



**Resource 5 for Question 2**  
**Criteria for achieving effective outcomes for REDD+ projects in Indonesia**

Project Name	Criteria				
	Finance	Community Involvement	Monitoring	Boundary Enforcement	Carbon & Biodiversity
Harapan	-	-	-	-	?
Rimba Raya	+	+/-	+	+	+
Kapuas Hulu	+/-	+	-	+/-	?

Key:

+ : has achieved some effectiveness

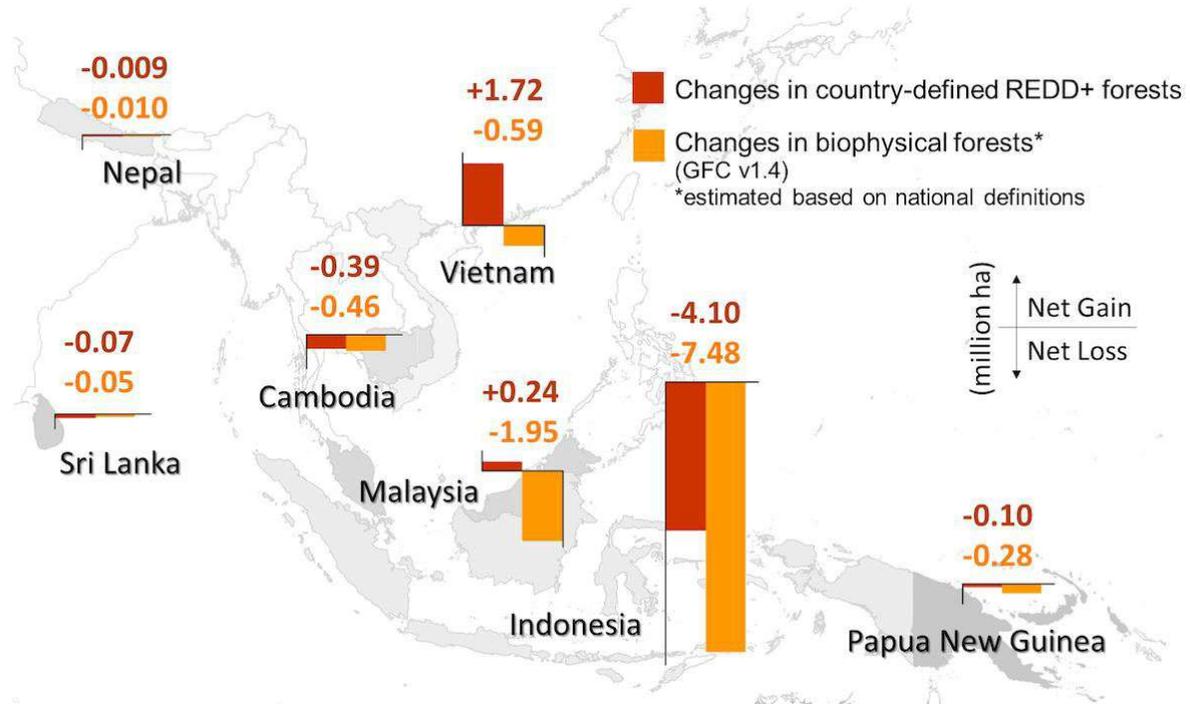
+/- : some effectiveness but still facing some challenges

- : has yet to achieve effectiveness

? : unverified/uncertain outcomes

[Turn over

**Resource 6 for Question 2**  
**Gains and losses in REDD+ forests and biophysical forests**

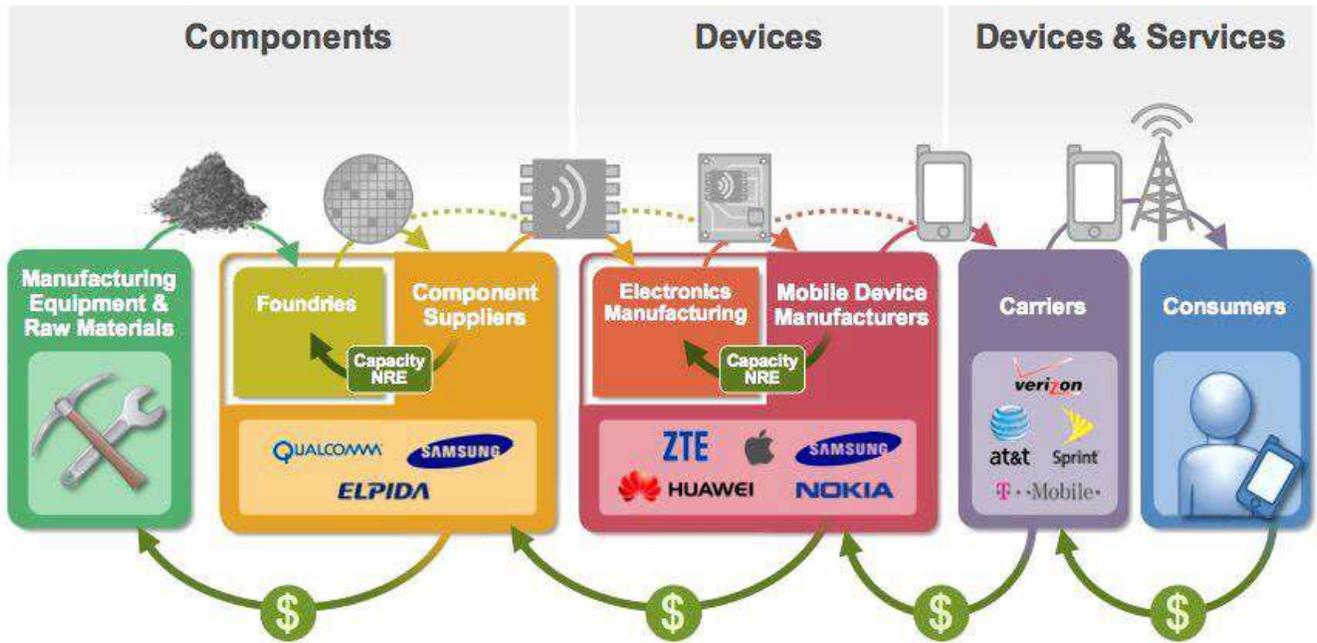


**Resource 7 for Question 2**  
**Comparison of REDD+ finance received and domestic expenditure on agricultural and biofuel subsidies (annual average \$ million)**

	REDD+ Finance (2006-2014 Annual Average)	Agricultural Subsidies (2010-2012 Annual Average)	Biofuel Subsidies (2009)
Brazil	158	11,082	2,700
Chile	0	709	v/a
China	9	160,023	500
Indonesia	165	27,072	79
Mexico	12	7,880	n/a
<b>Total</b>	<b>346</b>	<b>206,766</b>	<b>3,279</b>

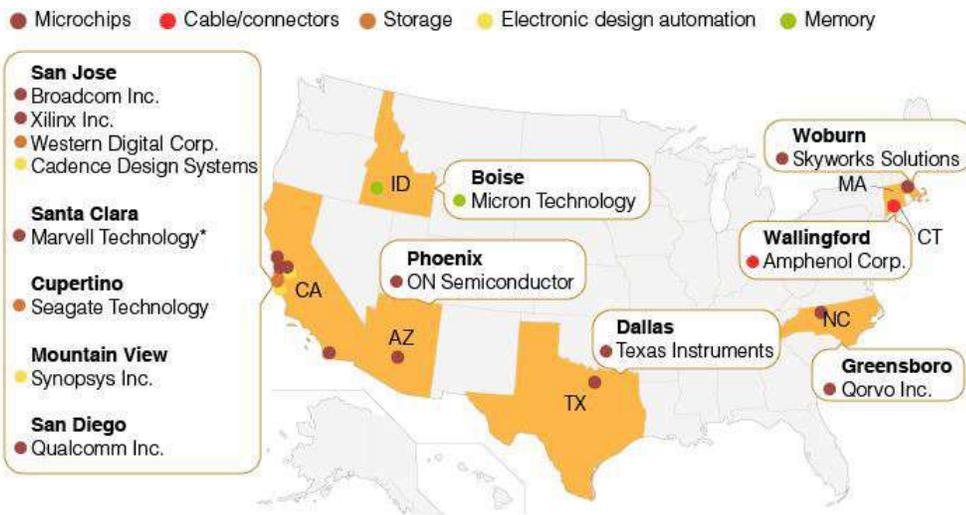
[Turn over

**Resource 8 for Question 3**  
**Smartphone supply chain network**



\* Some of the smartphone manufacturing firms are also component suppliers such as Samsung, LG and Sony which produce and sell to other manufacturers

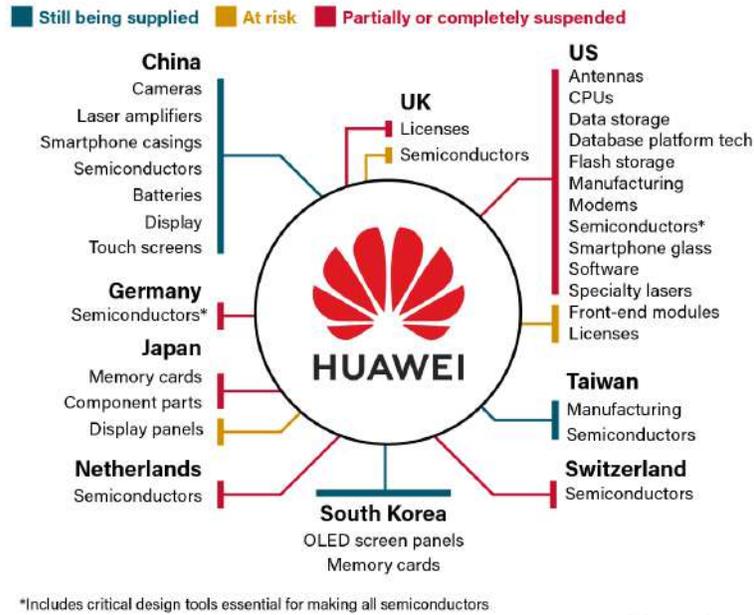
**Resource 9 for Question 3**  
**Huawei's major U.S. suppliers**



\*Company officially lists its headquarters as Bermuda, but its main operations are in California.

[Turn over

**Resource 10 for Question 3**  
**Huawei's supply chain and responses by suppliers to the US ban on sale of technology to Huawei**

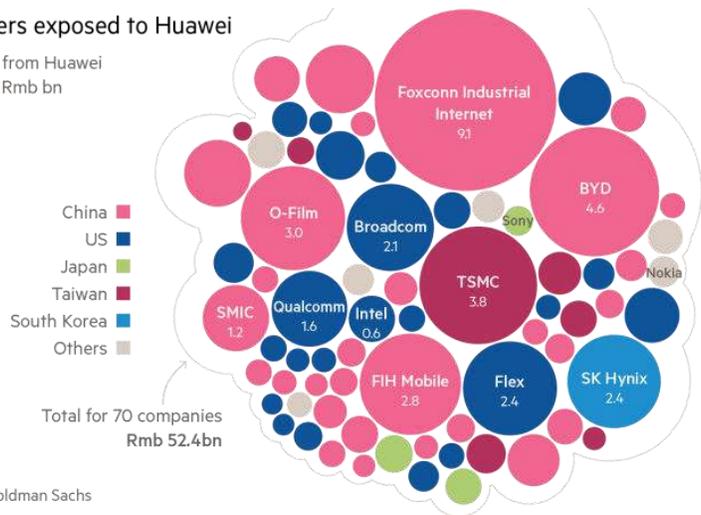


**Resource 11 for Question 3**  
**A Flex factory in Zhuhai, China (left) and suppliers that are exposed to Huawei (right)**



Suppliers exposed to Huawei

Revenue from Huawei  
 Q3 2018, Rmb bn

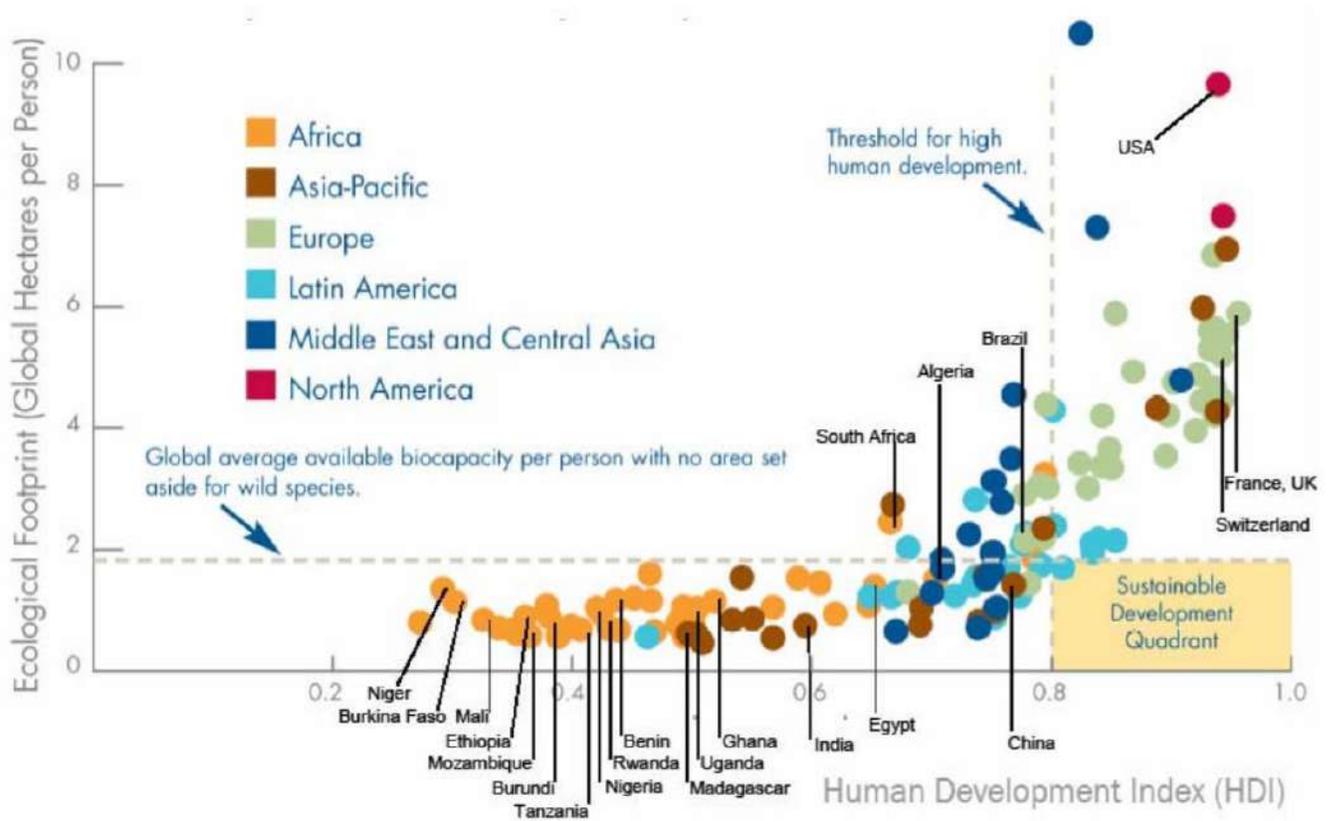


Source: Goldman Sachs  
 © FT

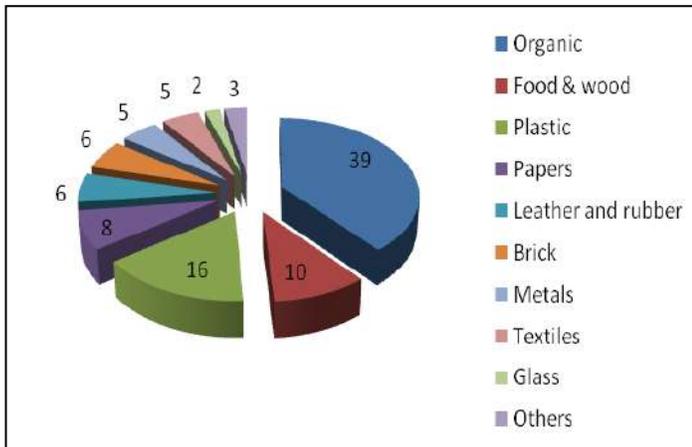
\*Left, a Flex factory in the southern Chinese city of Zhuhai, where a worker said production for Huawei had been partially halted.

[Turn over

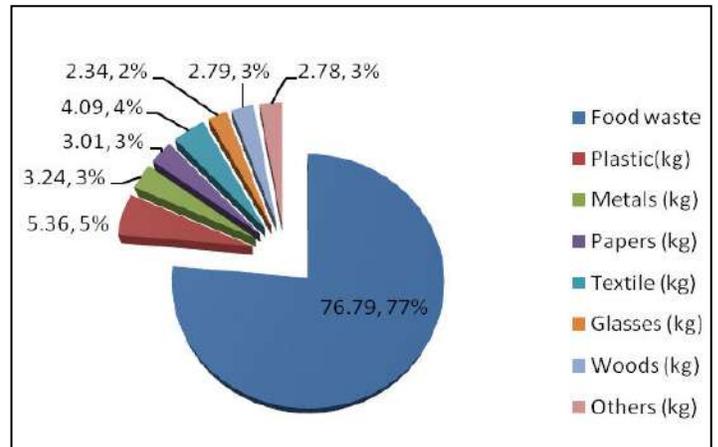
**Resource 12 for Question 4**  
**Ecological footprint and the Human Development Index of selected countries**



**Resource 13 for Question 4**  
**Types of solid waste in Arusha City and Mbeya City**



**Arusha City**



**Mbeya City**

[Turn over

**Resource 14 for Question 4**  
**Solid waste management statistics in selected cities in Tanzania**

Urban centres	Population	Generation rate (tons/day)	Collection rate (tons/day)	Percentage (%)	Recycled/reused (tons/day)	Total number of wards	Service coverage (wards)
Mbeya city council	385,279	400.0	140.0	35.0	Unknown	36	8
Mwanza city council	706,453	338.0	227.0	67.2	Unknown	18	8
Tanga city council	313,625	185.3	166.8	90.0	14.0	27	11
Arusha city council	507,903	550.0	302.0	54.9	8.8	25	15
Moshi municipality	210,000	225.0	203.0	90.2	Unknown	21	12
Dodoma municipality	507,350	305.0	100.0	32.8	Unknown	47	15
Lindi municipality	78,841	23.0	11.0	47.8	Unknown	18	5
Mtwara-mikindani municipality	108,299	97.5	59.0	60.5	Unknown	18	5

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**Acknowledgements:**

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--	--	--	--

INDEX  
NUMBER

--	--	--	--

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**GEOGRAPHY**

**9751/02**

Additional Materials: Answer Paper  
1 Insert  
World outline map

**20 September 2019**  
**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

Write your name and CT class clearly on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Candidates answer **all** questions.

The Insert contains all the Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or the classroom,  
even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

**Submit your answers in two separate sets:**

- 1. Questions 1 and 2**
- 2. Questions 3 and 4**

**If you have not attempted any of the questions, indicate this in the answer booklet.**

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This document consists of **5** printed pages.

[Turn over

**Section A****Theme 4 - Geographical Investigation**

- 1 A group of 17 year old students investigated the impact of wind direction on rainfall in Singapore. Their study spanned 12 months from January to December in 2018. To collect primary data on rainfall and wind direction and speed, the students placed handmade rain gauges and data loggers at four sites, one each in the Northern, Eastern, Southern and Western parts of Singapore. The equipment was located on the roof tops of buildings where the students had access to.

Due to their busy schedules in school, they visited the sites to record the data once a week and sometimes more than a week lapsed before any of them were able to visit the sites.

The students also referred to secondary sources such as the National Environment Agency website to gather data to corroborate their findings.

Resource 1 shows the map of spatial distribution of total annual rainfall in Singapore. Resource 2 shows average hourly variation of surface wind speed (m/s) and direction for each month in Singapore. Resource 3 shows (a) a data logger with wind vane and anemometer and (b) a handmade rain gauge.

- (a) With reference to Resources 1 and 2, suggest a suitable research question for this study and explain how it may be well-defined. **[4]**
- (b) Assess the effectiveness of the data representation shown in Resource 2. **[4]**
- (c) Referring to Resource 3 and the context provided, identify and explain **two** possible issues with accuracy and/or reliability. **[6]**
- (d) With reference to the Resources and your own knowledge, to what extent would the students be able to answer the research question suggested in (a)? **[4]**
- (e) Students from another school were interested to conduct a similar study. What advice should the group of students who have conducted the investigation give them? **[7]**

[Turn over

**Section B****Theme 1 - Tropical Environments****Deforestation and REDD+ in Indonesia**

- 2** Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks (REDD+), is an essential part of the global efforts to mitigate climate change.

Resource 4 shows deforestation in Riau Province, Sumatra, Indonesia in 2014. Resource 5 shows the criteria for achieving effective outcomes for REDD+ projects in Indonesia. Resource 6 shows the gains and losses in REDD+ forests and biophysical forests. Resource 7 shows a comparison of REDD+ finance received and domestic expenditure on agricultural and biofuel subsidies .

- (a) With reference to Resource 4, describe the nature of deforestation and explain the possible physical impacts on the environment. **[5]**
- (b) Suggest reasons for the differences in achieving effective outcomes for REDD+ projects in Indonesia shown in Resource 5. **[4]**
- (c) With reference to Resource 6, suggest which country may be the most successful in managing deforestation and explain why. **[5]**
- (d) With reference to Resource 7, compare the REDD+ finance, biofuel and agriculture subsidies in Indonesia and Brazil. **[3]**
- (e) With reference to the resources and your own knowledge, assess the effectiveness of REDD+ in Indonesia. **[8]**

**[Turn over**

## Theme 2 - Development, Economy and Environment

### Huawei's Global Production Network

3 Huawei Technologies Co., Ltd. is a Chinese multinational technology company that provides telecommunications equipment and sells consumer electronics, including smartphones and is headquartered in Shenzhen, China. Huawei has deployed its products and services in more than 170 countries, and as of 2011 it served 45 of the 50 largest telecom operators. Although successful internationally, Huawei has faced difficulties in some markets. In 2018, it pulled out of the U.S. consumer market.

Resource 8 shows a typical smartphone supply chain network. Resource 9 shows Huawei's major U.S. suppliers. Resource 10 shows how Huawei's supply chain has altered since 2018. Resource 11 shows some impacts of Huawei's altered supply chain.

- (a) Using Resources 8-10, describe the characteristics of Huawei's global production network. **[4]**
- (b) Suggest reasons for Huawei's global production network you have described in (a). **[4]**
- (c) With the help of Resources 10 and 11, explain the key impacts of Huawei's decision to pull out of the U.S. consumer market in 2018. **[6]**
- (d) Suggest **one** limitation of Resource 10 in showing Huawei's inter-firm networks. **[2]**
- (e) Using the resources and your own knowledge, evaluate the extent to which TNCs can regulate economic activities. **[9]**

[Turn over

**Theme 3 : Sustainable Development****Solid Waste Management in Tanzania**

- 4 Resource 12 shows the relationship between Ecological footprint and the Human Development Index of selected countries. Resource 13 shows types of solid waste in Arusha City and Mbeya City. Resource 14 shows solid waste management statistics in selected cities in Tanzania.
- (a) Suggest reasons for the differences in the distribution shown in Resource 12. **[4]**
  - (b) Compare the type of solid waste collected in Arusha and Mbeya cities as shown in Resource 13. **[4]**
  - (c) With reference to Resource 13, suggest and explain **one** waste management strategy that can manage waste effectively in Arusha City. **[4]**
  - (d) Using Resource 14, identify and explain **two** issues with solid waste management in Tanzania. **[6]**
  - (e) With reference to the resources and your own knowledge, evaluate the importance of understanding the ecological footprint to manage solid waste in Tanzania. **[7]**

**[Turn over**

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**Acknowledgements:**

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# 2019 H2 Geography Paper 2

## Suggested Mainpoints

### Section A

#### Theme 4 - Geographical Investigation

1 Resource 1 shows the map of spatial distribution of rainfall in Singapore. Resource 2 shows hourly variation of surface wind speed (m/s) and direction for each month in Singapore. Resource 3 shows (a) a data logger with wind vane and anemometer and (b) a handmade rain gauge.

(a) With reference to Resources 1 and 2, suggest a suitable research question for this study and explain how it may be well-defined. [4]

- Research question: To what extent is spatial rainfall distribution in Singapore influenced by wind direction?
- Independent variable: wind direction
- Dependent variable: rainfall distribution
- Controlled variable: Singapore

(b) Assess the effectiveness of the data representation shown in Resource 2. [4]

*At least one positive and one negative aspect with reference to R2 and explanation.*

#### Positive:

- Use of colour to represent wind speed for the arrows helps differentiate the different wind speeds
- The arrows all placed together over a period of 24 hours and over one year allows for comparison between the different times of day and year

#### Negative:

- Some colours are too similar to tell the difference between the speeds e.g. between 1 - 2 m/s
- No information if the data reflects average wind speed or which part of Singapore it is collected

(c) Referring to Resource 3 and the context provided, identify and explain **two** possible issues with accuracy and/or reliability. [6]

*Points be made with clear reference to accuracy and/or reliability. Reference must be made to R3.*

#### Accuracy:

- Nature of rain gauge
  - Handmade hence each rain gauge is not produced with strict standardisation of dimensions
  - Markings on bottle done manually and slight variations can occur with each rain gauge produced. Parallax error may occur during marking and reading
  - Presence of gravel/pebbles at base can cause irregularities as size of gravel differ unless the volume of rainwater is measured carefully with a measuring cylinder
- Long time lapse between data collection
  - Evaporation can occur and reduce the total volume collected in rain gauge
  - Sometimes, data collection is done on other days and more than one week has lapsed

#### Reliability

- Too few data sites (far too few) to draw conclusions on the spatial distribution of rainfall
- Sampling of sites is by convenience

(d) With reference to the Resources and your own knowledge, to what extent would the students be able to answer the research question suggested in (a)? [4]

#### Relevant data collected

- Relevant data has been collected regarding wind direction, rainfall amounts etc

**However, there is insufficient data**

- To answer the question, more data collection sites are needed to provide data on different parts of Singapore

**However, there are issues in data collection leading to inaccuracies**

- Rainfall data may not be collected simultaneously from every site, thus the time of data collection is not held constant
- Rainfall is also not collected daily and this restricts the access to data which may help reflect changes in wind direction and rainfall amounts

- (e) Students from another school were interested to conduct a similar study. What advice should the group of students who have conducted the investigation give them? [7]

*At least 3-4 points that are well explained*

- Increase reliability
  - Increase number of sites
  - Sample sites by random sampling
- Increase accuracy
  - Use measuring cylinder to measure rainfall amounts
  - Use automated rain gauge e.g. one with a tipping bucket but such equipment is expensive
- Safety
  - Safety must be observed at roof top
  - Checking of weather before data collection and taking note of lightning alerts
- Scope of investigation
  - Students may want to consider narrowing the scope of the investigation such as reducing the time frame and reducing the spatial extent

Level	Marks	Descriptor
3	7-8	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response. Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.
2	4-6	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response. Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.
1	1-3	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response. Provides little or no evaluation
0	0	No creditworthy response.

## Theme 1 - Tropical Environments

### Deforestation and REDD+ in Indonesia

- 2 Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks (REDD+), is an essential part of the global efforts to mitigate climate change.

Resource 4 shows deforestation in Riau Province, Sumatra, Indonesia in 2014. Resource 5 shows the criteria for achieving effective outcomes for REDD+ projects in Indonesia. Resource 6 shows the gains and losses in REDD+ forests and biophysical forests. Resource 7 shows a comparison of REDD+ finance received and domestic expenditure on agricultural and biofuel subsidies .

- (a) With reference to Resource 4, describe the nature of deforestation and explain the possible physical impacts on the environment. [5]

#### Nature of deforestation

- Area has been divided into sections and deforestation has occurred in different sections at different timings as shown by the brown, light green and dark green areas
- Clear-cutting or clear-felling has been carried out – most or all the trees in selected areas have been uniformly cut down, leaving what seems to be bare soil in some sections

#### Physical impacts on the environment

- Lower humidity. Vegetation release moisture to the atmosphere through transpiration, hence without trees, less transpiration occurs.
- Higher temperatures. Lack of or absence of shade from trees allow insolation to reach the ground directly to be absorbed, raising temperatures.
- Higher precipitation may occur in the immediate area and timing of deforestation due to greater evaporation from the soil and strong thermals due to the higher temperatures. However, as moisture is not released slowly to the atmosphere without the presence of the trees, rainfall will decrease eventually.
- Soil erosion and lower soil fertility. Without the protection of the vegetation to reduce rain drop impact, soil erosion can occur. If surface runoff occurs, the fertile top soil will be eroded into streams and lakes.

- (b) Suggest reasons for the differences in achieving effective outcomes for REDD+ projects in Indonesia shown in Resource 5. [4]

#### Brief description of the performance of the projects

- None of the projects have achieved major positive results.
- Rimba is the best performing project with 4/5 criteria having achieved some effectiveness
- Harapan is the worst performing project which has yet to achieve effectiveness in any of the criteria

#### Possible reasons

- General : Quality of management by government agency with effective enforcement
- General : The strictness of the validation and verification process undertaken in the assessment of the projects may vary
- Finance : access to sustainable source of finance from DCs or NGOs is important as these projects require
- Community Involvement : Cooperation and participation in project by the community. Sound planning to include different groups in the local community, their roles and expected outcomes
- Monitoring : regular checks are made on the ground to ensure that planned action to be taken is executed such as conservation of forest carbon stocks by retaining primary forests as well as enhancement of forest carbon stocks such as afforestation and deforestation.
- Boundary Enforcement : Much human and financial resources is required to enforce areas involved in the projects to ensure that there is no encroachment from other landowners and activities.
- Carbon & Biodiversity : this requires much data to be collected to check on the carbon stocks and the biodiversity in an area. This might explain the “?” for Harapan and Kapuas projects. More effort to collect data can help reflect the effectiveness of the project.

- (c) With reference to Resource 6, suggest which country may be the most successful in managing deforestation and explain why. [5]

- Overall, Vietnam is the most successful in managing deforestation
- Vietnam has a gain of 1.72 million ha in country-defined REDD+ forests and a loss of 0.59 million ha in biophysical forests. All the other countries recorded losses in both categories except for Malaysia which recorded just 0.24 million ha for the country-defined REDD+ forests.

**Possible reasons**

- Political will by authorities to ensure that sound policies effective action is taken such as monitoring and enforcement
- Active data collection on different scales to provide accurate and updated information. This allows for effective decisions to be made by authorities.
- Policies to encourage development of service sector to reduce reliance on timber or other activities that require massive land clearance e.g. ecotourism
- Development of alternative methods to tapping on forest resources that can limit forest clearance such as agroforestry
- Ground-up or bottom-up initiatives by local communities to reduce forest clearance and degradation. This can be done by seeking alternative sources of income and employment.

- (d) With reference to Resource 7, compare the REDD+ finance, biofuel and agriculture subsidies in Indonesia and Brazil. [3]

**Similarity**

- Similar amount of REDD+ Finance - \$158 million in Brazil, \$165 million in Indonesia

**Differences**

- Agricultural subsidies are 59% greater in Indonesia (27072) than Brazil (11082)
- Biofuel subsidies are 97% greater in Brazil (2700) than Indonesia (79)

- (e) With reference to the resources and your own knowledge, assess the effectiveness of REDD+ in Indonesia. [8]

**REDD+ in Indonesia is largely ineffective**

- **R4** - Practices such as clear-felling are still be carried out. Other practices such as selective cutting can be carried out. Selective cutting is the cutting down of selected trees in a forest so that growth of other trees is not affected. This is done according to criteria regarding minimum tree size for harvesting, specifications of the number, spacing and size classes of residual trees per area, and allowable cut.
- **R5** – Difficult in most cases e.g. Raya and Hulu projects to assess the effectiveness of projects as data is often not collected/available. Reflects the lack of rigour in the authorities to track and monitor the success of the project.
- **R6** – Indonesia recorded net loss in both country-defined REDD+ forests and biophysical<sup>1</sup> forests. Gains should have occurred in at least the country-defined REDD+ forests. Instead, Indonesia recorded 4.10 million ha net loss. **However**, note that the net loss in the country-defined REDD+ forests is 45.2% lower than the net loss in biophysical forests, possibly reflecting some success.
- **Own knowledge** – A report in 2017 reflected that despite the US\$1 billion REDD deal, agreed with Norway in 2010, so far Indonesia has failed to reduce its emissions from deforestation and forest degradation. Between 2010 and 2015, Indonesia lost a total of 9.9 million hectares of tree cover.

**REDD+ in Indonesia can achieve some effectiveness**

- **R5** – At least Rimba project reflects some success, achieving some effectiveness in all of the criteria listed. Kapuas project has returned some success as well.
- **Own knowledge** – Indonesia has an agreement with Norway under the REDD+ scheme that was signed since 2010. In 2019, Indonesia and Norway have agreed on a first payment from a \$1

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<sup>1</sup> A biophysical environment is a biotic and abiotic surrounding of an organism or population, and consequently includes the factors that have an influence in their survival, development, and evolution

billion deal under which Indonesia preserves its rainforests to curb carbon dioxide emissions, although the amount of the first payment still needs to be negotiated by both sides. However, Indonesia is pushing for a higher valuation than the \$5 per ton of carbon dioxide equivalent that Norway paid Brazil under a similar deal. Nevertheless, Indonesia still has work to do to ensure a consistent pace of progress and tackle the forest fires that account for much of the loss of its forests. All these may indicate that Norway has acknowledged that Indonesia has made progress in protecting its forests.

Level	Marks	Descriptor
3	7-8	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response. Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.
2	4-6	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response. Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.
1	1-3	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response. Provides little or no evaluation
0	0	No creditworthy response.

## Theme 2 - Development, Economy and Environment

### Huawei's Global Production Network

- 3 Huawei Technologies Co., Ltd. is a Chinese multinational technology company that provides telecommunications equipment and sells consumer electronics, including smartphones and is headquartered in Shenzhen, China. Huawei has deployed its products and services in more than 170 countries, and as of 2011 it served 45 of the 50 largest telecom operators. Although successful internationally, Huawei has faced difficulties in some markets. In 2018, it pulled out of the U.S. consumer market.

Resource 8 shows a typical smartphone supply chain network. Resource 9 shows Huawei's major U.S. suppliers. Resource 10 shows how Huawei's supply chain has altered since 2018. Resource 11 shows some impacts of Huawei's altered supply chain.

- (a) Using Resources 8-10, describe the characteristics of Huawei's global production network. **[4]**
- Resource 8 – output of one stage forms the input of the next stage, increase in value down the circuit
  - Resource 9 – international production and general complexity demonstrating diversification e.g. relying on different suppliers for the same components
  - Resource 10 – international supply chain in both DCs (e.g. UK, US, Japan, Germany) and LDCs (e.g. NIEs like Taiwan and S. Korea, China), with China and the US being the main suppliers of component parts
- (b) Suggest reasons for Huawei's global production network you have described in (a). **[4]**
- Diversification to cushion supply chain shocks
  - Role of governments in attracting Huawei to set up plants there
  - Cheaper to fragment the production process

- Market factors which could cut logistical costs
  - US: important market and collaborator
  - China: important home market base (growing middle class) and regional market base for Asia (emerging markets, growing demand)

Other DCs/ NIEs: technological expertise, relatively skilled workforce (relatively cheap labour in Taiwan and China where the technology is fast catching up too)

(c) With the help of Resources 10 and 11, explain the key impacts of Huawei's decision to pull out of the U.S. consumer market in 2018. **[6]**

- Resource 10 – shows those at risk (e.g. semiconductors in UK, display panels in Japan) which might now be suspended with the loss of the US market, majority still being supplied to China (and likely to increase in the short term as new suppliers/ partnerships are being formed/ explored), those still supplied (e.g. Taiwan and S. Korea) might increase if the firm decides to focus more on Asia as a market
- Resource 11- job losses in the short term at least even in China as production is partially halted (may switch to other localities if Huawei decides to consolidate the market back home/ in Asia), suppliers to the firm likely to lose revenue in the short term (quote some figures) or having to explore new options/ partnerships if they still want to maintain US market access

(d) Suggest **one** limitation of Resource 10 in showing Huawei's inter-firm networks. **[2]**

- Info gaps: may not capture all the inter – firm networks (e.g. strategic alliances, joint ventures, etc.) or value creation; even outsourcing can be very complex
- As the trade war is developing, information is still in the process of being updated amidst possible gag orders in order to protect business interests/ due to the political sensitivity of the issue
- Scale/ extent of inter – firm network not shown
- Confidentiality of supply chain – likely not to be fully transparent
- Focus should be on inter – firm networks

(e) Using the resources and your own knowledge, evaluate the extent to which TNCs can regulate economic activities. **[9]**

- TNCs – scale of operations and economic/ political clout
- Still subject to intervening obstacles such as state action and the political landscape e.g. in this case boycott by the US government
- Factors to consider: role of governments, other non – state actors
- Need for some balance/ consideration of other actors
- Need to refer to both the resources (e.g. for role of governments) as well as own knowledge (e.g. for non – state actors like consumer groups, media, etc.) and other GPN actors (see table )

GPN actors	Role	Value activity	Examples in manufacturing	Examples in service industries
Lead firms	Coordination and control	Product and market definition	Apple and Samsung (ICT), Toyota (automobiles)	HSBC (banking), Singapore Airlines (transport)
Strategic partners	Partial or complete solutions to lead firms	Co-design and development in manufacturing or advanced services	Hon Hai or Flextronics (ICT), ZF (automobiles)	IBM Banking (banking), Boeing or Airbus (transport)
Specialized suppliers (industry-specific)	Dedicated supplies to support lead firms and/or their partners	High value modules, components or products	Intel (ICT), Delphi and Denso (automobiles)	Microsoft (ICT), Fidelity or Schroders (banking), Amadeus (transport)
Specialized suppliers (multi-industrial)	Critical supplies to lead firms or partners	Cross-industrial intermediate goods or services	DHL (ICT), Panasonic Automotive (automobiles)	DHL (banking), Panasonic Avionics (transport)
Generic suppliers	Arm's length providers of supplies	Standardized and low-value products or services	Plastics in ICT and automobile manufacturing	Cleaning in banking and transport services
Key customers	Transfer of value to lead firms	Intermediate or final consumption	Other lead firms or consumers	Other lead firms or consumers

Source: Yeung and Coe (2015: Table 3, 45).

Level	Marks	Descriptor
3	7-9	<p>Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.</p> <ul style="list-style-type: none"> <li>Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.</li> </ul>
2	4-6	<p>A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.</p> <ul style="list-style-type: none"> <li>Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.</li> </ul>
1	1-3	<p>Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response.</p> <ul style="list-style-type: none"> <li>Provides little or no evaluation</li> </ul>
0	0	No creditworthy response.

## Theme 3 : Sustainable Development

### Solid Waste Management in Tanzania

4 Resource 12 shows the relationship between Ecological footprint and the Human Development Index of selected countries. Resource 13 shows types of solid waste in Arusha City and Mbeya City. Resource 14 shows solid waste management statistics in selected cities in Tanzania.

(a) Suggest reasons for the differences in the distribution shown in Resource 12. [4]

- **Countries with high HDI and high EF are generally located in Europe, North America and Asia-Pacific e.g. US (EF: 9, HDI: 0.92)**
  - Economic structure – Capitalism<sup>2</sup>. Little concern for the impacts of production processes and waste produced on the environment. Highly anthropocentric.
  - Private lifestyles – high private car ownership, high energy consumption, consumerism<sup>3</sup>, high meat protein diet
  - Result in large land area needed to produce the natural resources that the country consumes and to absorb the waste it produces
- **Countries with low HDI and low EF are generally located in Africa and Asia Pacific e.g. Tanzania (EF: 1.7, HDI: 0.42)**
  - Lower energy consumption
  - Lower meat protein diet
  - Result in the smaller land area needed to produce the natural resources that the country consumes and to absorb its waste
- **Only one country from Latin America within the Sustainable Development Quadrant**
- **Concentration of Latin American and European countries located near the SD Quadrant**

(b) Compare the type of solid waste collected in Arusha and Mbeya cities as shown in Resource 13. [4]

#### Similarity

- Both cities have plastic at rank no. 2
- Glass in both cities has the lowest %

#### Differences

- Very high food waste in Mbeya at 76% while food waste and wood in Arusha is at 10%
- Arusha's highest % is organic at 39% while Mbeya's is food waste at 76%

(c) With reference to Resource 13, suggest and explain **one** waste management strategy that can manage waste effectively in Arusha City. [4]

- **Recycling** – this strategy would be useful to manage the plastic, paper, metal and glass waste. These waste that is generated in industrial or domestic activities can be sorted into the different categories and recycled to form new products e.g. organic and food waste can be composted to produce fertilisers  
In many LDC cities, informal waste pickers scavenge and pick recyclable items and very effectively put these materials back into the system. Other positive aspects of recycling that makes it sustainable :
  - reduces the amount of waste sent to landfills and incinerators
  - Conserves natural resources such as timber, water and minerals
  - Increases economic security by tapping a domestic source of materials
  - Prevents pollution by reducing the need to collect new raw materials
  - Saves energy
  - Helps create jobs in the recycling and manufacturing industries

(Other strategies can be identified as well but their effects should be largely positive)

<sup>2</sup> An economic and political system in which a country's trade and industry are controlled by private owners for profit, rather than by the state.

<sup>3</sup> Human desire to own and obtain products and goods in excess of one's basic needs.

(d) Using Resource 14, identify and explain **two** issues with solid waste management. [6]

- Generation rate > Collection rate in cities such as Mbeya
  - Disposal of waste in the streets → accumulation in large amounts leads to smell, infestation by rodents, water-borne diseases when waste traps water
- Low recycling rate
  - Increases amount of waste
  - Clogging of public spaces such as drains and rivers and polluting them
  - Pollutes oceans and cause danger to wildlife when they consume plastics
- % of service coverage is low for most cities
  - Some areas may be too remote and may not be able to afford the service
  - If no alternatives are in place, such areas will see a build-up in solid waste and the accompanying health and environmental issues

(e) With reference to the resources and your own knowledge, evaluate the importance of understanding the ecological footprint to manage solid waste in Tanzania. [7]

*At least 3 main points with explanation and evaluation*

Define EF: Ecological footprint refers to the ecological assets that a given population requires to produce the natural resources it consumes (e.g. livestock, fish, timber, space, water) and to absorb its waste (e.g. CO<sub>2</sub>)

**Understanding EF is important**

- From R12, high HDI is associated with high EF → In considering the inputs and outputs to the city, EF can help cities evaluate the amount of resources they use for consumption and how much they can actually reduce to reduce their EF
  - Cities can also consider how reducing waste produced will also mean reducing the land and other areas of the environment to absorb the waste
- From R13, R14 and EF, the cities can gain understanding of the types of waste produced (esp. recyclable materials such as plastic and food waste) and the potential of the practices of reduce, reuse and recycle to reduce the EF.
- The use of alternative energy can also be considered to reduce the resources used as input and the waste produced as output of the system
- Comparisons can be made with the other cities to understand how well Tanzania is performing
- Tanzania can also understand the importance of recycling and reusing and adapt its available resources to do that e.g. emphasis on the informal waste picking sector

**Understanding EF is less important**

- Tanzania’s EF is one of the lowest compared to other LDCs and DCs, so there may not be much concern over EF
- HOWEVER, EF provides some conceptual understanding of how solid waste can be managed as well as how Tanzania’s development path should proceed to raise its HDI but keep its EF low

Level	Marks	Descriptor
3	6-7	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response. Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.
2	3-5	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response. Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.
1	1-2	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited

		relevance to the question. Source(s) is not used or not accurately used to support the response. Provides little or no evaluation
0	0	No creditworthy response.

Name: \_\_\_\_\_

Class: \_\_\_\_\_



## JURONG PIONEER JUNIOR COLLEGE

### JC2 Preliminary Examination 2019

#### **GEOGRAPHY Higher 2**

**9751 / 02**

**September 2019**

Paper 2 Data Response Questions

**3 hours**

Additional materials:      Writing Paper  
   1 Insert  
   World outline map (upon request)

#### **READ THESE INSTRUCTIONS FIRST**

Write your name and civics class on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Answer **ALL** the questions.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagram and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of 4 printed pages.

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**[Turn over]**

## Section A

### Theme 4: Geographical Investigation

- 1 A team of 12 students were tasked to carry out a geographical investigation on two contrasting sites along Kallang River to ascertain the flood risk in these locations.

The team decided to focus their investigation on river discharge in differing land use in influencing flood risk. The team was divided into two groups of six to measure river velocity and cross-sectional area of each site. Site A was in a nature reserve. Site B was in an urban residential neighbourhood.

The team took measurements on two consecutive Saturdays in September and were given 4 hours between 10 a.m. and 2 p.m. at each site to complete the river velocity and cross-sectional area measurements. Discharge is calculated by multiplying the cross-sectional area of the channel by the velocity of the water.

Each group was each given the following equipment to gather the primary data on river velocity (see Resource 3):

- Oranges (floating object)
- Tape measure
- Stop watch

Whilst measuring river velocity at Site A, the group found that the floating object often became stuck in fallen trees or debris in the river. The data collected was recorded using a data collection sheet (see Resource 4).

To measure the river's cross-sectional area, the group used the following equipment:

- Tape measure
- Ranging poles
- Meter rulers

Resource 1 shows land use in drainage basins associated with Sites A and B. Resource 2 shows two photographs, Site A in a nature reserve and Site B in an urban neighbourhood. Resource 3 shows students measuring river velocity and cross-sectional area. Resource 4 shows the data collected by the team to calculate the river velocity along the channels at Sites A and B.

- (a) With reference to Resource 1, suggest a suitable hypothesis for the investigation. [1]
- (b) Explain how the team would minimise the impact of the investigation differently at the two sites shown in Resource 2. [5]
- (c) Describe how the team can collect data on cross-sectional area at Site B as shown in Resource 3. [4]
- (d) The team concluded that the discharge data collected may not be completely reliable and/or accurate. Explain how the process of data collection could be improved. [6]
- (e) Evaluate the usefulness of the river velocity data shown in Resource 4 in helping to ascertain the flood risk at each of the two sites. [9]

## Section B

### Theme 1: Tropical Environments

#### 2 Ganges and Brahmaputra River Basins in South Asia

Resource 5 shows a map of the Ganges and Brahmaputra River Basins in India and Bangladesh. Resource 6 shows a map of rivers in Asia, including Ganges River and Brahmaputra River, and the annual run-off from each source (rainfall, meltwater from snow and ice, and groundwater). Resource 7 shows a section of the Brahmaputra River in the upper course in Assam and Resource 8 shows a section of the Ganges River in the lower course in India.

- (a) With reference to Resource 6, compare the contribution of different sources to the annual run-off between the Ganges River and the Brahmaputra River. [3]
- (b) With reference to Resources 5 and 6, explain possible reasons for the variation in rainfall runoff between the Ganges River Basin and the Brahmaputra River Basin. [5]
- (c) Describe the channel characteristics of the Brahmaputra River and the Ganges River as seen in Resources 7 and 8. [4]
- (d) Explain **two** possible reasons that can account for the formation of mid channel bars as seen in Resource 7. [4]
- (e) Using Resources 6, 8 and your own knowledge, evaluate the factors affecting the channel pattern as seen in Resource 8. [9]

### Theme 2: Development, Economy and Environment

#### 3 Apple Inc.'s Global Production Network (GPN)

Apple Inc. is a transnational corporation (TNC) which operates globally via its extensive production network. Resource 9 shows the global production network of Apple Inc. in 2019. Resource 10 is a Factfile about Brazil. Resource 11 shows the share of global mining production of battery components (lithium, cobalt, nickel, manganese and graphite) for the year 2016.

- (a) With reference to Resource 9, describe the spatial distribution of Apple Inc.'s final assembly locations and component suppliers. [4]
- (b) As shown in Resource 9, explain possible reasons for the location of Apple Inc.'s Research and Development (R&D) centres. [5]
- (c) Explain the variation in the distribution of retail stores between US and China as shown in Resource 9. [5]
- (d) Using evidence from Resources 9 and 10, suggest **two** reasons why Apple continued its assembly facility in Brazil in 2018. [4]
- (e) Using Resources 9, 11 and your own knowledge, explain the possible impacts on D.R. Congo as a result of Apple Inc.'s Global Production Network (GPN). [7]

**Theme 3: Sustainable Development**

4

**Urban Reimaging in Swansea (United Kingdom)**

Resource 12 shows the Swansea Dock area in the United Kingdom before and after urban renewal. Resource 13 shows future plans for St David's Shopping Centre, located in Swansea Central. Resource 14 shows the possible development proposals for Area X shown in Resource 12.

- (a) Describe the changes in landuse patterns in Resource 12 before and after urban renewal in the Swansea Dock area. [3]
- (b) With reference to Resource 12, explain the possible reasons for changes to distribution of residential areas in the Swansea Dock area. [5]
- (c) Account for the particular strategy of urban reimaging as seen in Resource 13. [5]
- (d) Imagine you are the chief planning officer for Swansea Dock Area tasked to decide between Proposals 1 and 2 for the development of the area marked X as shown in Resource 12. Using Resources 12 and 14, explain your considerations for the choice of your proposal. [6]
- (e) With reference to Resources 12 and 13 and your own knowledge, explain how changes in the landuse patterns in the Swansea Dock Area can improve liveability for the residents. [6]

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**End**

Name: \_\_\_\_\_

Class: \_\_\_\_\_



**JURONG PIONEER JUNIOR COLLEGE**

**JC2 Preliminary Examination 2019**

**GEOGRAPHY  
Higher 1**

Paper 1

INSERT

**8813 / 01**

**September 2019**

**3 hours**

**READ THESE INSTRUCTIONS FIRST**

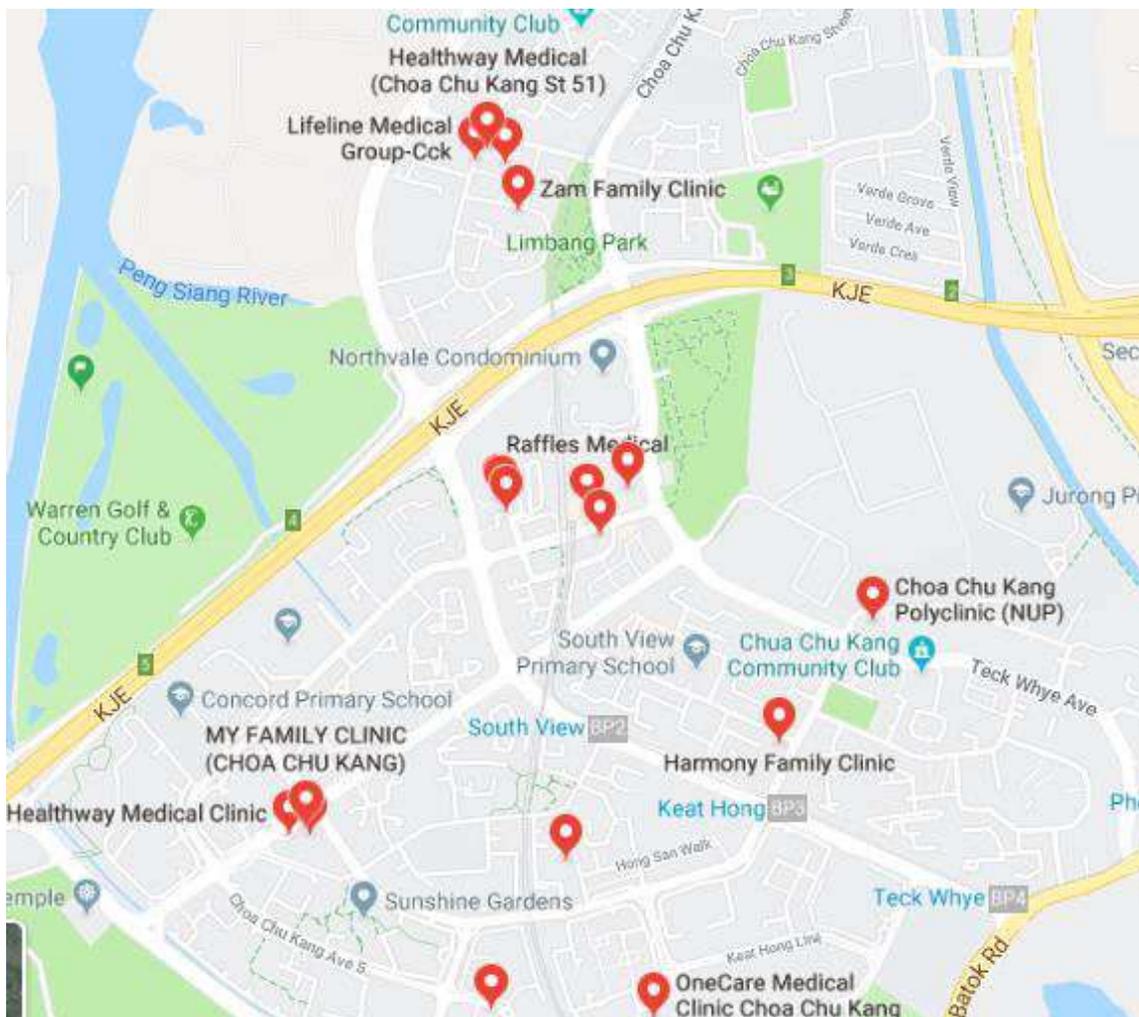
This insert contains all the Resources referred to in the questions.

This document consists of **5** printed pages and **1** blank page.

**Resource 1 for Question 1**  
**Demographic Data of Elderly Residents (65 years and above) in Choa Chu Kang**

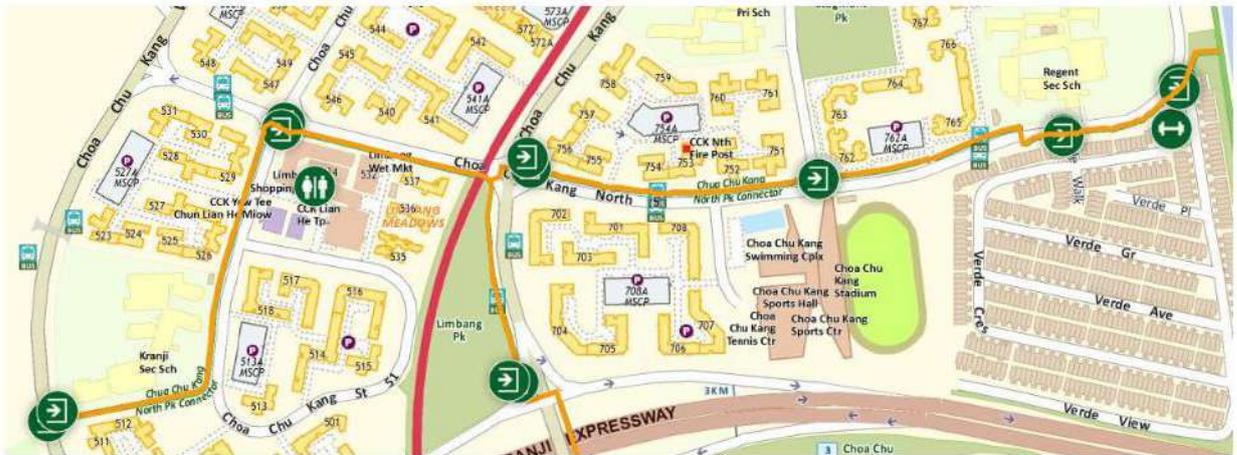
Age Group	Percentage (%)
65-69	46
70-74	33
75-79	16
80-84	4
85 and above	2
Type of Residence	Percentage (%)
HDB Public Housing	86
Condominium	12
Landed Property	2

**Resource 2 for Question 1**  
**Map showing the location of clinics in Choa Chu Kang**



## Resource 3 for Question 1

Map showing the Choa Chu Kang Park Connector



Legend



Park Connector

## Resource 4 for Question 1

Data collected from elderly residents about their perceptions of their neighbourhood amenities and infrastructure

General satisfaction with neighbourhood amenities and infrastructure	Agree and Strongly Agree (%)
There are adequate clinics providing healthcare services in this neighbourhood.	75.1
The nearest clinic is within walking distance.	67.6
There is good access to green space in this neighbourhood.	65.4
The Choa Chu Kang Park connector is within walking distance.	50.4
The footpaths in this neighbourhood are adequate.	84.1

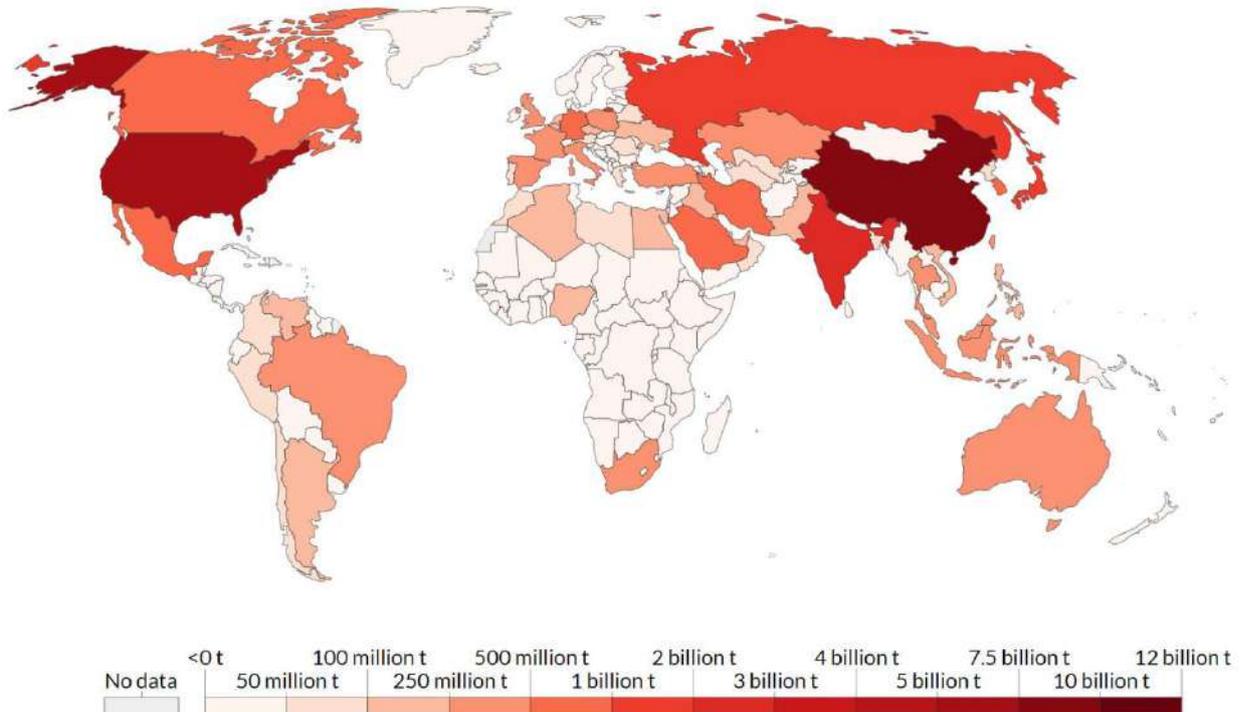


### Resource 5 for Question 2

#### Annual carbon dioxide emissions by country, 2016

##### Annual CO<sub>2</sub> emissions, 2016

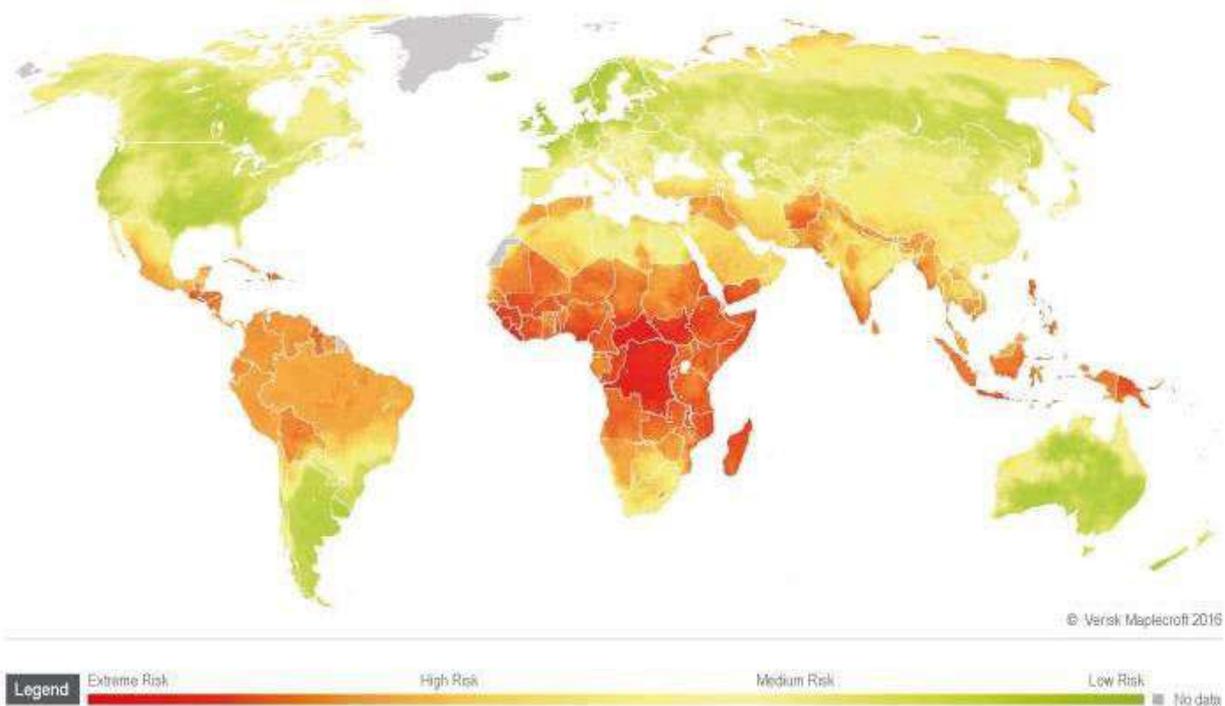
Annual carbon dioxide (CO<sub>2</sub>) emissions, measured in tonnes per year.



Source: Global Carbon Project; Carbon Dioxide Information Analysis Centre (CDIAC)

### Resource 6 for Question 2

#### Climate Change Vulnerability Index 2017



**Resource 7 for Question 2****Statements on climate change by leaders of Small Island Developing States**

“The Maldives is an archipelago consisting of tiny islands scattered in a vast expanse of the Indian Ocean. Over 80% of the land area have less than one meter above mean sea level, climate change and its associated sea level rise would undoubtedly be a catastrophe and threaten the livelihood of the islanders in the Maldives alike many thousands of others in low-lying island states. Sixteen years ago in April 1987, Maldives experienced unusual high waves causing extensive damage to the islands. Two thirds of the whole Maldives, including the capital island, Malé, was inundated for two days causing extensive damage to the infrastructure. Male International Airport, the only gateway to the Maldives, was closed for two days, causing delays in receiving the relief assistance from the international community, cancellation of tourist arrivals and lot more.”

*Statement by Mr. Abdullahi Majeed (Maldives) December 2003*

“Our Pacific island nations, including my own country, know from bitter experience of cyclones that regularly batter our region, of the disheartening effect of disasters in setting back in a matter of hours hard-earned development achievements of many years. SIDS concerns and the vulnerability of our nations are therefore quite real. While we accept the primary responsibility for achieving the goals of the [Barbados] Programme of Action, the reality is that the support of the international community is indispensable to success.”

*Statement by Tuila’Epa Sailele Malielegaoi, Prime Minister of Samoa, 2004*

“As an island nation, Sao Tome and Principe continues to see our very existence threatened by global warming. Our shorelines erode, our national territory shrinks as the seas rise. Is my small country to end up nothing but a tiny volcanic peak sticking up above the waves with the last of our people clinging to the land left unclaimed by the rising sea? The Kyoto Protocol must be implemented by all for the benefit of all.”

*Fradique Bandeira de Melo de Menezes President, Sao Tome and Principe, 2004*

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**End**

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Name: \_\_\_\_\_

Class: \_\_\_\_\_



## JURONG PIONEER JUNIOR COLLEGE

### JC2 Preliminary Examination 2019

#### **GEOGRAPHY** **Higher 1**

Paper 1

**8813 / 01**

**September 2019**

**3 hours**

Additional materials:      Writing Paper  
   1 Insert  
   World outline map (upon request)

#### **READ THESE INSTRUCTIONS FIRST**

Write your name and civics class on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Answer **four** questions in total.

##### **Section A**

Answer Question 1.

##### **Section B**

Answer Question 2.

##### **Section C**

Answer two questions, each from a different theme.

The Insert contains all the Resources referred to in the question.  
You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagram and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **4** printed pages.

## Section A

### Theme 3: Geographical Investigation

- 1 A group of eight 18 year-old students wanted to examine the needs of elderly living in urban neighbourhoods. They selected the neighbourhood of Choa Chu Kang in Singapore for their investigation. They had access to census information about the percentage of elderly living in the neighbourhood and their dwelling type.

The students wanted to gain further information on access to healthcare services and green spaces to gain a fuller picture of liveability of Choa Chu Kang neighbourhood for the elderly. They were allocated two days for field investigation at the beginning and at the end of August. They conducted a questionnaire survey with 50 elderly residents of Choa Chu Kang and asked questions regarding their satisfaction of their neighbourhood amenities and infrastructure. The survey results were represented in a table for analysis.

Resource 1 shows the demographic data of the elderly resident population in the Choa Chu Kang neighbourhood in 2018. Resource 2 shows the location of clinics in the neighbourhood. Resource 3 shows the Choa Chu Kang Park Connector that spans a total of 5.4 kilometres. Resource 4 shows the survey results collected on the general satisfaction with the neighbourhood amenities and infrastructure of Choa Chu Kang.

- (a) With reference to Resources 2 and 3, suggest a possible hypothesis for the students' investigation and state two reasons why the hypothesis is at a suitable scale. [3]
- (b) Explain how the students can address **two** possible ethical issues that may arise during the investigation. [4]
- (c) Explain an appropriate sampling method to collect the survey results as shown in Resource 4. [5]
- (d) Explain **two** limitations of the data representation method shown in Resource 4 and suggest how the data representation method can be improved. [5]
- (e) Using all the resources, evaluate the usefulness of this investigation in assessing the liveability of Choa Chu Kang neighbourhood for the elderly. [8]

**Section B****Theme 2: Climate Change and Flooding**

- 2** Resource 5 shows the annual emission of carbon dioxide (CO<sub>2</sub>) by country for 2016. Resource 6 shows the Climate Change Vulnerability Index for 2017. Resource 7 shows various statements on climate change from leaders of Small Island Developing States (SIDS).
- (a)** Describe the global pattern of annual CO<sub>2</sub> emissions in 2016 as shown in Resource 5. [3]
  - (b)** Suggest possible reasons for the variations in CO<sub>2</sub> emission within Asia as shown in Resource 5. [6]
  - (c)** Describe the pattern of vulnerability to climate change as shown in Resource 6. [4]
  - (d)** With reference to Resource 7, explain the factors that can affect a country's vulnerability to climate change. [6]
  - (e)** With reference to Resource 7 and your own knowledge, explain possible strategies to minimise the impact of climate change in developing countries. [6]

**Section C**

Answer **two** questions from this section.

**Either** Question 3 **or** Question 4 and **Either** Question 5 **or** Question 6.

**Theme 1: Climate Change and Flooding**

- 3 (a) Explain why rainfall patterns vary between the Tropical Rainforest (Af) and Tropical Desert (BWh) climates. [9]
- (b) 'The effects of climate change pose the greatest risks to countries at low levels of development.' How far do you agree with this statement? [16]
- 4 (a) Explain the factors contributing to the shape of flash flood hydrographs in the humid and arid tropics. [9]
- (b) To what extent are hard engineering strategies more effective than soft engineering strategies in managing fluvial floods? [16]

**Theme 2: Urban Change**

- 5 (a) Explain how the concept of *urban metabolism* is important in understanding waste management in cities of countries at varying levels of development. [9]
- (b) Evaluate the effectiveness of strategies used to manage non-hazardous solid waste in urban areas. [16]
- 6 (a) Explain the factors that contribute to crowding **or** fear produced in cities of countries at high levels of development. [9]
- (b) Evaluate the effectiveness of strategies used to mitigate the issue of **either** crowding **or** fear in the city. [16]

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**End**

Name: \_\_\_\_\_

Class: \_\_\_\_\_



## JURONG PIONEER JUNIOR COLLEGE

### JC2 Preliminary Examination 2019

#### **GEOGRAPHY** **Higher 2**

**9751 / 01**  
**September 2019**

Paper 1 Structured Essay Questions

**3 hours**

Additional materials:      Writing Paper  
   World outline map (upon request)

#### **READ THESE INSTRUCTIONS FIRST**

Write your name and civics class on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.

Diagram and sketch maps should be drawn whenever they serve to illustrate an answer.

The world outline map may be annotated and handed in with relevant answers.

You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **3** printed pages and **1** blank page.

**Section A**

**Tropical Environments**

Answer **one** question from this section

- 1 (a) Explain the weakening of the Walker Circulation in the Pacific region. [12]
- (b) To what extent are monsoonal winds the most dominant factor in influencing rainfall patterns in the tropics? [20]
- 2 (a) Explain the role of climate in influencing soil development in the tropics. [12]
- (b) To what extent is climate the most important factor in the formation of karst landscapes in the humid tropics? [20]

**Section B**

**Development, Economy and Environment**

Answer **one** question from this section

- 3 (a) Explain the factors that led to the emergence of a new international division of labour (NIDL). [12]
- (b) "Human Development Index (HDI) is the best indicator to measure development." [20]  
How far do you agree with this statement?
- 4 (a) Explain the environmental impacts of extractive industries on countries at low levels of development. [12]
- (b) To what extent does the resource curse thesis hold true for countries that are resource rich? [20]

**Section C**

## Sustainable Development

Answer **one** question from this section

- 5 (a) Explain the effects of the use of fossil fuels on the global carbon cycle. [12]
- (b) “International agreements is the most effective way to manage climate change.” To what extent do you agree with this statement? [20]
- 6 (a) Explain how the concept of *urban metabolism* is important in understanding sustainable urban development in cities of countries at varying levels of development. [12]
- (b) “The best strategy to manage non-hazardous solid waste in cities is reducing waste generation.” How far do you agree with this statement? [20]

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**End**

**BLANK**

Name: \_\_\_\_\_

Class: \_\_\_\_\_



**JURONG PIONEER JUNIOR COLLEGE**

**JC2 Preliminary Examination 2019**

**GEOGRAPHY**  
**Higher 2**

Paper 2 Data Response Questions

INSERT

**9751 / 02**

**September 2019**

**3 hours**

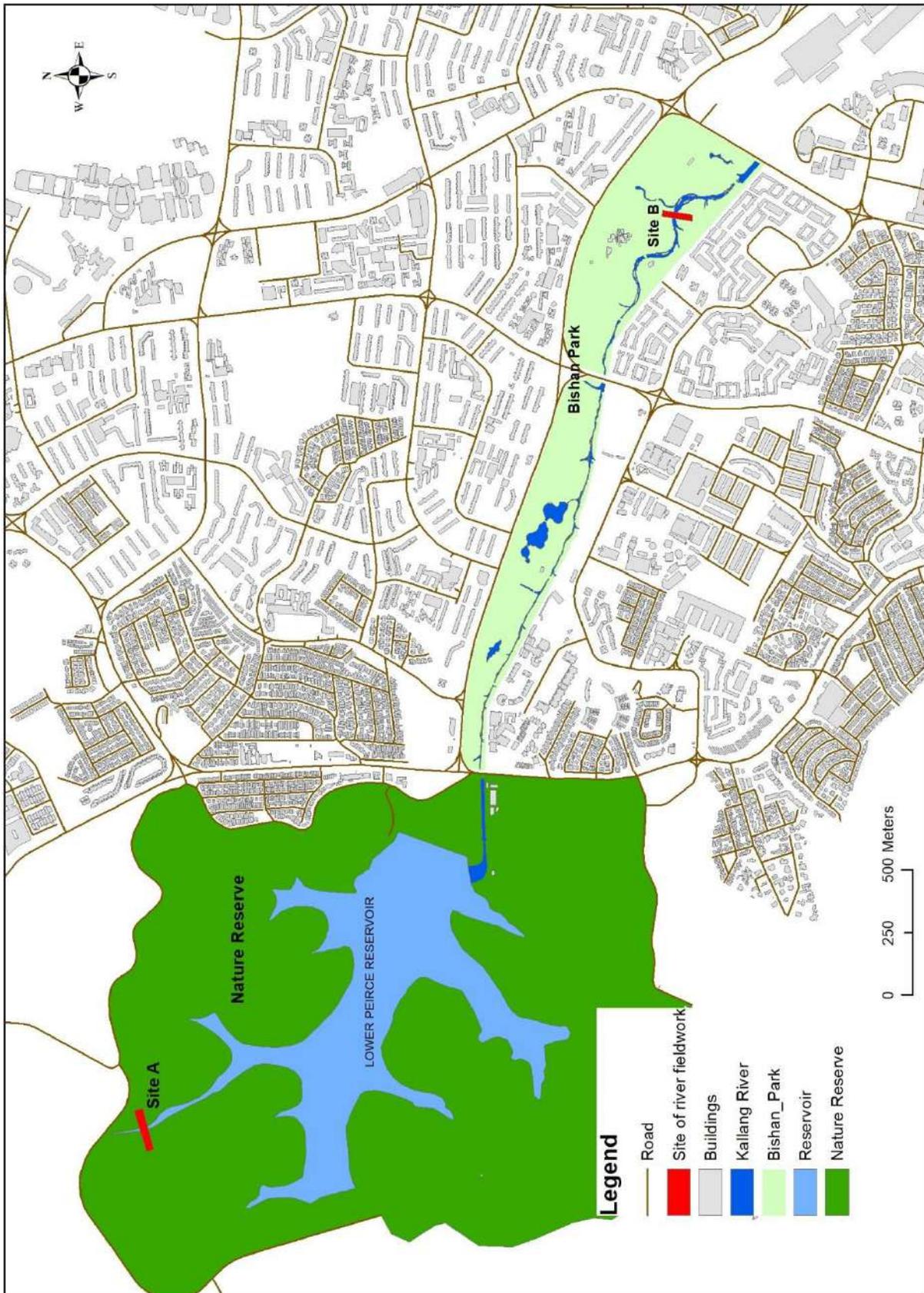
**READ THESE INSTRUCTIONS FIRST**

This insert contains all the Resources referred to in the questions.

This document consists of **10** printed pages.

Resource 1 for Question 1

Land use in drainage basins associated with Sites A and B



Resource 2 for Question 1

Site A



Site B



## Resource 3 for Question 1

Students measuring river velocity and cross-sectional area at Site B



## Resource 4 for Question 1

Data collected for river velocity of Sites A and B

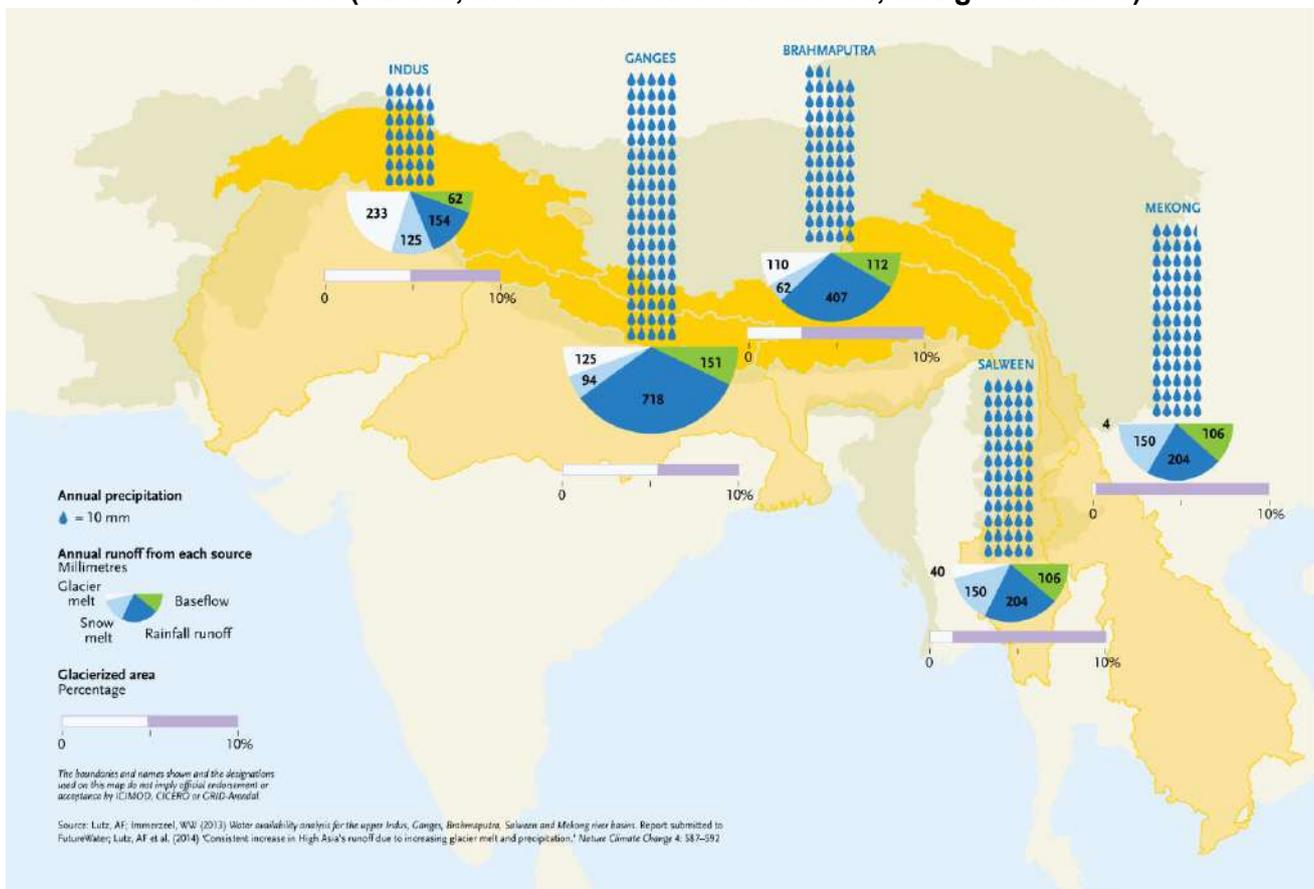
Time	Site A – Velocity (m/s)				Site B – Velocity (m/s)			
	1 <sup>st</sup> Reading	2 <sup>nd</sup> Reading	3 <sup>rd</sup> Reading	Average Reading	1 <sup>st</sup> Reading	2 <sup>nd</sup> Reading	3 <sup>rd</sup> Reading	Average Reading
10:00	0.42	0.48	0.46	0.45	0.36	0.40	0.45	0.40
11:00	0.50	0.50	0.48	0.49	0.52	0.58	0.56	0.55
12:00	0.56	0.58	0.55	0.56	0.62	0.63	0.66	0.67
13:00	0.53	0.52	0.54	0.53	0.51	0.53	0.56	0.53
14:00	0.48	0.46	0.45	0.46	0.48	0.49	0.50	0.49

**Resource 5 for Question 2**  
**Ganges and Brahmaputra River Basins in India and Bangladesh**



**Resource 6 for Question 2**

**Map of rivers in Asia, including Ganges and Brahmaputra Rivers, and the annual run-off from each source (rainfall, meltwater from snow and ice, and groundwater).**



**Resource 7 for Question 2**  
**A section of the Brahmaputra River at the upper course in Assam**

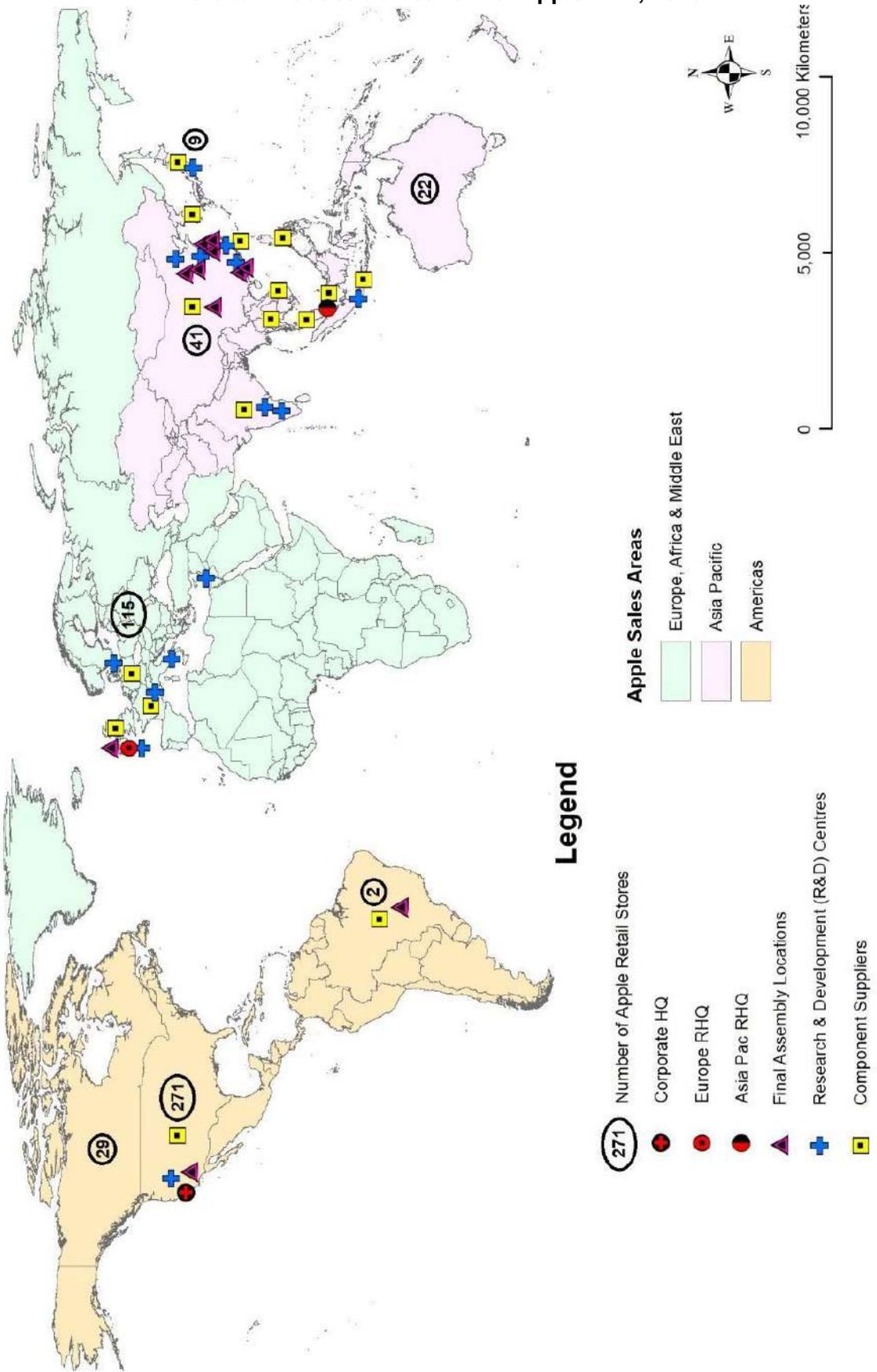


**Resource 8 for Question 2**  
**A section of the Ganges River at the lower course in India**



Resource 9 for Question 3

Global Production Network of Apple TNC, 2018



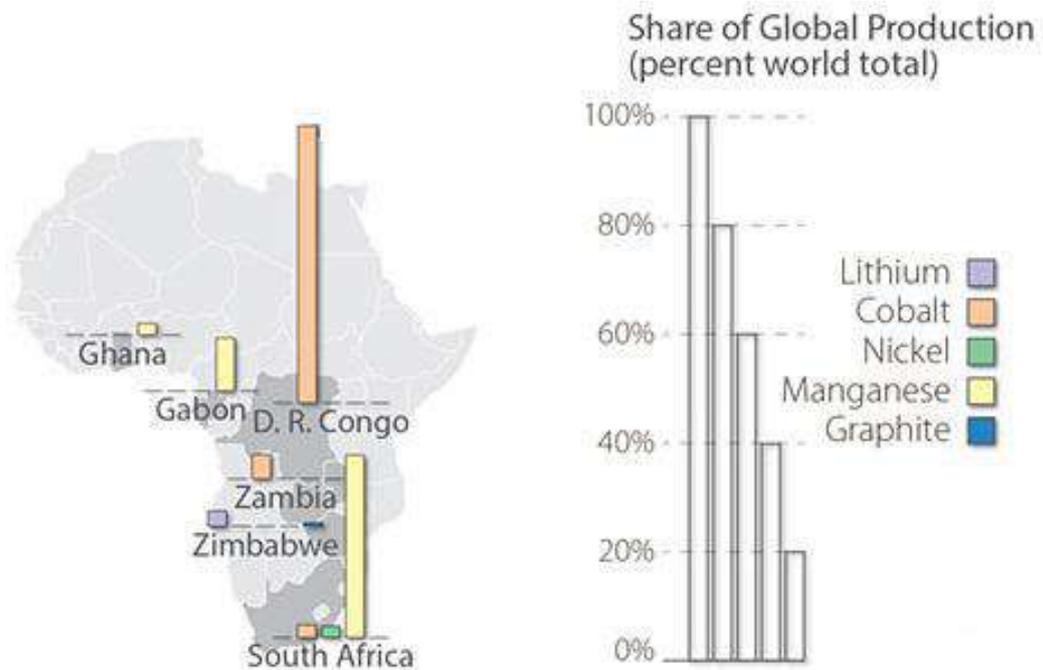
## Resource 10 for Question 3

## Brazil Factfile

Year	2005	2010	2018
Total population (millions)	186	193	211
Rate of natural increase (%)	2.9	1.1	0.9
GDP per person (US\$)	4,739	10,978	8,968
Employment in industry (%)	13.2	17.4	20.4

## Resource 11 for Question 3

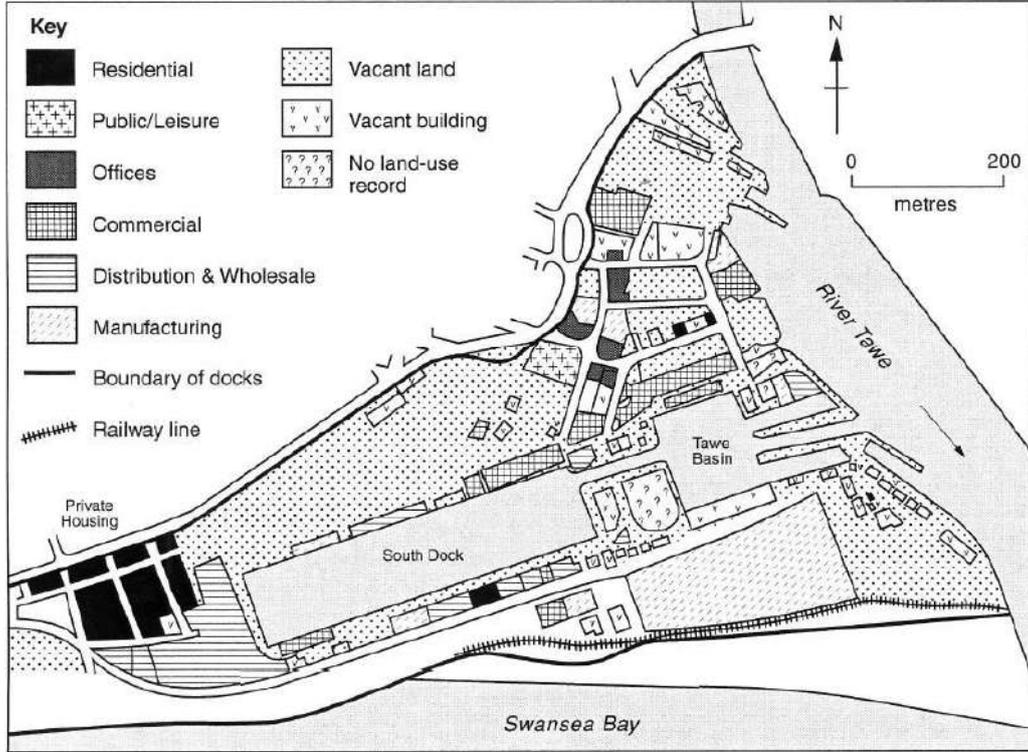
## Share of Global Mining Production of Battery Components, 2016



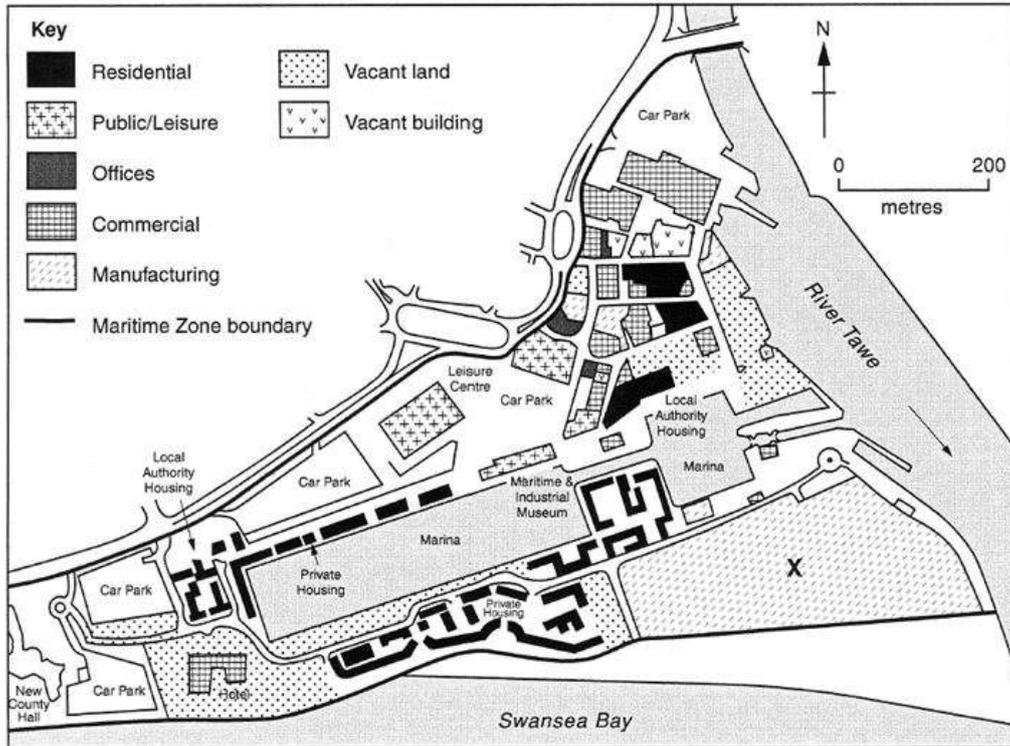
**Note:** Lithium-ion batteries used in smartphones comprise minerals such as cobalt, nickel, manganese or graphite.

Resource 12 for Question 4

Swansea Dock Area in the United Kingdom before and after urban renewal



Before urban renewal



After urban renewal

(Note: Local Authority Housing is public housing)

### Resource 13 for Question 4

#### Plan for St David's Shopping Centre located in Swansea Central



Plans for the St David's Shopping Centre, which is going to be one of the landmarks for Swansea Central by the Swansea Council. The plans for the north site include seven buildings - the tallest just seven storeys - and a maximum floor space of 84,050m<sup>2</sup> made up of shops, offices, residential and leisure space. The south site plans feature a hotel or residential building of up to 13-storeys in height, and a new arena of up to 40,700m<sup>2</sup>.

### Resource 14 for Question 4

#### Possible development proposals for Area X in Resource 1

<b>Proposal 1</b> <b>24-hour City Concept</b>	<b>Proposal 2</b> <b>Cultural Heritage Centre</b>
<ul style="list-style-type: none"> <li>• Mainly a food and beverage (F&amp;B) area infused with pubs and cafes</li> <li>• The existing manufacturing buildings can be renovated and reimaged to be a hip café area in the daytime and exciting night life area with pubs.</li> </ul>	<ul style="list-style-type: none"> <li>• An exhibition of the cultural heritage of Swansea Dock Area</li> <li>• Green open space, landscaping with trees, grass and seating</li> <li>• Recreation and play area</li> </ul>

**End**

## H2P1 Geography Suggested Mark Scheme

Level	Marks	Descriptors
4	10–12	Response is consistently analytical and comprises purposeful explanations. Response addresses the question fully using accurate and detailed knowledge. Depth of relevant knowledge and understanding is evident throughout. Response is coherent and use of terminology is accurate throughout.
3	7–9	Response is analytical and explanatory rather than descriptive. There is a clear focus on the question. Response demonstrates relevant knowledge and understanding. The response is coherent and the use of terminology is mostly accurate.
2	4–6	Response includes analysis and explanation but is generally dominated by description. Response reflects understanding of the question and is generally relevant. Some parts of the response may be unclear. Use of terminology is limited.
1	1–3	Response lacks focus on the question. Response is generally fragmentary and lacks a clear structure and organisation. There may be many unsupported, brief or incomplete assertions and/or arguments with some inaccurate use of terminology.
0	0	No creditworthy response.

**Note:** The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.

Level	Marks	Descriptors
5	17–20	Response is perceptive, logical and has strong evaluative elements. Evaluation is relevant and comprehensive. Strong evidence of synoptic thinking where knowledge from different topics is synthesised purposefully. Response fully addresses the demands of the question and features detailed and accurate knowledge reflecting depth of understanding of the subject content. The argument or discussion is coherent and well supported by relevant material. Use of terminology is accurate.
4	13–16	Response displays a sound evaluative element. There is some evidence of synoptic thinking through synthesising knowledge from different topics. Response is generally focussed on the demands of the question and features accurate knowledge, reflecting depth of understanding of the subject content. The argument or discussion is coherent and supported by relevant material. Use of terminology is accurate and appropriate.
3	9–12	Response is broadly evaluative rather than descriptive. Response addresses the question and features accurate knowledge, reflecting some understanding of the subject content. Argument or discussion is mainly coherent and supported by material which is largely relevant. Use of terminology is relevant and mostly accurate.
2	5–8	Response is largely descriptive. Response attempts to provide an argument to address the question. The weakest responses in this level may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Some lapses in use of terminology though generally accurate.
1	1–4	Response lacks focus on the question and may be largely irrelevant to it. Response is fragmentary and lacks clarity. There may also be unsupported assertions and/or arguments with limited or no use of relevant terminology.
0	0	No creditworthy response.

**Note:** The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.

## Section A (Tropical Environments)

- 1 (a) Explain the weakening of the Walker Circulation in the Pacific region. [12]**

**Indicative content:**

Candidates should explain the how the weakening of the Walker Circulation is resulted. Responses should explain how atmospheric circulation affects oceanic circulation thus resulting in the Walker Circulation.

A higher level of response would supplement answer with well-annotated diagrams of Walker Circulation and El Nino (weakening of Walker Circulation) to support the explanation. Candidates could also analyse how the weakening of Walker Circulation affects location spatially and its effects varies temporally.

- (b) To what extent are monsoonal winds the most dominant factor in influencing rainfall patterns in the tropics? [20]**

**Indicative content:**

Explanation to rainfall patterns in the tropics should focus on factors at different scales. Global or macro-scale factors such as ITCZ and STHP with reference to Hadley cells. Regional or meso-scale factors such as monsoonal winds and El Nino (episodic atmospheric event). Localised factors such as maritime/coastal locations, topography and tropical cyclones (episodic phenomenon).

A higher response would consider multiple factors and how the different factors affects climate at different scales. Students should take a stand that generally global factors play a more important predominant role than localised factors which play the supporting but significant roles. Perspective on temporal aspect could also be an influential factor on rainfall pattern in the tropics i.e. less permanent or temporary or episodic events or factors do not have a lasting influence on the rainfall pattern.

- 2 (a) Explain the role of climate in influencing soil development in the tropics. [12]**

**Indicative content:**

Candidates should demonstrate an understanding of the impacts of climate on the soil profiles of humid tropics and arid tropics. Answer will need to make clear links to explain how climate can result in the different aspect of the soil profile (e.g. thickness, colour) of both humid and arid tropics. Important processes such as laterisation and calcification/salinization have to be linked to the influence of climate.

A high level response will acknowledge the spatial variations in the soil profiles, where climate play a more significant role with its global scale of influence.

- (b) To what extent is climate the most important factor in the formation of karst landscapes in the humid tropics? [20]**

**Indicative Content**

Karst landscapes in the humid tropics have characteristic surface and sub surface morphology as a result of the interaction between water and geology. Candidates should demonstrate the movement of both surface water (rivers) and sub-surface river and water and the dissolution processes of the rock type (limestone or dolomites) and rock structure. A variety of surface landforms such as cone, tower and isolated karst and surface landforms such as cave and speleothems could be used to illustrate the movement of water affect the geology or vice versa. Other factors that could influence the karst landforms could be tectonic uplift, vegetation and time.

A higher level response should demonstrate the differential erosion by water on the soluble rock guided by secondary permeability of the rock structure. This is evident through the varied landforms found in the landscapes. Evidence of the varied landscapes can be seen. The counter argument to the statement could examine the presence of other factors such as tectonic uplift in changing the dynamic of solution processes to enhance the forms of the landforms over time. Reference to concrete examples of karst landscapes in Guilin, China or Vietnam and Malaysia should be credited.

### **Section B (Development, Economy and Environment)**

- 3 (a) Explain the factors that led to the emergence of a new international division of labour (NIDL). [12]**

**Indicative content:**

Candidates should explain factors that led to the emergence of NIDL. The underlying development of the NIDL is the primary desire of firms to maximise profits that governs any factor that allows the firms seek to either lower costs or increase revenue. The factors that have led to the emergence of NIDL relate to technology, comparative advantage and actions by actors such as TNCs, states and supranational organisations.

A higher level response would analyse that the NIDL are dynamic nature, giving rise to different spatial configurations of labour over time.

- (b) “Human Development Index (HDI) is the best indicator to measure development.” How far do you agree with this statement? [20]**

**Indicative Content:**

Responses should include a discussion of the usefulness and limitations of HDI in measuring development comprehensively or holistically. Candidates could highlight the usefulness of HDI in terms multi-dimensionality and comparability between countries. There is also a need to discuss other indicators such as MPI, MDGs and SDGs to show how they may be better (or not) than HDI in being the best or better indicator.

A higher level response could comprise the evaluation of 3 or more indicators in terms of being ‘best’ in measuring development using appropriate criteria.

- 4 (a) Explain the environmental impacts of extractive industries on countries at low levels of development. [12]

**Indicative Content:**

Candidates should explain possible environmental impacts of extractive industries. Discussions of the environmental impacts of extractive industries can include impacts on ecosystem and habitat destruction, geomorphological changes to the surrounding landscapes, as well as pollution problems associated with inappropriate surface disposal of waste rocks or 'tailings'. Explanation should include details of these impacts and why these impacts would occur, particularly in the context of LDCs.

A higher level response would include a well-elaborated case studies situated in LDCs to elaborate on identified impacts of extractive industries. Candidate could also examine the degree of impacts on countries with low level of development is dependent on the nature of stakeholder.

- (b) To what extent does the resource curse thesis hold true for countries that are resource rich? [20]

**Indicative Content**

Candidates should discuss the conditions of resource rich countries that causes them to be susceptible to the resource curse thesis. The discussion should also include a recognition that the resource curse thesis would not apply to all resource rich countries, as countries that have managed to diversify its economy, or limit economic leakages are able to avoid the resource curse. Arguments should be well exemplified throughout.

A higher level response would be to discuss the underlying conditions (e.g. existing political climate/direction) that causes resource rich countries to fall under the resource curse.

### Section C (Sustainable Development)

- 5 (a) Explain the effects of the use of fossil fuels on the global carbon cycle. [12]

**Indicative content**

Candidates should demonstrate an understanding of the impact of the use of fossil fuels on the global carbon cycle. Answer will need to make clear links to explain how fossil fuel combustion can impact the different aspects of global carbon cycle. Important processes of how use of fossil fuels intensify the amount of carbon in the atmosphere and how the various carbon sinks are affected via positive feedback loops.

A higher level response will acknowledge the spatial variation in anthropogenic activities that impact the carbon cycle OR the impact on carbon cycle in the temporal scale.

- (b) "International agreements is the most effective way to manage climate change." To what extent do you agree with this statement? [20]

**Indicative content:**

Candidates to show understanding of the various strategies to manage climate change at the different levels: global, regional and local scales. There is a need to address international agreements as it is the given content in the question and discuss the relevance and limitation of the strategy and evaluate its importance at the global platform.

Higher level responses should look at other strategies at varying scales to have an integrated approach to manage climate change.

- 6 (a) Explain how the concept of *urban metabolism* is important in understanding sustainable urban development in cities of countries at varying levels of development. [12]

**Indicative content**

Candidates should be able to explain the concept of urban metabolism; the characteristics of both linear and circular urban metabolism and the idea of it being linear and circular is linked to the cities' achieving SUD.

A higher level response will offer detailed examples of how cities in varying levels of development are doing waste management hence differ in urban metabolism.

- (b) "The best strategy to manage non-hazardous solid waste in cities is reducing waste generation." How far do you agree with this statement? [20]

**Indicative content:**

Candidates should be able to develop an argument related to the view presented in the question and use BPs to support the argument rather than to evaluate strategies alone. Answers should draw on cities at different levels of development to analyse the effectiveness of strategies. Reference should be drawn to context of cities to depict why reducing waste generation is a central concern in achieving sustainability; i.e. achieving circular urban metabolism.

A higher level response would look at the spatial variations when managing waste sustainably and challenges faced as cities at different levels of development are likely to face differing issues/concerns.

**End**

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**1 (a) With reference to Resource 1, suggest a suitable hypothesis for the investigation. [1]**

Award 1 mark for any testable and sensible hypothesis related to flood risk associated with nature of channels.

Possible responses include:

- River Site B has a higher flood risk than River Site A.
- An area with a higher proportion of vegetation (Site A) is less prone to flooding than an area with lower proportion of vegetation (Site B).

Point Marked

**(b) Explain how the team would minimise the impact of the investigation differently at the two sites shown in Resource 2. [5]**

Indicative Content:

- Do not leave litter – River B student could suggest using litter bins; River A student could suggest bagging litters and taking it away with them.
- Avoid unnecessary damage to trees and plants such as cutting down overhanging branches at River A.
- Avoid unnecessary disturbance to wildlife at River A such as disturbance of riverside nesting sites, river banks and the river channel itself.
- Avoid making excessive noise at River B due to close proximity to residents

Levels Marked

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of geographical investigation methods and potential damage they might cause at both sites with a thorough explanation of strategies used to alleviate these. Reflects a good understanding of the context of the investigation and of work in the field.
2	3 – 4	Response demonstrates good knowledge of geographical investigation methods and their potential damage to the fieldwork sites. Provides an explanation of ways to minimise this damage, which may be limited in depth and detail or apply mostly to only one site. Some of the response may address generic fieldwork problems not relevant to the context of the investigation.
1	1 – 2	Response shows some knowledge of relevant geographical investigation methods and the ways in which they may cause damage at the two fieldwork sites. Strategies mentioned in the response may be generic to fieldwork but of limited relevance to the given context.
0	0	No creditworthy response.

**(c) Describe how the team can collect data on cross sectional area ~~wetted perimeter~~ [4]**  
 Need a home tutor? Visit [smiletutor.sg](http://smiletutor.sg)

at Site B as shown in Resource 3.

**To measure cross-sectional area:**

- Firstly, **measure the width** of the River at Site B (Resource 3) of the cross-section perpendicular to the main flow direction with a tape measure. Anchor both ends of the tape on the opposite banks using ranging poles so that the tape is suspended about 30cm above the water.
- Secondly, decide on the number of points where readings would be taken from at that cross-section. Divide the cross-section into equal distance (though not necessary) for **sample points** for easy measurement.
- Thirdly, **measure the channel depth** at each sample point by using a ranging pole or meter rule starting from one side of the bank to the other. Plot the height of the water in the river on a graph paper.
- From the plotted graph, find the average depth. This is the sum of all the dept readings divided by the number of readings (n) plus 1. To **calculate the cross-sectional area**, multiply the average depth with the total width.

(d) **The team concluded that the discharge data collected may not be completely reliable and/or accurate. Explain how the process of data collection could be improved. [6]**

Indicative Content

- Due to frequent obstruction by debris in the river and of float being stuck in fallen trees, repeated measurements and taking averages can reduce the margin of error.
- With depth measurements ensure that the tape measure is weighted so that it sinks in to just touch the river bed and take care to record any anomalies in depth caused by irregularities in the river bed.
- Students' position by the river may change due to movements and hence is not an accurate way of determining the start and end points for the floating object. students could fix the start and finish lines using tape measures to help to minimise errors

*Levels Marked*

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of river discharge data collection methods, issues with both accuracy and/or reliability of these and relevant improvements. Reflects a good understanding of the context of the investigation and of data collection techniques.
2	3 – 4	Response demonstrates good knowledge of river discharge data collection methods. Provides an explanation of issues relating to reliability and/or accuracy with some reference to possible improvements. Description may be limited in depth and detail or apply mostly to only one set of measurements (i.e. velocity) without referring to wetted perimeter/depth. Some of the response may focus on generic river fieldwork issues and improvements and not be relevant to the context of the investigation.
1	1 – 2	Response shows some knowledge of relevant data collection methods. Some reference is made to issues with accuracy and reliability but may recommend inappropriate or irrelevant improvements or provide incorrect explanation of methods. Response may be of limited relevance to the given context.
0	0	No creditworthy response.

- (e) Evaluate the usefulness of the river velocity data shown in Resource 4 in helping to ascertain the flood risk at each of the two sites. [9]

Indicative Content

Usefulness points could include the fact that the data gives some idea of river response to rainfall event. They could also include the relative difference in response between River Site A and River Site B. Response could also recognise that there are limitations related to the methods involved in the collection of velocity data.

A higher level response will present evaluation of usefulness of resource and of knowledge of river velocity measurements as well as a detailed discussion of other information that is useful in being able to assess flood risk.

*Levels marked using H2 generic level descriptors for 9m open-ended DRQ for Theme 4*

Level	Marks	Descriptors
3	7 – 9	Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides a logical and well-developed evaluation, which may include perceptive insights for the strongest responses. Reflects strong critical thinking skills and a good understanding of the requirements of the question.
2	4 – 6	Response demonstrates good knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides an evaluation, which may be limited in depth and detail. Response reflects critical thinking skills in general but may not always be relevant to the question.
1	1 – 3	Response shows inadequate knowledge and understanding of geographical investigation skills and methods relevant. Response has some, though limited, relevance to the given context. Provides little or no evaluation. May include material that is irrelevant to the question.
0	0	No creditworthy response

## Ganges and Brahmaputra River Basins in South Asia

Resource 5 shows a map of the Ganges and Brahmaputra River Basins in India and Bangladesh. Resource 6 shows a map of rivers in Asia, including Ganges River and Brahmaputra River, and the annual run-off from each source (rainfall, meltwater from snow and ice, and groundwater). Resource 7 shows a section of the Brahmaputra River in the upper course in Assam and Resource 8 shows a section of the Ganges River in the lower course in India.

- (a) **With reference to Resource 6, compare the contribution of different sources to the annual run-off between the Ganges River and the Brahmaputra River.** [3]

Possible responses include:

- The source with the largest difference is rainfall runoff: 718mm in Ganges vs 407mm in Brahmaputra
- Both snowmelt and baseflow are similar in variations
- The source with the smallest difference (can be a similarity) is glacier melt: 125mm in Ganges vs 110mm in Brahmaputra

Point marked.

- (b) **With reference to Resources 5 and 6, explain possible reasons for the variation in rainfall runoff between the Ganges River Basin and the Brahmaputra River Basin.** [5]

### Indicative content

- Responses to consider both natural and human factors that result in the variation in rainfall runoff with 718mm in Ganges vs 407mm in Brahmaputra. Reasons should include natural reasons such as amount/intensity of rainfall received in both regions and human factor such as different land-use in both regions that can cause rainfall runoff to differ.
- A higher level response would explain the reasons with reference to the context of Ganges and Brahmaputra River Basin.

Levels marked.

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of the possible reasons that can account for the variation in rainfall runoff. Explanation is detailed, thorough and relevant. Reference made to resources in response.
2	3-4	Response demonstrates adequate knowledge of the possible reasons that can account for the variation in rainfall runoff. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question. Limited reference made to resource.
1	1-2	Response demonstrates limited or no knowledge and understanding of the possible reasons that can account for the variation in rainfall runoff. Explanation lacks detail. Overall the response does not the address the context of the question. No reference made to resource.
0	0	No creditworthy response

- (c) **Describe the channel characteristics of the Brahmaputra River and the Ganges River as seen in Resources 7 and 8.** [4]

Possible responses include:

- Res 7 shows a braided river that is wide, relatively straight, multi thread with many mid-channel bars.
- Res 8 shows a meandering river that has sinuosity index more than 1.5, single thread, wide.

Point marked. Award 1m for each description for braided and meandering rivers.

(d) Explain two possible reasons that can account for the formation of mid channel bars as seen in Resource 7. [4]

Possible responses include:

- Responses to explain factors that can account for the formation of mid-channel bars when the river is having low level of discharge. Possible reasons include seasonal rainfall/discharge, bank erodibility, availability of coarse sediment load.

Award 2m for 1 well-explained reason.

(e) Using Resources 6, 8 and your own knowledge, evaluate the factors affecting the channel pattern as seen in Resource 8. [9]

Indicative content

- Candidates should weigh the factors such as climate, discharge, sediment load in influencing the formation of meandering river as seen in Resource 8.
- Resource 6 shows that Ganges river receive 900mm annual precipitation and 1088mm runoff annually from various sources. This suggests that the area is considered humid tropics that can result in the Ganges River having high level of discharge.
- Higher level response would weigh the factors according to scale.

Level	Marks	Descriptors
3	7-9	<p>Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source (s) is well used to support the response.</p> <p>Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.</p> <p>OR</p> <p>Makes a decision which clearly addresses different elements of the issue and/or interest of different stakeholders.</p>
2	4-6	<p>A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks details and may contain some inaccuracies. Displays general critical thinking skills. Source (s) is used to support parts of the response.</p> <p>Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.</p> <p>OR</p> <p>Shows some attempt to address different elements of the issue and/or views of different stakeholders when making a decision but is not well-developed.</p>
1	1-3	<p>Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source (s) is not used or not accurately used to support the response.</p> <p>Provides little or no evaluation.</p> <p>OR</p> <p>Evidence of decision-making, if present is simple and may be flawed.</p>
0	0	No creditworthy response.

3

### Apple Inc.'s Global Production Network (GPN)

Apple Inc. is a transnational corporation (TNC) which operates globally via its extensive production network. Resource 9 shows the global production network of Apple Inc. in 2019. Resource 10 is a Factfile about Brazil. Resource 11 shows the share of global mining production of battery components (lithium, cobalt, nickel, manganese and graphite) for the year 2016.

(a) **With reference to Resource 9, describe the spatial distribution of Apple Inc.'s final assembly locations and component suppliers. [4]**

- The final assembly locations can be found in every world-region: 2 in Americas, 1 in Europe, Africa & Middle East and 8 in Asia Pacific.
- The greatest concentration of Apple Inc's final assembly locations is found in China with a total of 8.
- Similarly, component suppliers of Apple Inc. can be found in every world-region: 2 in Americas, 3 in Europe, Africa & Middle East and 11 in Asia Pacific.
- The greatest concentration of component suppliers is found in the Southeast Asia with a total of 6.
- No component suppliers and final assembly locations are found in Africa, Russia and Australia.

Point marked (1m for each point)

(b) **As shown in Resource 9, explain possible reasons for the location of Apple Inc.'s Research and Development (R&D) centres. [5]**

Possible responses for reasons of Apple Inc.'s R&D centres include:

- Access to highly skilled labour – applied to most centres particularly DCs and relatively lower cost high-skilled labour in LDCs (India, Indonesia, China)
- Proximity to other R&D centres and related industries/support services or tie-ins with local universities.
- Customisation for regional consumer markets. – applied to most centres especially LDCs such as Indonesia, China and India.

Data from Resource 9 should be used where appropriate to support responses.

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of the factors influencing Apple Inc's R&D location. Explanation is detailed, thorough and relevant. Reference made to resource in response and information from resource used to substantiate response.
2	3-4	Response demonstrates adequate knowledge of the factors influencing Apple Inc's R&D location. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question. Limited reference made to resource.
1	1-2	Response demonstrates limited or no knowledge and understanding of the factors influencing Apple Inc's R&D location. Explanation lacks detail. Overall the response does not address the context of the question. No reference made to resource.
0	0	No creditworthy response

(c) **Explain the variation in the distribution of retail stores between US and China as shown in Resource 9. [5]**

Possible reasons for the variation can include:

- Large customer market / base in the US

- Consumers are very affluent in purchasing 'upscale' and expensive Apple products
- US has very good relationship with its US consumers – Apple's notable brand loyalty among its US consumers is very high
- Apple Inc's in the US has very few competitors in the market – high geographical coverage in the US to ensure its market dominance
- China has relatively fewer retail stores because of lower customer market / base
- There are many competitors to Apple in China such as Huawei, Oppo, Xiaomi etc
- Appeal of operating system (iOS) is low in China, as it uses WeChat which can outdo what Apple does in terms of chatting, ordering or paying. So very little benefits to invest in many retail stores in China.

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of the variation in the distribution of retail stores between US and China. Explanation is detailed, thorough and relevant. Reference made to resource in response and information from resource used to substantiate response.
2	3-4	Response demonstrates adequate knowledge of the variation in the distribution of retail stores between US and China. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question. Limited reference made to resource.
1	1-2	Response demonstrates limited or no knowledge and understanding of the variation in the distribution of retail stores between US and China. Explanation lacks detail. Overall the response does not address the context of the question. No reference made to resource.
0	0	No creditworthy response

- (d) Using evidence from Resources 9 and 10, suggest two reasons why Apple [4] continued its assembly facility in Brazil in 2018.

Award 1 mark for each reason without supporting evidence to a maximum of 2 marks.  
Award 2 marks for each reason with supporting evidence to a maximum of 4 marks.

Possible reasons include:

1. Availability of low-skilled labour
2. Availability of component suppliers
3. Large potential market

- (e) Using Resources 9, 11 and your own knowledge, explain the possible impacts on [7] D.R. Congo as a result of Apple Inc.'s Global Production Network (GPN).

Students to identify and explain both positive and negative impacts on D.R. Congo as a result of Apple's Inc. GPN.

High level response will consider impacts of different aspects (social, economic and environment) at different scales. Students should use resources to support their responses.

Level	Marks	Descriptors
3	6-7	Response demonstrates accurate knowledge of the possible impacts of Apple's GPN on D.R. Congo. Three aspects of impacts (economic, social and environment) are explored. Explanation is detailed, thorough and relevant. Reference made to resource in response and information from resource used to substantiate response.
2	4-5	Response demonstrates adequate knowledge of the possible impacts of

		Apple's GPN on D.R. Congo. At least two aspects of impacts are explored. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question. Limited reference made to resource.
<b>1</b>	<b>1-3</b>	Response demonstrates limited or no knowledge and understanding of the possible impacts of Apple's GPN on D.R. Congo. Explanation lacks detail. Overall the response does not the address the context of the question. No reference made to resource.
<b>0</b>	<b>0</b>	No creditworthy response

### Urban Reimaging in Swansea (United Kingdom)

Resource 12 shows the Swansea Dock area in the United Kingdom before and after urban renewal. Resource 13 shows future plans for St David's Shopping Centre, located in Swansea Central. Resource 14 shows the possible development proposals for Area X shown in Resource 12.

(a) Describe the changes in landuse patterns in Resource 12 before and after urban renewal in the Swansea Dock area. [3]

Possible responses include:

- There is an increase in residential areas, particularly the new stretch of private housing area along the Swansea bay, South of the Swansea Dock Area
- There is also an addition of a cluster of public housing with the Local Authority Housing at the northeast part of the Swansea Dock Area
- Several land uses have been removed, i.e. the Railway line, distribution and wholesale
- Commercial land use remained but it has increased after urban renewal

Point marked. Award 1m for 1 valid description.

(b) With reference to Resource 12, explain the possible reasons for changes to distribution of residential areas in the Swansea Dock area. [5]

Indicative content

- Candidates should explain **two** valid reasons for the changes to distribution of both private and public residential areas in the Swansea Dock Area.
- A higher level response would explain the reasons with reference to Swansea Dock Area by making good references to Res 12.

Levels marked.

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of the possible reasons for changes to distribution to the residential areas in the Swansea Dock Area. Explanation is detailed, thorough and relevant. Reference made to resource in response and information from resource used to substantiate response.
2	3-4	Response demonstrates adequate knowledge of the possible reasons for changes to distribution to the residential areas in the Swansea Dock Area. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question. Limited reference made to resource.
1	1-2	Response demonstrates limited or no knowledge and understanding of the possible reasons for changes to distribution to the residential areas in the Swansea Dock Area. Explanation lacks detail. Overall the response does not the address the context of the question. No reference made to resource.
0	0	No creditworthy response

- (c) **Account for the particular strategy of urban reimagining as seen in Resource 13.** [5]  
Indicative content

Candidates should identify features in Res 13 and account for the use of such reimagining strategy.

A higher level of response would make good references to Resource 13 to support response.

Levels marked.

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of the features of flagship development and reasons for adopting this strategy. Explanation is detailed, thorough and relevant. Reference made to resource in response.
2	3-4	Response demonstrates adequate knowledge of the features of flagship development and reasons for adopting this strategy. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question. Limited reference made to resource.
1	1-2	Response demonstrates limited or no knowledge and understanding of the features of flagship development and reasons for adopting this strategy. Explanation lacks detail. Overall the response does not the address the context of the question. No reference made to resource.
0	0	No creditworthy response

- (d) **Imagine you are the chief planning officer for Swansea Dock Area tasked to decide between Proposals 1 and 2 for the development of the area marked X as shown in Resource 12. Using Resources 12 and 14, explain your considerations for the choice of your proposal.** [6]

Indicative content

- Response has to identify a proposal and clearly explain the considerations/reasons for the choice.
- Explain how the proposal will achieve the outcome and also boost liveability for various stakeholders.
- A higher level response would have good use of both Res 12 (e.g. relate to the other land uses) and Res 14 to support choice of proposal.

Levels marked.

Level	Marks	Descriptors
3	5-6	Response demonstrates accurate knowledge of the possible reasons for choice of proposal. Explanation is detailed, thorough and relevant. Reference made to resource in response and information from resource used to substantiate response.
2	3-4	Response demonstrates adequate knowledge of the possible reasons for choice of proposal. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question. Limited reference made to resource.
1	1-2	Response demonstrates limited or no knowledge and understanding of the possible reasons for choice of proposal. Explanation lacks detail. Overall the response does not the address the context of the question. No reference made to resource.
0	0	No creditworthy response

- (e) **With reference to Resources 12 and 13 and your own knowledge, explain how changes in the landuse patterns in the Swansea Dock Area can improve liveability for the residents.** [6]

Indicative content:

- Candidates should explain how changes in the landuse patterns in Swansea Dock Area can see an improvement in liveability for the different groups of residents.

- Higher level responses will look all 3 aspects of liveability and the use of different social groups to illustrate the point.

Levels marked.

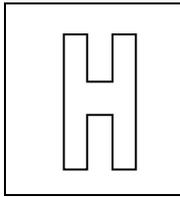
Level	Marks	Descriptors
3	5-6	Response demonstrates accurate knowledge of the possible reasons for choice of proposal. Explanation is detailed, thorough and relevant. Reference made to resource in response and information from resource used to substantiate response.
2	3-4	Response demonstrates adequate knowledge of the possible reasons for choice of proposal. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question. Limited reference made to resource.
1	1-2	Response demonstrates limited or no knowledge and understanding of the possible reasons for choice of proposal. Explanation lacks detail. Overall the response does not the address the context of the question. No reference made to resource.
0	0	No creditworthy response

**End**

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Candidate Name: \_\_\_\_\_

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## 2019 Preliminary Exams Pre-University 3

### GEOGRAPHY

Paper 1 Structured Essay Questions

**9751/01****16 September 2019****3 hours**Additional Materials: Answer Paper  
World Outline Map

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### INSTRUCTIONS TO CANDIDATES

Write your name, admission number and class on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use a soft pencil for any diagrams, graphs, or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagram and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

### Section A – Tropical Environments

Answer **one** question from this section.

- 1 (a) Explain the climatic characteristics of the humid tropics.  
[12]
- (b) 'Monsoon is the most crucial factor influencing tropical climates.'  
Evaluate the validity of this statement.  
[20]
- 2 (a) Explain the formation of various landforms in the arid tropics.  
Support your answer with relevant diagram(s).  
[12]
- (b) Discuss the factors that affect the formation of landforms in the tropics.  
[20]

### Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a) Explain the role of Transnational Corporations (TNCs) in governing the global economy.  
[12]
- (b) 'The benefits that Transnational Corporations (TNCs) bring to their host economies outweigh the negative impact resulted.'  
To what extent do you agree with the statement above?  
[20]
- 4 (a) Explain why the management of natural resources is difficult in the world today.  
[12]
- (b) 'The endowment of natural resources is to be blamed for the underperformance of resource-rich countries.'  
Discuss the validity of the statement.  
[20]

### Section C – Sustainable Development

Answer **one** question from this section.

- 5 (a) Explain the promises and issues associated with hydropower and **either** nuclear energy **or** biofuels in countries at low levels of development.  
[12]
- (b) Evaluate the extent to which sustainable development can be achieved.  
[20]

Need a home tutor? Visit [smiletutor.sg](http://smiletutor.sg)

- 6 (a) Explain the difficulties of measuring sustainable urban development in countries

at low levels of development.  
[12]

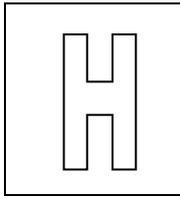
**(b)** 'It is easier to achieve sustainable urban development than urban liveability.'

How far do you agree with the statement?  
[20]

Class Adm No

Candidate Name: \_\_\_\_\_

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## 2019 Preliminary Exams Pre-University 3

### **GEOGRAPHY**

Paper 2 Data Response Questions

**9751/02**

**4 September 2019**

**3 hours**

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### **READ THESE INSTRUCTIONS FIRST**

This Insert contains all the Resources referred to in the questions.

Resource 1 for Question 1

Field site the group did their investigation in (top) and photograph of field site found online prior to the ABC Waters Programme (bottom)



**Resource 2 for Question 1****Recording sheet to calculate river discharge**For Wetted Perimeter

<b>Section</b>	1 (Start)	2	3	4	5	6	7	8	9	10	11 (End)
<b>Depth/ cm</b>											

Each section is 50cm apart.

For River Velocity

Length of River Segment:

Time (seconds)			
1	2	3	Average

Average velocity:

**Resource 3 for Question 1****Environmental assessment of the upper course of Kallang River**

	-3	-2	-1	0	1	2	3	
Vulnerable to overtopping			B			A		Effective against overtopping
Aesthetically unpleasing		B					A	Aesthetically pleasing
Prevents public access to river	B					A		No limit on public access to river

Adapted from: <https://www.geography-fieldwork.org/a-level/water-carbon/flooding/method/#bi>

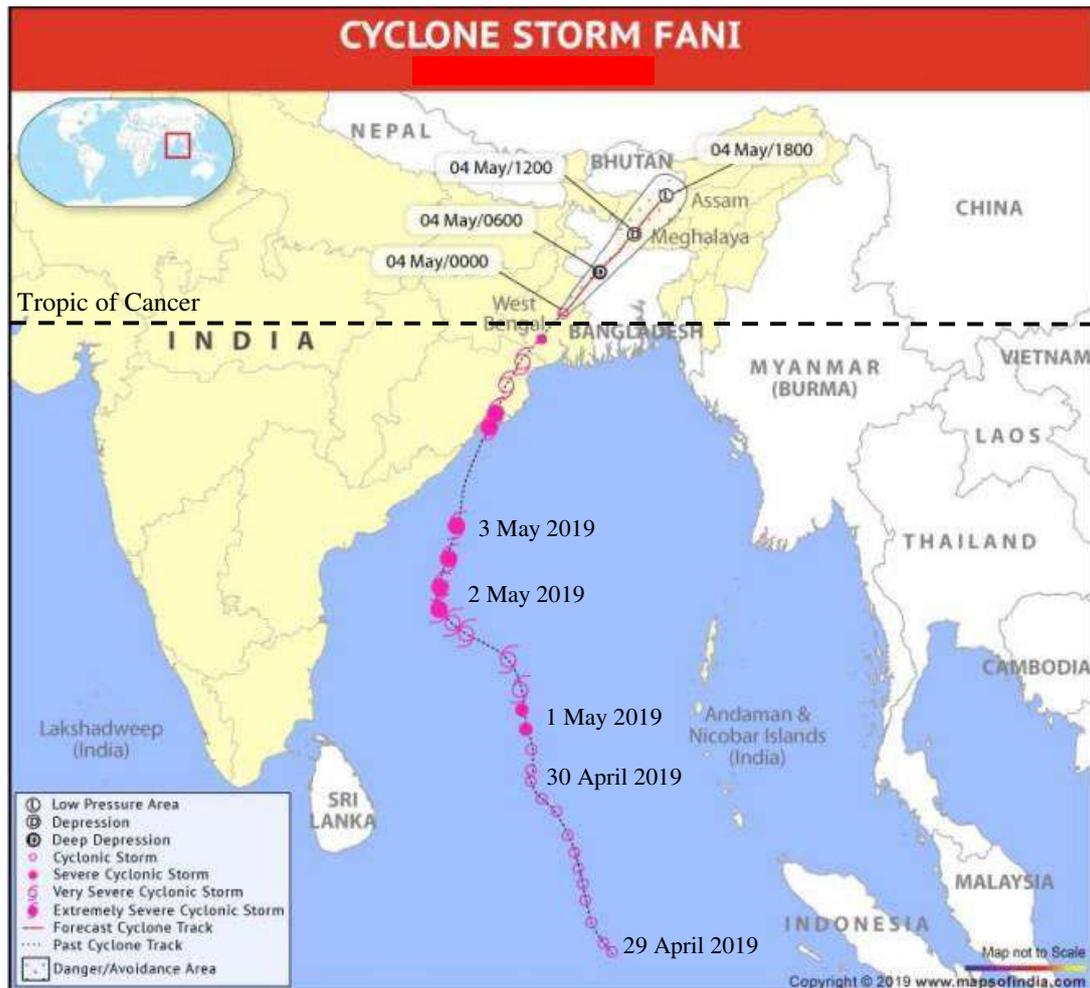
Legend:

A – Current Kallang River

B – Kallang River prior to ABC Waters Programme

## Resource 4 for Question 2

## Development of Cyclone Fani



## Resource 5 for Question 2

## Characteristics of selected major rivers in the world

River	Average Discharge (m <sup>3</sup> /s)	Annual Average Suspended Load (million tonnes/year)	Total Sediment Load (million tonnes/year)	Extent of bank erosion
Amazon	200,000	850	950	High
Brahmaputra	19,830	402	721	Severe
Mekong	14,900	160	165	Moderate
Mississippi	18,400	80	150	High
Yangtze	28,500	480	507	High

**Resource 6 for Question 2****Aerial photograph of Brahmaputra River****Resource 7 for Question 2****News excerpt on a monsoon that hit Assam in July 2019****Monsoon floods kill dozens and displace millions in India**

18 July 2019

Millions have been stranded or displaced as devastating floods continue to ravage large parts of India, Nepal and Bangladesh.

In India, the eastern state of Bihar and the north-eastern state of Assam have been the worst hit.

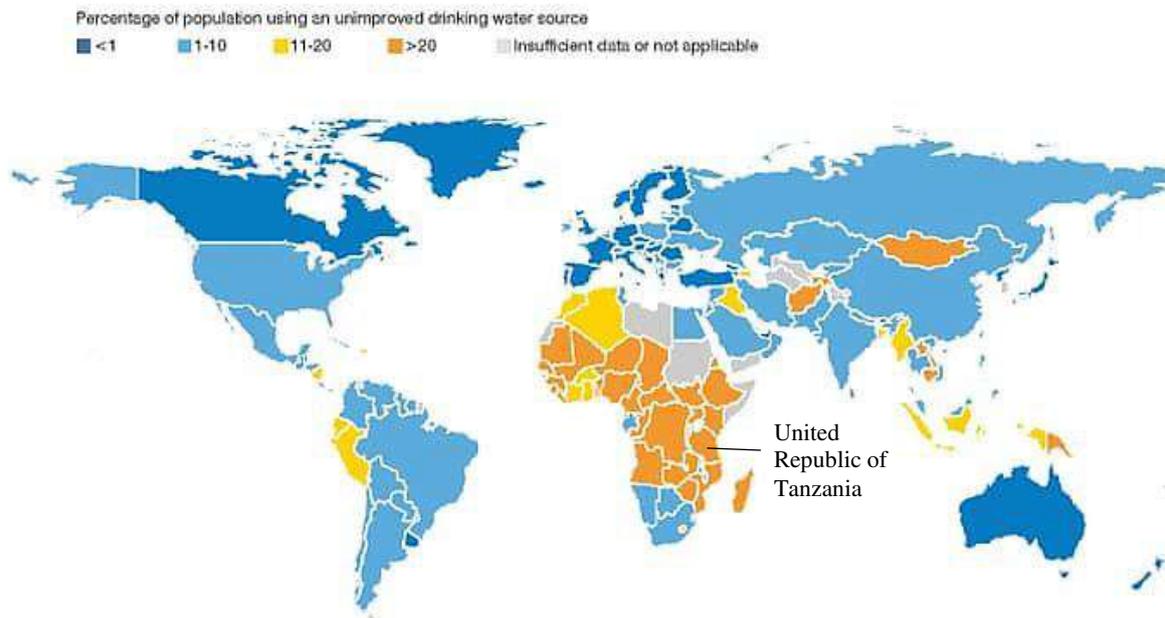
The region was hit by monsoon rains which triggered floods and landslides, submerging homes and transport links.

In Assam, the water level in the Brahmaputra river and its tributaries is showing a "rising trend", officials told Reuters. They added that it is "flowing above the danger mark in at least 10 places".

Residents are waiting for the water to recede in Assam's Barpeta district, which, according to some reports, is the worst hit in the state.

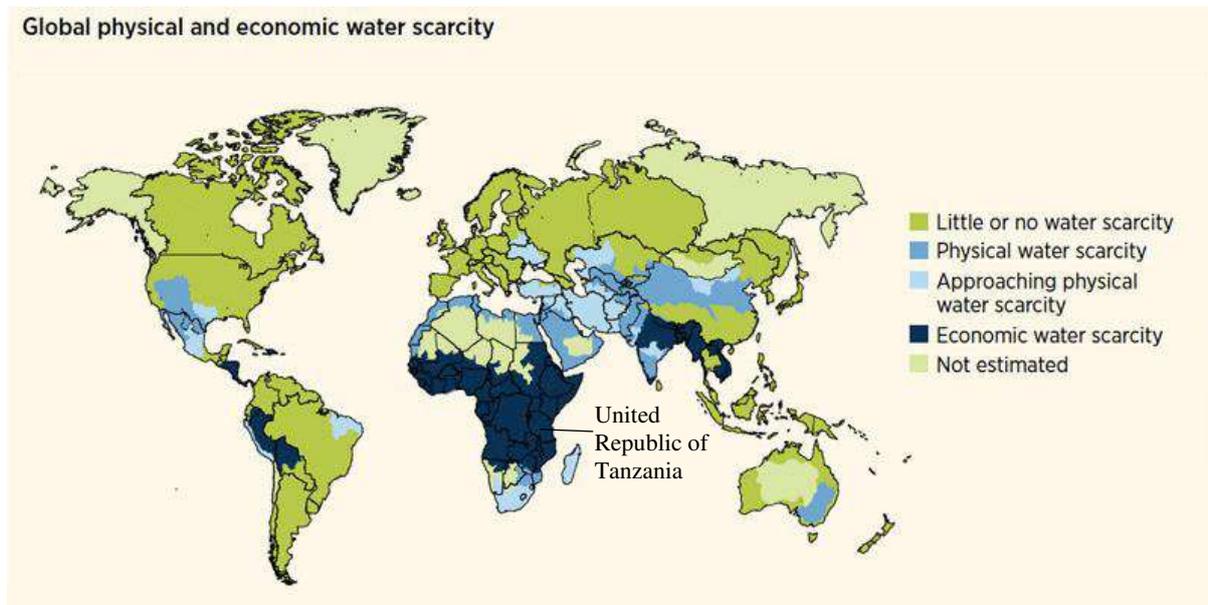
### Resource 8 for Question 3

#### Proportion of population around the world using an unimproved drinking water source in 2012



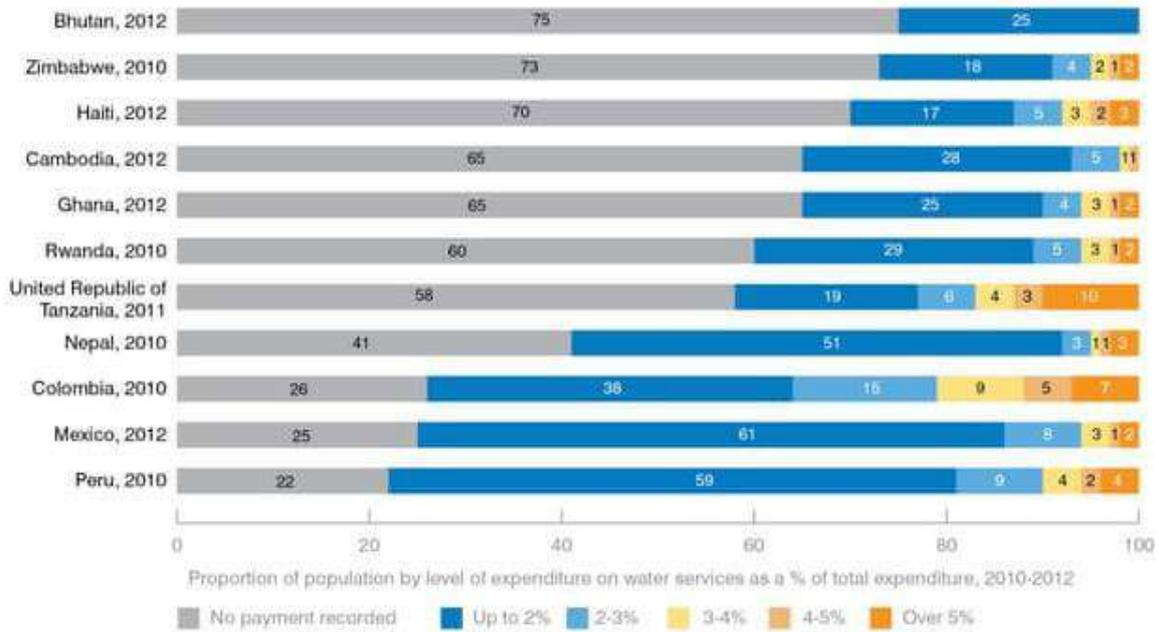
### Resource 9 for Question 3

#### Global physical and economic water scarcity in 2012



## Resource 10 for Question 3

## Proportion of population by level of expenditure on water services as a percentage of total expenditure, 2010-2012



**Resource 11 for Question 3****Online Article on Water Privatisation**

## Water Privatisation: A Worldwide Failure?

2015•02•20 [John Vidal](#) [The Guardian](#)

### **The tide has turned on privatisation**

Research shows that the tide of water privatisation has now turned. Many cities that rushed to sign 20-year or longer concessions with water companies in expectation of clean water at a socially acceptable cost have chosen to terminate agreements and return urban water provision to public control.

A report by the Transnational Institute (TNI), Public Services International Research Unit and the Multinational Observatory suggests that 180 cities and communities in 35 countries, including Buenos Aires, Johannesburg, Paris, Accra, Berlin, La Paz, Maputo and Kuala Lumpur, have all “re-municipalised” their water systems in the past decade. More than 100 of the “returnees” were in the US and France, 14 in Africa and 12 in Latin America. Those in developing countries tended to be bigger cities than those in richer countries.

“Direct experience with common problems of private water management — from lack of infrastructure investments, to tariff hikes to environmental hazards — has persuaded communities and policymakers that the public sector is better placed to provide quality services to citizens and promote the human right to water,” said the report’s author, Satoko Kishimoto, water coordinator with the Transnational Institute in Brussels.

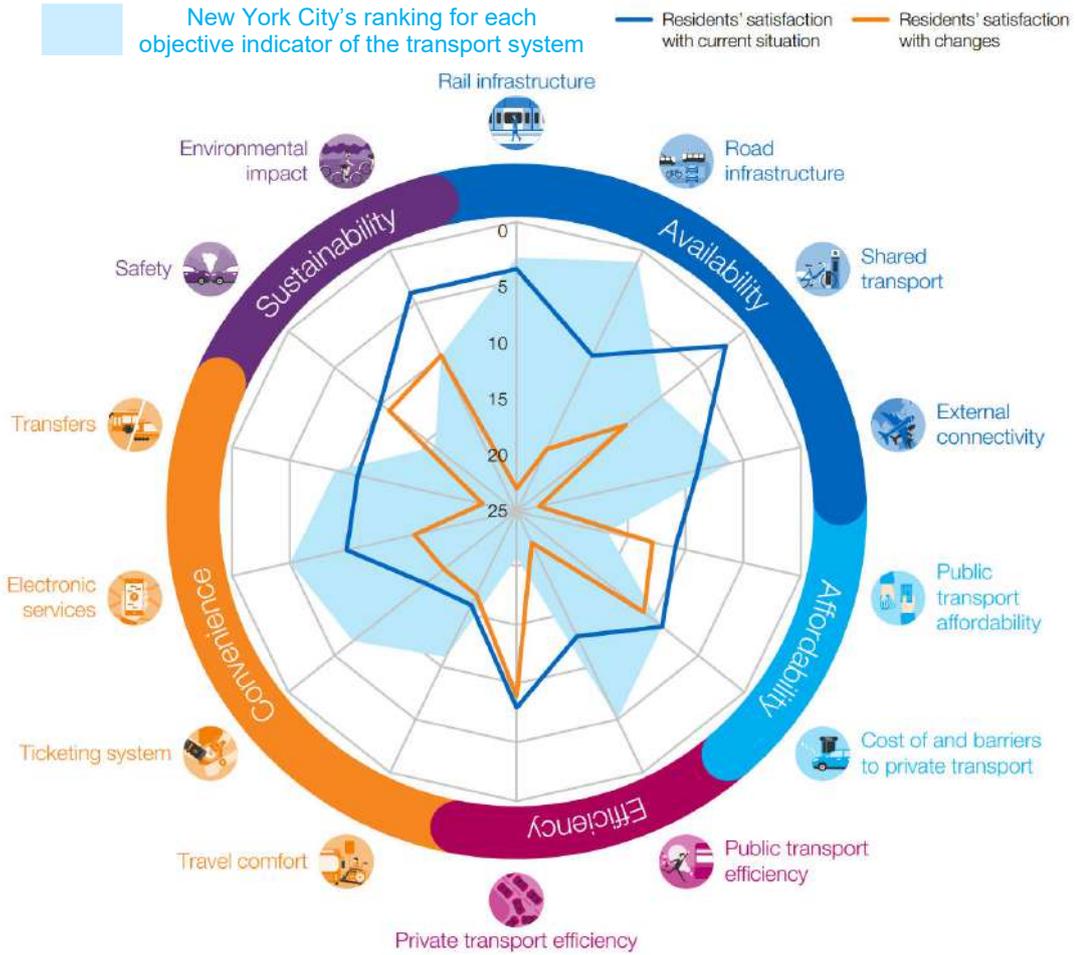
“A growing number of water utilities that have gone through a re-municipalisation process are increasingly ready, along with other institutions, to share experiences and provide practical support. Cooperation between public services is the most efficient way to improve water services and promote the human right to water,” she said.

**Resource 12 for Question 4****Top 10 most congested cities in the world in 2016**

<b>Rank</b>	<b>City</b>	<b>Country</b>	<b>Hours Spent in Congestion</b>	<b>Driving Time in Congestion</b>
#1	Los Angeles	USA	104.1	13%
#2	Moscow	Russia	91.4	25%
#3	New York	USA	89.4	13%
#4	San Francisco	USA	82.6	13%
#5	Bogota	Colombia	79.8	32%
#6	Sao Paulo	Brazil	77.2	21%
#7	London	UK	73.4	13%
#8	Magnitogorsk	Russia	71.1	42%
#9	Atlanta	USA	70.8	10%
#10	Paris	France	65.3	11%

**Resource 13 for Question 4**

**New York City Transport System Profile in 2018**

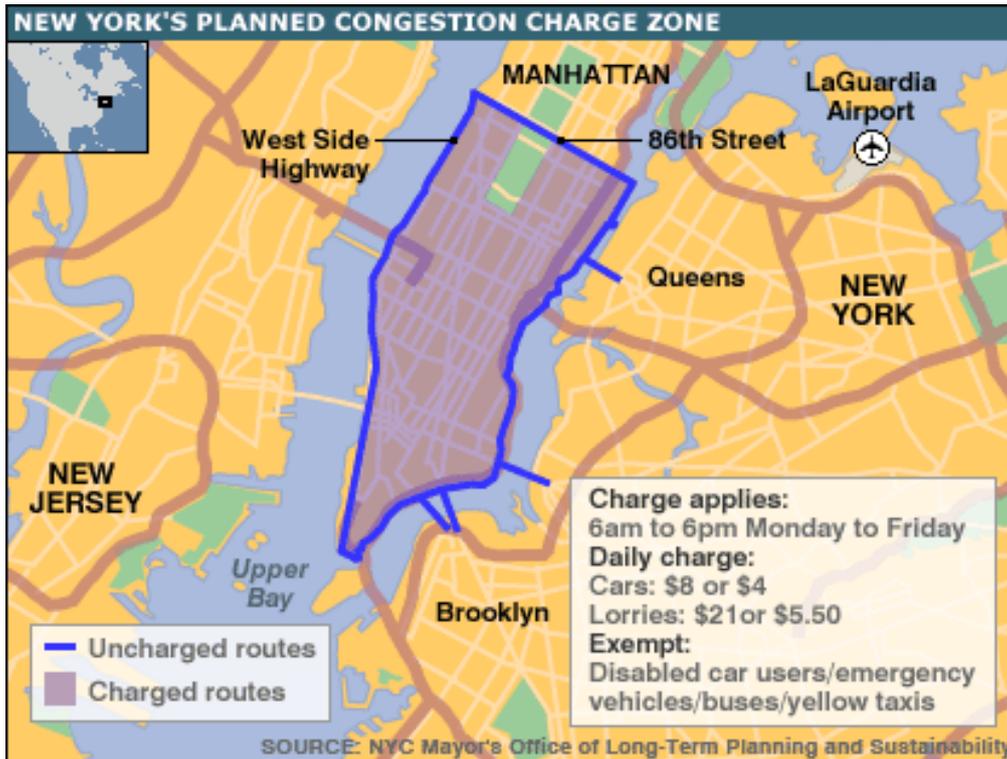


Urban transportation systems in 24 global cities were assessed and ranked in 2018. The results above show New York City's ranking for each objective transport indicator, as well as results from survey on residents' satisfaction with current situation and with changes introduced by urban authorities since 2017.

Dimension	Indicators
Availability	<ul style="list-style-type: none"> <li>• Rail Infrastructure</li> <li>• Road Infrastructure</li> <li>• Shared Transport</li> <li>• External Connectivity</li> </ul>
Affordability	<ul style="list-style-type: none"> <li>• Public Transport Affordability</li> <li>• Cost of and barriers to private transport</li> </ul>
Efficiency	<ul style="list-style-type: none"> <li>• Public Transport Efficiency</li> <li>• Private Transport Efficiency</li> </ul>
Convenience	<ul style="list-style-type: none"> <li>• Travel Comfort</li> <li>• Ticketing System</li> <li>• Electronic Services</li> <li>• Transfers</li> </ul>
Sustainability	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Environmental Impact</li> </ul>

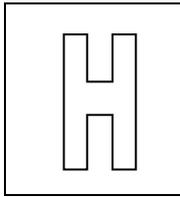
Resource 14 for Question 4

New York City Planned Congestion Charge Zone



Candidate Name: \_\_\_\_\_

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## 2019 Preliminary Exams Pre-University 3

### GEOGRAPHY

Paper 2 Data Response Questions

**9751/02**

**4 September 2019**

**3 hours**

Additional Materials:     Answer Paper  
                                  1 Insert  
                                  World Outline Map

### INSTRUCTIONS TO CANDIDATES

Write your name, admission number and class on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use a soft pencil for any diagrams, graphs, or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Candidates answer **all** questions.

The Insert contains all the Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagram and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

## Section A

### Theme 4: Geographical Investigation

- 1 A group of 10 students from Millennia Institute was given a task to conduct a geographical investigation at the upper course of Kallang River located at Bishan-Ang Mo Kio Park in Singapore. They were tasked to determine how the Active, Beautiful, Clean Waters (ABC Waters) Programme by the Public Utilities Board (PUB) had modified flood risk in the area.

The students went to the field site on a Saturday morning during the June holidays. They decided that the flood risk of a river is associated with river discharge, which can be calculated by multiplying the cross-sectional area of the channel by the velocity of the river flow. As inclement weather started to approach, the students only managed to obtain velocity data for one segment of the river. They had access to the following equipment to aid them in their investigation:

- Ranging poles
- Oranges
- Stopwatch
- Tape measure

An online research was done to obtain data on river discharge for Kallang River prior to the ABC Waters Programme for comparison. Besides measuring river discharge, the group also did an on-site environmental assessment via a bi-polar survey. They also found a photograph of the same section of the river prior to the ABC Waters Programme online to compare the changes done to the locality in managing flood risk.

Resource 1 shows the field site that the group did their investigation in, as well as a photograph they found online of the same segment prior to the ABC Waters Programme. Resource 2 shows the recording sheet the group used to record data at the field site. Resource 3 shows the environmental assessment done by the group.

- (a) Using Resource 1 and the information above, suggest a suitable hypothesis for the group's investigation and state why the investigation is capable of research. [4]
- (b) Explain **two** potential risks that the group might face and suggest relevant precautions that should be taken to minimise these risks. [4]
- (c) With reference to Resources 1, 2 and the information above, describe how the students can collect data on river discharge. [6]
- (d) Represent the data shown in Resource 3 with a suitable form of data representation and explain why it is suitable. [5]
- (e) The group concluded that their investigation may have limited usefulness in ascertaining how flood risk has changed.

Explain how the group can improve their investigation. [6]

**Section B****Theme 1: Tropical Environments****Tropical Environment of Assam, India**

- 2** Assam is a state in north-eastern India. Resource 4 shows the development of Cyclone Fani across India and Bangladesh in 2019. Resource 5 shows characteristics of selected major rivers in the world. Resource 6 shows an aerial photograph of the Brahmaputra River in Assam, India. Resource 7 shows a news excerpt on a monsoon that hit Assam, India in July 2019.
- (a)** With reference to Resource 4, describe the movements and intensity of Cyclone Fani.  
[3]
- (b)** Explain the development of Cyclone Fani as shown in Resource 4.  
[6]
- (c)** Using Resource 5, compare the characteristics of Brahmaputra River with selected major rivers in the world.  
[3]
- (d)** With a well-labelled diagram, describe the characteristics of the Brahmaputra River shown in Resource 6.  
[4]
- (e)** Using Resources 4, 5, 6, 7 and your own knowledge, assess the relative importance of the different physical factors in influencing the channel morphology of the Brahmaputra River.  
[9]

## Theme 2: Development, Economy and Environment

### Water Scarcity and Privatisation

- 3** Resource 8 shows the proportion of population around the world using an unimproved drinking water source (i.e. drinking water that is not protected from contamination) in 2015. Resource 9 shows the global physical and economic water scarcity\* in 2012. Resource 10 shows the proportion of population by level of expenditure on water services as a percentage of total expenditure between 2010 and 2012. Resource 11 shows an online article regarding water privatisation.

\*According to the Food and Agriculture Organisation of the United Nations (FAO), physical water scarcity occurs when there is insufficient water to meet all demands, while economic water scarcity is a result of lack of investment in water or a lack of human capacity to satisfy the demand for water, even in places where water is abundant.

- (a)** With reference to Resource 8, describe the global distribution of population using unimproved drinking water sources.  
[4]
- (b)** Using Resources 8 and 9, suggest reasons for the relationship between percentage of population using unimproved drinking water sources and economic water scarcity.  
[4]
- (c)** Using Resource 10, compare the proportion of population by level of expenditure on water services between Colombia and Mexico.  
[3]
- (d)** Suggest possible reasons for the generally high proportion of population with 'no payment recorded' as shown in Resource 10.  
[5]
- (e)** Using Resources 8, 9, 10, 11 and your own knowledge, recommend if United Republic of Tanzania should privatise its water resources.  
[9]

## Theme 3: Sustainable Development

### New York City Transport System

- 4 Resource 12 shows a list of the top 10 most congested cities in the world in 2016. Resource 13 shows the performance of urban transportation system in New York City ranked against 23 other global cities in 2018. The ranking includes i) results of objective indicators, ii) survey results of residents' satisfaction with current transport situation and iii) survey results of residents' satisfaction with changes in the transport system introduced by urban authorities since 2017. Resource 14 shows New York's planned congestion charge zone.
- (a) Describe the patterns in traffic congestion ranking as shown in Resource 12. [4]
- (b) Using Resource 13, explain the possible causes of traffic congestion in New York City as shown in Resource 12. [5]
- (c) Explain the strengths and limitations of the data shown in Resource 13 as information for urban planners to manage traffic congestion. [7]
- (d) Using Resource 14, explain how the planned congestion charge zone may help New York City achieve sustainable urban development. [5]
- (e) With reference to Resource 13, recommend **two** other strategies that urban authorities in New York City can implement to alleviate the issue of traffic congestion. [4]

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#### Copyright Acknowledgements

Question 1 Resource 1	<a href="https://upload.wikimedia.org/wikipedia/commons/thumb/f/f0/Bishan_Park_vor_und_nach_renaturierung.jpg/800px-Bishan_Park_vor_und_nach_renaturierung.jpg">https://upload.wikimedia.org/wikipedia/commons/thumb/f/f0/Bishan_Park_vor_und_nach_renaturierung.jpg/800px-Bishan_Park_vor_und_nach_renaturierung.jpg</a> (last accessed 23 August 2019)
Question 1 Resource 3	Table adapted from <a href="https://www.geography-fieldwork.org/a-level/water-carbon/flooding/method/#bi">https://www.geography-fieldwork.org/a-level/water-carbon/flooding/method/#bi</a> (last accessed 3 August 2019)
Question 2 Resource 4	<a href="https://www.mapsofindia.com/my-india/india/what-is-cyclone-fani-live-blog#">https://www.mapsofindia.com/my-india/india/what-is-cyclone-fani-live-blog#</a> and <a href="http://www.newindianexpress.com/states/odisha/2019/apr/29/cyclone-fani-odisha-alerts-district-collectors-1970565.html">http://www.newindianexpress.com/states/odisha/2019/apr/29/cyclone-fani-odisha-alerts-district-collectors-1970565.html</a> (last accessed 23 August 2019)
Question 2 Resource 5	a. <a href="https://www.researchgate.net/figure/Large-rivers-in-the-world-in-terms-of-suspended-sediment-load-water-discharge-and_tbl1_229151197">https://www.researchgate.net/figure/Large-rivers-in-the-world-in-terms-of-suspended-sediment-load-water-discharge-and_tbl1_229151197</a> b. <a href="https://www.mdpi.com/2076-3263/8/9/343/html">https://www.mdpi.com/2076-3263/8/9/343/html</a> c. <a href="https://en.prothomalo.com/environment/news/109277/Erosion-rates-of-Brahmaputra-river-on-the-rise">https://en.prothomalo.com/environment/news/109277/Erosion-rates-of-Brahmaputra-river-on-the-rise</a> d. <a href="https://onlinelibrary.wiley.com/doi/abs/10.1002/%28SICI%291099-1085%2819991215%2913%3A17%3C2907%3A%3AAID-HYP906%3E3.0.CO%3B2-E">https://onlinelibrary.wiley.com/doi/abs/10.1002/%28SICI%291099-1085%2819991215%2913%3A17%3C2907%3A%3AAID-HYP906%3E3.0.CO%3B2-E</a> e. <a href="https://www.researchgate.net/publication/288029718_Sediment_loads_estimate_in_the_lower_Mekong_River">https://www.researchgate.net/publication/288029718_Sediment_loads_estimate_in_the_lower_Mekong_River</a> f. <a href="https://acwi.gov/sos/pubs/3rdJFIC/Contents/9E-Knuuti.pdf">https://acwi.gov/sos/pubs/3rdJFIC/Contents/9E-Knuuti.pdf</a> g. <a href="https://www.nature.com/articles/278161a0">https://www.nature.com/articles/278161a0</a> h. <a href="https://www.nature.com/articles/srep12581">https://www.nature.com/articles/srep12581</a> (all last accessed 4 August 2019)
Question 2 Resource 6	<a href="https://www.amusingplanet.com/2016/02/the-stunning-beauty-of-braided-rivers.html">https://www.amusingplanet.com/2016/02/the-stunning-beauty-of-braided-rivers.html</a> (last accessed 4 August 2019)
Question 2 Resource 7	<a href="https://www.bbc.com/news/world-asia-india-49028155">https://www.bbc.com/news/world-asia-india-49028155</a> (last accessed 4 Aug 2019)
Question 3 Resource 8	<a href="https://www.theguardian.com/global-development-professionals-network/2017/mar/17/access-to-drinking-water-world-six-infographics#img-2">https://www.theguardian.com/global-development-professionals-network/2017/mar/17/access-to-drinking-water-world-six-infographics#img-2</a> (last accessed 14 August 2019)
Question 3 Resource 9	<a href="https://www.eoi.es/blogs/lmsd/water-scarcity-the-main-causes/">https://www.eoi.es/blogs/lmsd/water-scarcity-the-main-causes/</a> (last accessed 14 August 2019)
Question 3 Resource 10	<a href="https://www.theguardian.com/global-development-professionals-network/2017/mar/17/access-to-drinking-water-world-six-infographics#img-6">https://www.theguardian.com/global-development-professionals-network/2017/mar/17/access-to-drinking-water-world-six-infographics#img-6</a> (last accessed 14 August 2019)
Question 3 Resource 11	<a href="https://ourworld.unu.edu/en/water-privatisation-a-worldwide-failure">https://ourworld.unu.edu/en/water-privatisation-a-worldwide-failure</a> (last accessed 14 August 2019)
Question 4 Resource 12	<a href="https://www.visualcapitalist.com/congested-cities-world/">https://www.visualcapitalist.com/congested-cities-world/</a> (last accessed 27 August 2019)

- Question 4 Resource 13 [https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Sustainability/Our%20Insights/Elements%20of%20success%20Urban%20transportation%20systems%20of%2024%20global%20cities/Urban-transportation-systems\\_e-versions.ashx](https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Sustainability/Our%20Insights/Elements%20of%20success%20Urban%20transportation%20systems%20of%2024%20global%20cities/Urban-transportation-systems_e-versions.ashx)  
(last accessed 27 August 2019)
- Question 4 Resource 14 <http://news.bbc.co.uk/2/hi/americas/6962970.stm> (last accessed 27 August 2019)



**NATIONAL**  
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**National Junior College  
SH2 Preliminary Exam 2019**

**GEOGRAPHY**  
Paper 1 Structured Essay Questions

**9751/01**

**Higher 2**

**3 hours  
27 August 2019**

**READ THESE INSTRUCTIONS FIRST**

Write your index number and name on the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

**Section A**

Answer one question.

**Section B**

Answer one question.

**Section C**

Answer one question.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your answer scripts securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

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### Section A – Tropical Environments

Answer **one** question from this section.

- 1 (a) Describe and explain how the re-distribution of surplus solar radiation has led to the distinctive characteristics of the tropics. [12]
- (b) Discuss the significance of water in influencing the formation of karst landforms in the humid tropics. [20]
- 2 (a) Compare the characteristics of flash and fluvial flood hydrographs. [12]
- (b) Assess the extent to which flooding is the most disastrous impact of tropical deforestation. [20]

### Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a) Describe and explain the characteristics of extractive industries. [12]
- (b) With reference to examples which you have studied, discuss the extent to which resource scarcity can be managed. [20]
- 4 (a) Explain how different factors may influence society's extraction of value from the environment. [12]
- (b) Evaluate the role of resources in bringing about economic growth and human development to countries with rapidly growing populations. [20]

**Section C – Sustainable Development**

Answer **one** question from this section.

- 5 (a)** Explain how the political and economic challenges in attaining sustainable development vary across developed and developing regions. [12]
- (b)** How far do you agree with the assertion that climate change has had a more significant impact on developing regions than developed regions? [20]
- 6 (a)** Describe how the issues that confront cities in achieving sustainable development vary across developed and developing regions. [12]
- (b)** Discuss the effectiveness of strategies put in place to address the issues outlined in part (a), using examples from countries with rapidly expanding populations. [20]

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**National Junior College  
SH2 Preliminary Exam 2019  
Paper 1**

**SUGGESTED MARKING GUIDE**

*Disclaimer:*

*The Suggested Marking Guide  
should be used with discretion.*

## Notes on Marking

### Indicative Content

Indicative content is provided for all levels mark questions. It provides suggested responses and/or approaches to questions. The suggested responses and/or approaches are neither exhaustive nor should they be treated as model answers.

### Marking of Structured Essay Questions

- (i) All Part (a) structured essay questions will be assessed using the following generic level descriptors:

#### **H2 Generic Level Descriptors for 12m SEQ sub-part (a)\***

<b>Level</b>	<b>Marks</b>	<b>Descriptors</b>
4	10 – 12	Response is consistently analytical and comprises purposeful explanations. Response addresses the question fully using accurate and detailed knowledge. Depth of relevant knowledge and understanding is evident throughout. Response is coherent and use of terminology is accurate throughout.
3	7 – 9	Response is analytical and explanatory rather than descriptive. There is a clear focus on the question. Response demonstrates relevant knowledge and understanding. The response is coherent and the use of terminology is mostly accurate.
2	4 – 6	Response includes analysis and explanation but is generally dominated by description. Response reflects understanding of the question and is generally relevant. Some parts of the response may be unclear. Use of terminology is limited.
1	1 – 3	Response lacks focus on the question. Response is generally fragmentary and lacks a clear structure and organisation. There may be many unsupported, brief or incomplete assertions and/or arguments with some inaccurate use of terminology.
0	0	No creditworthy response.

- (ii) All Part (b) structured essay questions will be assessed using the following generic level descriptors:

**H2 Generic Level Descriptors for 20m SEQ sub-part (b)\***

<b>Level</b>	<b>Marks</b>	<b>Descriptors</b>
5	17 – 20	Response is perceptive, logical and has strong evaluative elements. Evaluation is relevant and comprehensive. Strong evidence of synoptic thinking where knowledge from different topics is synthesised purposefully. Use of detailed and accurate knowledge reflecting depth of understanding of the subject content. The argument or discussion is coherent and well supported by relevant material. Use of terminology is accurate.
4	13 – 16	Response displays a sound evaluative element. There is some evidence of synoptic thinking through synthesising knowledge from different topics. Response is generally focused on the demands of the question and features accurate knowledge, reflecting depth of understanding of the subject content. The argument or discussion is coherent and supported by relevant material. Use of terminology is accurate and appropriate.
3	9 – 12	Response is broadly evaluative rather than descriptive. Response addresses the questions and features accurate knowledge, reflecting some understanding of the subject content. Argument or discussion is mainly coherent and supported by material which is largely relevant. Use of terminology is relevant and mostly accurate.
2	5 – 8	Response is largely descriptive. Response attempts to provide an argument to address the question. The weakest responses in this level may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Some lapses in use of terminology though generally accurate.
1	1 – 4	Response lacks focus on the question and may be largely irrelevant to it. Response is fragmentary and lacks clarity. There may also be unsupported assertions and/or arguments with limited or no use of relevant terminology.
0	0	No creditworthy response.

*\*The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level*

<b>Section A – Tropical Environments</b>		
Answer <b>one</b> question from this section.		
<b>1</b>	<b>(a)</b>	Describe and explain how the re-distribution of surplus solar radiation has led to the distinctive characteristics of the tropics. <span style="float: right;">[12]</span>
		<p><u>Indicative Content:</u></p> <p>Candidates should be able to identify how the re-distribution of surplus solar radiation is brought about by the Hadley Cell, which can then result in distinctive characteristics of the tropics such as the humid conditions in the regions closest to the equator within 20 degrees north and south of the equator, as well as the arid conditions in the regions further away from the equator within 20 to 35 degrees north and south of the equator. Responses should include a brief description of the unevenness of solar radiation across the world, as well as an explanation of how the ascending and descending limbs of the Hadley Cell influence the distinctive climatic conditions in the humid and arid tropics (including the levels and temporal distribution of precipitation and temperature range). They should also be supported with reference to a variety of locations within the tropics, and the climatic characteristics which these locations experience.</p> <p>Better responses usually include the use of a diagram that explains how the re-distribution of solar radiation can lead to distinctive characteristics within the tropics. They should also be able to explain how the re-distributed solar radiation will respond differently to local and regional conditions, which will then have some bearing on the characteristics of the tropics.</p> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a).</i></p>
	<b>(b)</b>	Discuss the significance of water in influencing the formation of karst landforms in the humid tropics. <span style="float: right;">[20]</span>
		<p><u>Indicative Content:</u></p> <p><i>Having discussed the re-distribution of surplus solar radiation and its impact of climatic characteristics, in particular rainfall, across the tropics, candidates will now examine how water, available in abundance in the humid tropics, can influence landscapes.</i></p> <p>Candidates should first be able to explain the multiple roles that water plays in the formation of karst landforms in the humid tropics. These include the chemical weathering – dissolution – of calcium carbonate in karst landscapes (or carbonation), as well as the fluvial erosion of weathered material on not only the surface of these landscapes, but also along the base of these landscapes, giving rise to a variety of karst landforms. Candidates should be able to argue that these processes are</p>

		<p>fundamental to the formation of karst landforms, and given that water is a necessary agent for these processes to occur, it is therefore highly significant. Responses should also include a comparison of water with other factors which influence the formation of karst landforms, such as the nature of rocks, the presence, spacing and density of joints and bedding planes, relief and the rate of tectonic uplift, as well as a comparison across different karst landforms (tower, cone and isolated karst). They should also be supported with reference to evidence from a variety of locations within which karst landforms are found - all of which should be within the humid tropics.</p> <p>Higher level responses should include a discussion of the interplay across the various factors which can influence the formation of karst landforms. They could also include diagrams which are used purposefully to explain how karst landforms are formed in the humid tropics.</p> <p>Possible synoptic links include tropical climates (Theme 1.1), rock characteristics (Theme 1.1) as well as weathering and erosional processes (Theme 1.1).</p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b).</i></p>	
<b>2</b>	<b>(a)</b>	<p>Compare the characteristics of flash and fluvial flood hydrographs.</p> <p><u>Indicative Content:</u> Candidates should be able to come up with points of comparison between flash and fluvial flood hydrographs. These include lag time, peak discharge and the recession limbs of the hydrographs. Responses should also include a brief explanation of these characteristics in relation to the conditions and processes which give rise to them. Flash flood hydrographs are generally found in areas where land surfaces are less permeable, such as urbanised areas or arid regions, hence influencing the way in which water reaches the channels (more likely to be due to surface runoff as opposed to subsurface flows). Fluvial flood hydrographs are usually found in areas where land surfaces are generally more permeable, which results in the dominance of subsurface flows as compared to surface runoff in contributing to channel discharge. Responses could be backed up with reference to located examples.</p> <p>Better responses will include the use of diagrams to illustrate the differences in the characteristics of flash and fluvial hydrographs. They should also be able to point to the difficulty of distinguishing between flash and fluvial flood hydrographs, given that there are no clear markers of distinction between these two types of hydrographs.</p> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a).</i></p>	[12]

	<p><b>(b)</b> Assess the extent to which flooding is the most disastrous impact of tropical deforestation.</p>	[20]
	<p><u>Indicative Content:</u>  <i>Having examined the characteristics of flash and fluvial flood hydrographs, candidates should now be able to discuss whether floods are indeed the most significant consequence of tropical deforestation, or whether there are other more disastrous effects.</i></p> <p>Candidates should be able to explain how flooding can be brought about by tropical deforestation. This will entail a discussion of soil erosion and sedimentation as well as landslides, and how these can possibly affect channel characteristics - and more specifically a channel's bankfull discharge. Candidates should then be able to explain the other effects of tropical deforestation, including the disruption of ecosystems and biogeochemical cycles, the loss of biodiversity, as well as the release of stored carbon. Candidates should be able to compare these with flooding to determine the extent to which the impacts are disastrous. Responses should be supported with a variety of case studies.</p> <p>Higher level responses should include the use of a well-delineated set of criteria which can be used to evaluate the extent to which the consequences are disastrous, such as the scale of impact, the temporal extent of the consequences and the volume of economic losses incurred.</p> <p>Possible synoptic links include both hydrological and fluvial processes (Theme 1.1) as well as climate change, especially in terms of how deforestation affects the global carbon cycle (Theme 3.1).</p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b).</i></p>	

**Section B – Development, Economy and Environment**

Answer **one** question from this section.

<b>3</b>	<b>(a)</b>	Describe and explain the characteristics of extractive industries.	[12]
		<p><u>Indicative Content:</u> Candidates should be able to define what extractive industries constitute before describing and explaining their characteristics with reference to case studies from energy minerals (oil), metallic minerals (tin ore) and non-metallic minerals (diamonds). These characteristics include the fixed amounts in which the natural resources in these extractive industries exist, the locational specificity of these industries, their capital and often, technologically, intensive nature, the volatility of demand for the resources from these industries, as well as the centrality of state involvement.</p> <p>Better responses will include a discussion of how these characteristics might vary across different extractive industries, with some industries being more technologically intensive than others, and others with varying degrees of state involvement.</p> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a).</i></p>	
	<b>(b)</b>	With reference to examples which you have studied, discuss the extent to which resource scarcity can be managed.	[20]
		<p><u>Indicative Content:</u> <i>Having described the characteristics of extractive industries, candidates should now be able to discuss how resource scarcity can or cannot be managed.</i></p> <p>Candidates should be able to define what resource scarcity constitutes, before explaining how it can be managed. One of the resources explored at length in the syllabus is that of water, so candidates are expected to make reference to case studies regarding water resource management. Responses are therefore expected to include an evaluation of the various strategies put in place to manage the scarcity of water resources, including privatisation of water, desalination and conservation, as well as strategies addressing water scarcity issues in urban areas such as poor pro-poor policies for safe water supply and sanitation, and integrated urban water management and governance. Other possible strategies to be discussed include actions taken to enhance agricultural productivity and sustainability such as increasing efficiency of water use in farming, increasing crop productivity and limiting agricultural water pollution, as well as actions taken to increase industrial and energy efficiency such as the combination of power and desalination plants and the retrofitting of facilities and plants to increase water efficiency. Responses should be backed up with</p>	

		<p>reference to detailed case studies such as Singapore, Israel and Mexico.</p> <p>Higher level responses should include the use of an appropriate and well-defined set of criteria which can be used to assess the extent to which the resource scarcity can be managed, such as the consequences which these resource management strategies could possibly lead to, their economic costs and the extent to which these regions experiencing issues of water scarcity can support, the extent to which the strategies target the causes of water scarcity as well as the temporal extent of the strategies.</p> <p>Possible synoptic links include sustainable urban development (Theme 3.2).</p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b).</i></p>	
4	(a)	<p>Explain how different factors may influence society's extraction of value from the environment.</p>	[12]
		<p><u>Indicative Content:</u> Candidates should be able to explain the various factors which may affect the way in which the appraisal of resources can occur. These include socio-economic factors such as income and education levels, cultural factors such as value systems and traditions, technological factors such as knowledge and technical expertise and political factors such as the influence of international organisations on the value of resources and national policies. Responses should be supported with evidence from various examples including anthropocentric and ecocentric attitudes towards the environment, the desalination of saltwater to increase the supply of water for consumption, as well as the manipulation of oil prices by the Organization of Petroleum Exporting Countries (OPEC).</p> <p>Better responses will demonstrate an understanding of resource appraisal as a multi-dimensional issue which is affected by the interplay of multiple factors. A case in point would be the financial capability of a country and its impact on the level of technological infrastructure and expertise within the country, therefore influencing society's extraction of value from the environment.</p> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a).</i></p>	
	(b)	<p>Evaluate the role of resources in bringing about economic growth and human development to countries with rapidly growing populations.</p>	[20]
		<p><u>Indicative Content:</u> <i>Having explained how the value of resources in society are influenced by a myriad of factors, candidates should now be able to discuss how resources can influence economic growth and human development in</i></p>	

*countries with rapidly burgeoning populations.*

Candidates should be able to explain how resources bring about economic growth to countries with fast-growing populations by generating revenue and employment for the people living in these countries. They should also be able to explain how these can lead to human development including higher life expectancies, higher levels and better quality of education as well as increased standards of living. Candidates should then be able to point out that while resources can be positive for society, the enclave tendencies of some of these resource industries – in particular the mineral resources – as well as their volatile nature, might possibly have impeded economic growth and human development in these countries. This might sometimes be referred to as the resource curse thesis. The role of resources should then be compared with other factors which can also bring about economic growth and human development, often by influencing the locational decisions of transnational corporations (TNCs), such as labour characteristics, state policies, regulations by international organisations and the actions of non-state actors. These factors should be discussed in relation to examples of TNCs as well as a multitude of initiatives undertaken by various states, international organisations and non-state actors.

Higher level responses should include an evaluation of the interplay across different factors in bringing about economic growth and human development to countries with rapidly growing populations. This would require a contextualization of these factors and how they might be relevant to countries which require rapid economic growth to meet the needs of their rapidly increasing populations. The complexity across the different factors which can bring about economic growth and human development would be clearly elucidated here.

Possible synoptic links include the notion of human development, the global production network and its constituents, as well as the actors which govern the global economy (Theme 2.1).

*Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b).*

<b>Section C – Sustainable Development</b>		
Answer <b>one</b> question from this section.		
<b>5</b>	<b>(a)</b>	Explain how the political and economic challenges in attaining sustainable development vary across developed and developing regions. <span style="float: right;">[12]</span>
		<p><u>Indicative Content:</u></p> <p>Candidates should be able to differentiate across the political and economic challenges which developed and developing regions face. These challenges include the need to promote renewable and alternative sources of energy in a bid to reduce carbon footprints for developed countries, the effects of structural adjustment programmes (SAPs) on existing and future loans for developing regions, as well as the need for new or additional financial resources to implement sustainable development programmes. Candidates should be able to explain how these challenges are different across developed and developing regions. Responses should also be supported by a variety of examples from different countries.</p> <p>Better responses will include a synthesis of the various challenges that developed and developing countries face, including similarities such as the need to balance energy needs with economic costs and pollution, and differences such as the management of water in urban areas. This would have allowed for a more holistic explanation of the challenges faced in developed and developing regions, such as the conflicting interests of development faced by developing regions.</p> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a).</i></p>
	<b>(b)</b>	How far do you agree with the assertion that climate change has had a more significant impact on developing regions than developed regions? <span style="float: right;">[20]</span>
		<p><u>Indicative Content:</u></p> <p><i>Having explained the political and economic challenges which developed and developing regions face in attaining sustainable development, candidates should now be able to discuss how climate change has affected developing regions more adversely than developed regions.</i></p> <p>Candidates should be able to explain how the effects of climate change are varied across the world due to the differences in the extent of exposure to the effects that each region has, as well as the extent of vulnerability caused by variations in the levels of development and technological expertise, and degree of preparedness. Responses should include a discussion of the different effects of climate change such as rising sea levels and its impact on agriculture and food security, as well as the spread of infectious diseases and heat-related mortality, and how these</p>

		<p>compare across developed and developing regions. There should also be an understanding of how the challenges which developed and developing countries face influence their ability to adapt to and mitigate the impacts of climate change. Responses should also supported by a variety of case studies.</p> <p>Higher level responses should include the use of a set of well-developed criteria to evaluate the impact of climate change including the scale of the effects, for example in the relative economic dependence of the region on climate-influenced industries, the temporal extent of these consequences, the nature of governance across the countries as well as the extent to which the needs of the populations in these countries can be addressed.</p> <p>Possible synoptic links include the impact of climate change on atmospheric, hydrological and fluvial processes (Theme 1.1), the formation of tropical cyclones and floods (Theme 1.2), and the nature of economic governance across countries at different levels of development (Theme 2).</p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b).</i></p>	
6	(a)	Describe how the issues that confront cities in achieving sustainable development vary across developed and developing regions.	[12]
		<p><u>Indicative Content:</u></p> <p>Candidates should be able to differentiate the issues which cities across developed and developing regions are confronted with in their pursuit of sustainable development. These issues can include waste generation and management, the provision of affordable housing for all urban dwellers, as well as ensuring mobility for them. They impede the ability of cities in achieving sustainable development when the needs of all stakeholders in the city are not met, and when the environment is damaged beyond its regenerative capacity. Candidates should be able to compare how the same issues are similar / different between developed and developing countries. Responses should be well-supported by evidence regarding transport congestion, housing conditions and non-hazardous solid waste generation.</p> <p>Better responses will demonstrate an integrated understanding of the issues. These include the use of a set of criteria to distinguish them, such as the extent of severity of the issues, the causes of these issues, the role which governments play in bringing about these issues, as well as the extent of economic costs incurred.</p> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a).</i></p>	

	<p><b>(b)</b> Discuss the effectiveness of strategies put in place to address the issues outlined in part (a), using examples from countries with rapidly expanding populations.</p>	[20]
	<p><u>Indicative Content:</u>  <i>Having described the differences in the issues challenging sustainable urban development between developed and developing regions, as outlined in part (a), candidates should now be able to discuss the strategies which have been put in place to address these issues.</i></p> <p>Candidates should be able to identify and explain the myriad of strategies which could be implemented to address the issues encountered in locations with rapidly growing populations. These the provision of more and better quality roads as well as the implementation of traffic regulations to counter congestion, the eviction of existing urban slums, the allocation of sites for housing to be constructed and the provision of basic construction materials for urban dwellers to be engaged in the construction process, the implementation of proper solid waste disposal systems, all of which are specific to countries with rapidly growing populations. Candidates should be able to compare these strategies with one another, and comment on their effectiveness, with reference to evidence from a variety of case studies.</p> <p>Higher level responses could possibly include the development of a set of criteria which can be used to evaluate the effectiveness of these strategies, such as the extent to which the strategies address the root causes of these issues, the extent of the different dimensions and severity of the consequences brought about by these strategies, the extent to which states are able to implement the strategies as well as the cooperation of various stakeholders. Attempts to synthesise across the strategies should also be present such as the need for the efficient use of government funds across all strategies.</p> <p>Possible synoptic links include a consideration of the impact which rapidly increasing population growth rates have on the environment (Theme 2.2) as well as environmental impacts including those on hydrological and fluvial processes (Theme 1.1).</p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b).</i></p>	



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SH2 Preliminary Exam 2019**

**GEOGRAPHY**  
Paper 2

**9751/02**

**INSERT**

**3 hours  
18 September 2019**

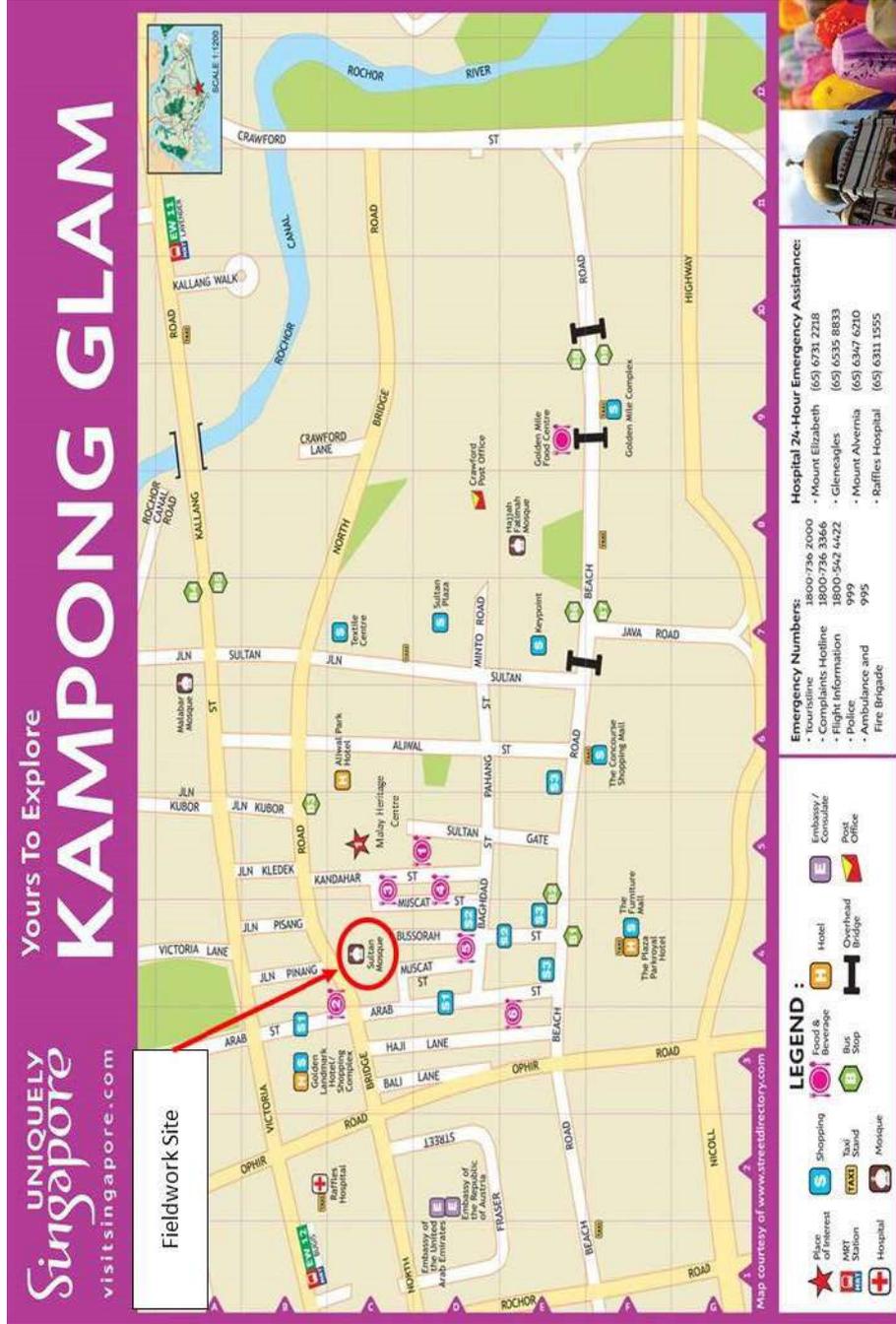
**READ THESE INSTRUCTIONS FIRST**

The insert contains all the Resources referred to in the questions.

This document consists of **15** printed pages and **1** blank page.

Resource 1 for Question 1

Map of Kampong Glam Area



Source: [https://www.streetdirectory.com/pdf/map-pdf/kampong\(eg\).pdf](https://www.streetdirectory.com/pdf/map-pdf/kampong(eg).pdf)

## Resource 2 for Question 1

## Data collected by the students from their questionnaire

Number of Respondents: 70

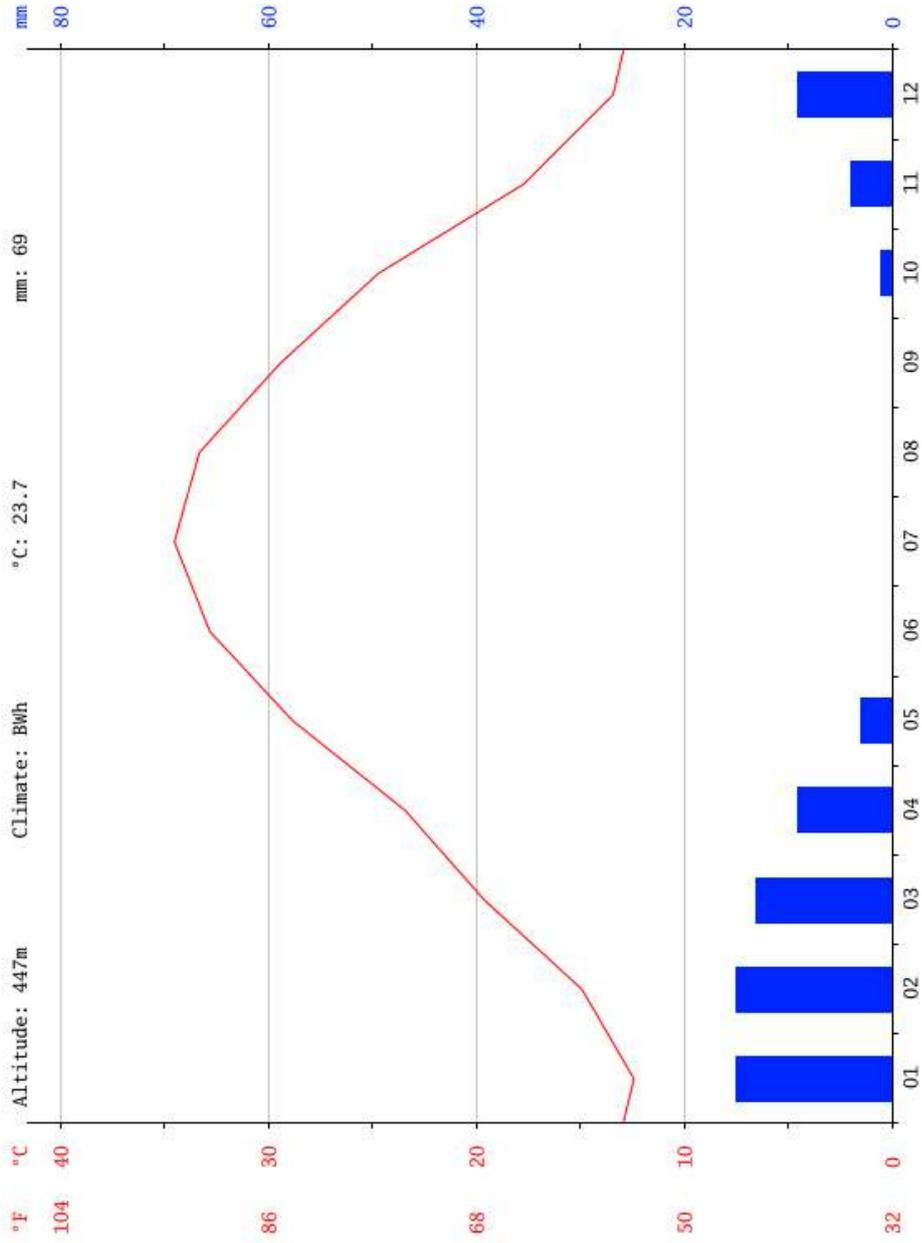
Local Tourist	12
International Tourist	54
Local Resident (lives in the area)	4

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) Kampong Glam caters well to different groups of people.	16	50	1	3	0
b) Kampong Glam has a good mix of businesses.	12	37	3	14	4
c) Kampong Glam is very lively with a lot of activity.	13	24	8	23	2
d) The infrastructure in Kampong Glam is well maintained.	19	48	0	3	0
e) Kampong Glam is catered to tourists more than it is catered to residents.	10	8	34	13	5
f) Overall, Kampong Glam meets my needs.	18	33	9	8	2

Source: Original

Resource 3 for Question 2

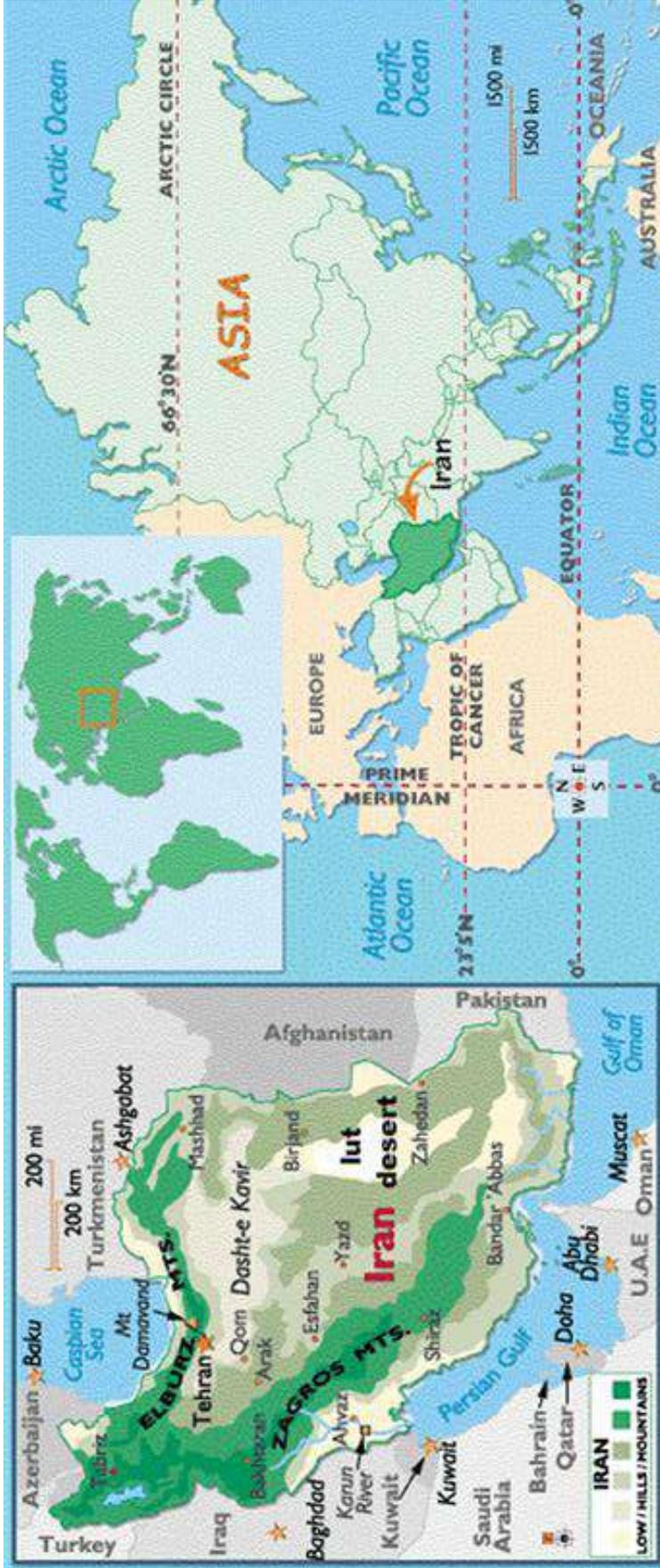
Climograph of Shahdad, Iran



Source: <https://en.climate-data.org/asia/iran/kerman/shahdad-50658/#climate-graph>

Resource 4 for Question 2

Location of the Lut Desert



Source: [https://file.scirp.org/Html/1-1210210\\_46677.htm](https://file.scirp.org/Html/1-1210210_46677.htm)

**Resource 5 for Question 2**

**Landform found in the Lut Desert**



**Source:** <https://www.pinterest.com/pin/408912841136117762/>

**Resource 6 for Question 2**  
**Rock in the Lut Desert**



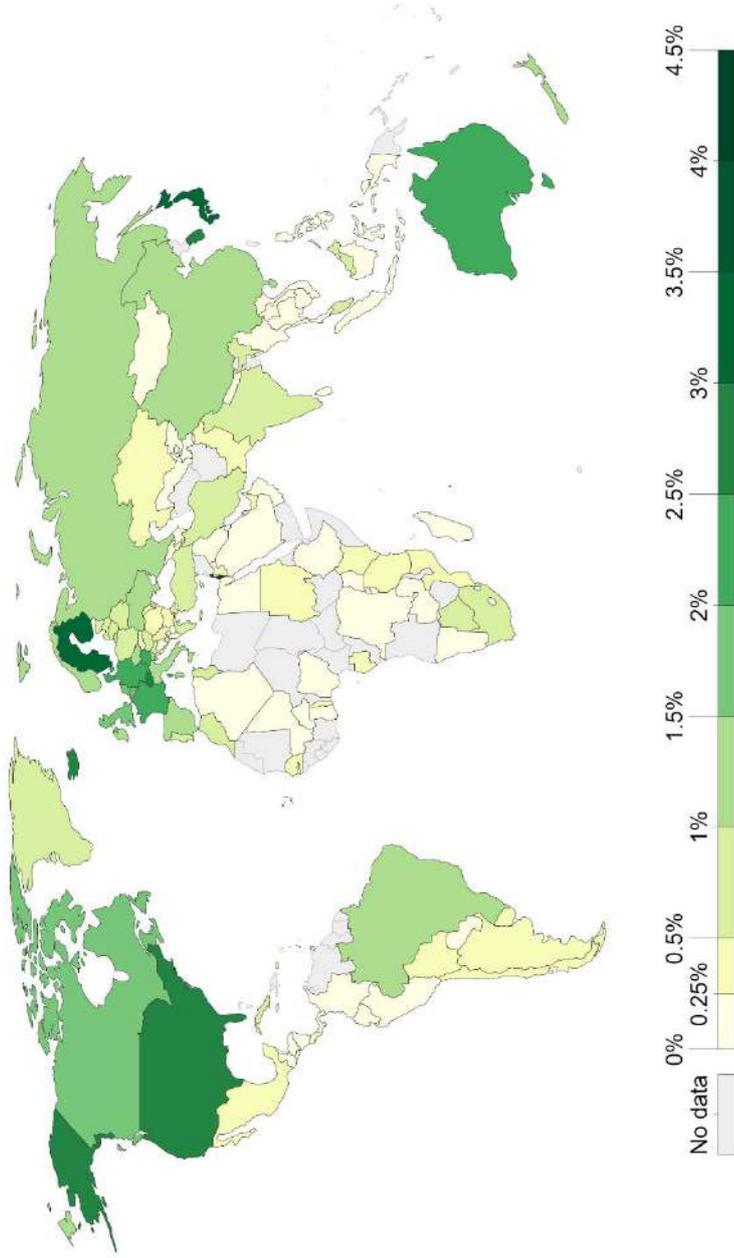
**Source:** <https://www.pinterest.com/pin/408912841136117762/>

Resource 7A for Question 3

Research and Development (R&D) expenditure (as % of GDP) across the world in 2005 and 2015

Spending on research and development as share of GDP, 2005

Expenditures for research and development are current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development.



Source: <https://ourworldindata.org/grapher/research-and-development-expenditure-of-gdp>

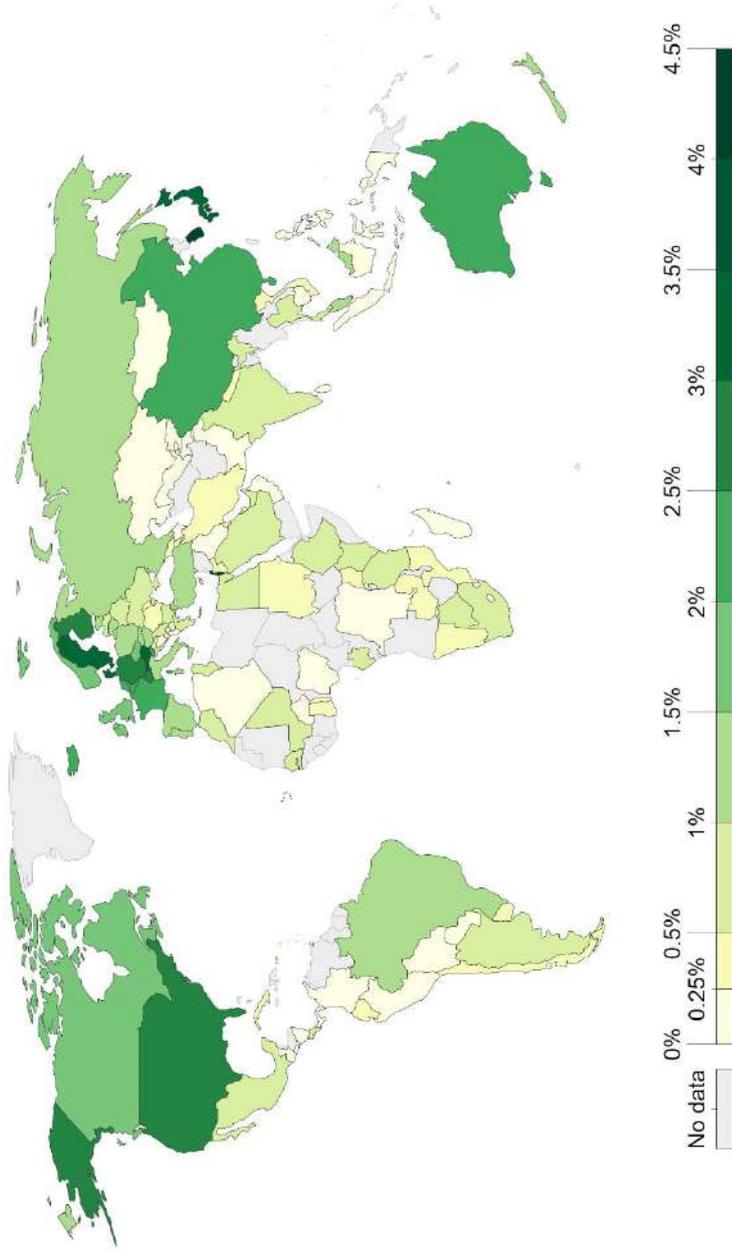
### Resource 7B for Question 3

#### Research and Development (R&D) expenditure (as % of GDP) across the world in 2005 and 2015

##### Spending on research and development as share of GDP, 2015

Expenditures for research and development are current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development.

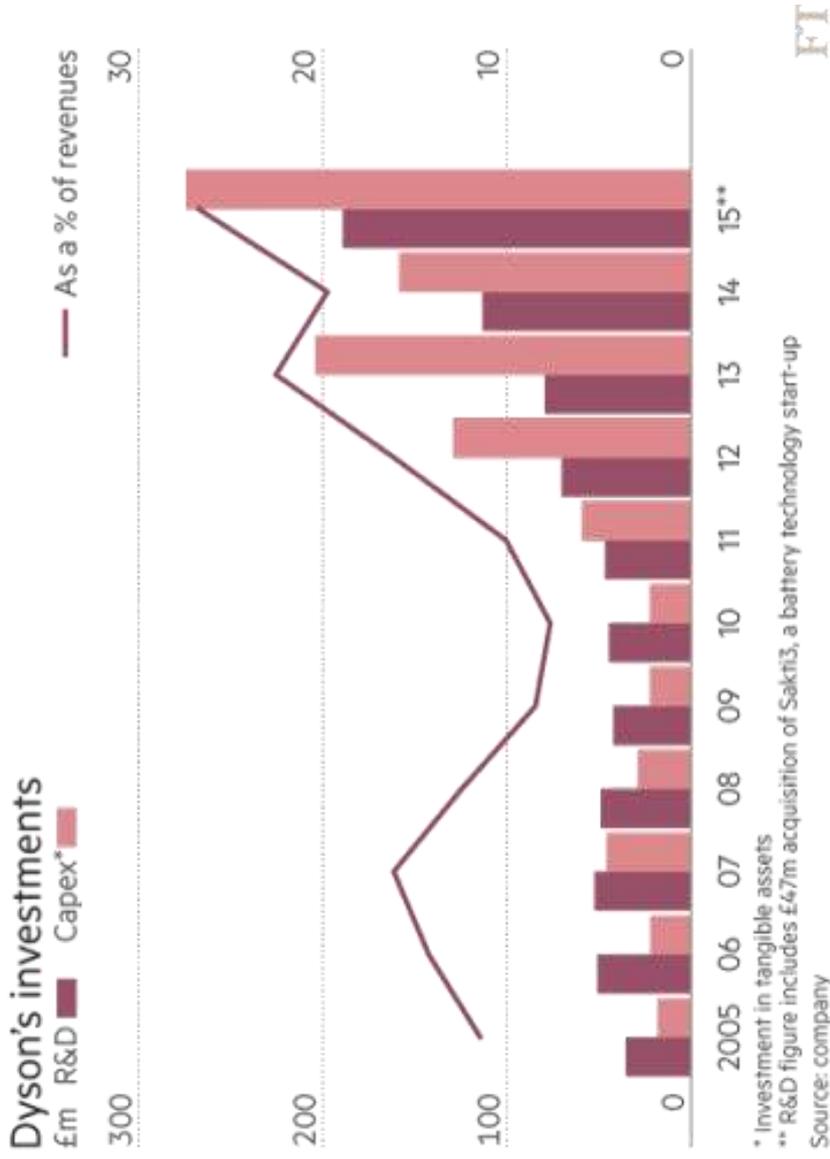
Our World  
in Data



Source: <https://ourworldindata.org/grapher/research-and-development-expenditure-of-gdp>

Resource 8 for Question 3

Dyson's investment in R&D and Capex (capital expenditure)



\*Capex = Capital Expenditure (funds used by a company to acquire, upgrade, and maintain physical or fixed assets such as property, buildings, industrial plants, or equipment.)

Source: <https://www.ft.com/content/2041b5b2-ec75-11e6-ba01-119a44939bb6>

**Resource 9 for Question 3****Extract on the relocation of Dyson's corporate headquarters to Singapore****British manufacturer Dyson to relocate corporate headquarters to Singapore**

SINGAPORE - British home appliance manufacturer Dyson will transfer its head office's registration to Singapore, a decision that comes just months after it announced that it will set up its first electric car plant here. This means Dyson - famed for its bagless vacuum cleaners and bladeless fans - will become a Singapore-based business and primarily be regulated by the law here.

[...] Jim Rowan, Dyson's chief executive stressed that the move to relocate to Singapore was an "evolutionary decision" due to the changing landscape. Dyson's "centre of gravity" has been shifting towards Asia, which in 2017 generated almost 75 per cent of its revenue growth. [...] He also said Singapore's corporate tax rate of 17 per cent - lower than Britain's - was also one reason for the relocation.

The firm already employs 1,100 people here and plans to double the size of its research and operations (R&D). Its Singapore Technology Centre at Science Park One will double in size as well. Its global R&D team grew to 5,853 engineers and scientists in 2018, with investments deepening in areas including energy storage and robotics. [...]

Dyson has also announced that its profits in 2018 broke £1 billion for the first time, growing 33 per cent to £1.1 billion (\$1.9 billion) from 2017. This came as investments in advanced manufacturing and research reached a new high, while revenue growth continued, in part on the back of new products such as its new hairdryer and air purification technology. [...]

The company has about 430 people working in the electric-car manufacturing facility, and expects this to grow as well. Its Singapore manufacturing facility is part of Dyson's £2 billion move into automobiles. Singapore expertise in advanced manufacturing was among the factors that made it an "ideal location" to manufacture the Dyson car, said the company, adding: "An increasing majority of Dyson's customers... are now in Asia. This shift has been occurring for some time and will quicken as Dyson brings its electric vehicle to market."

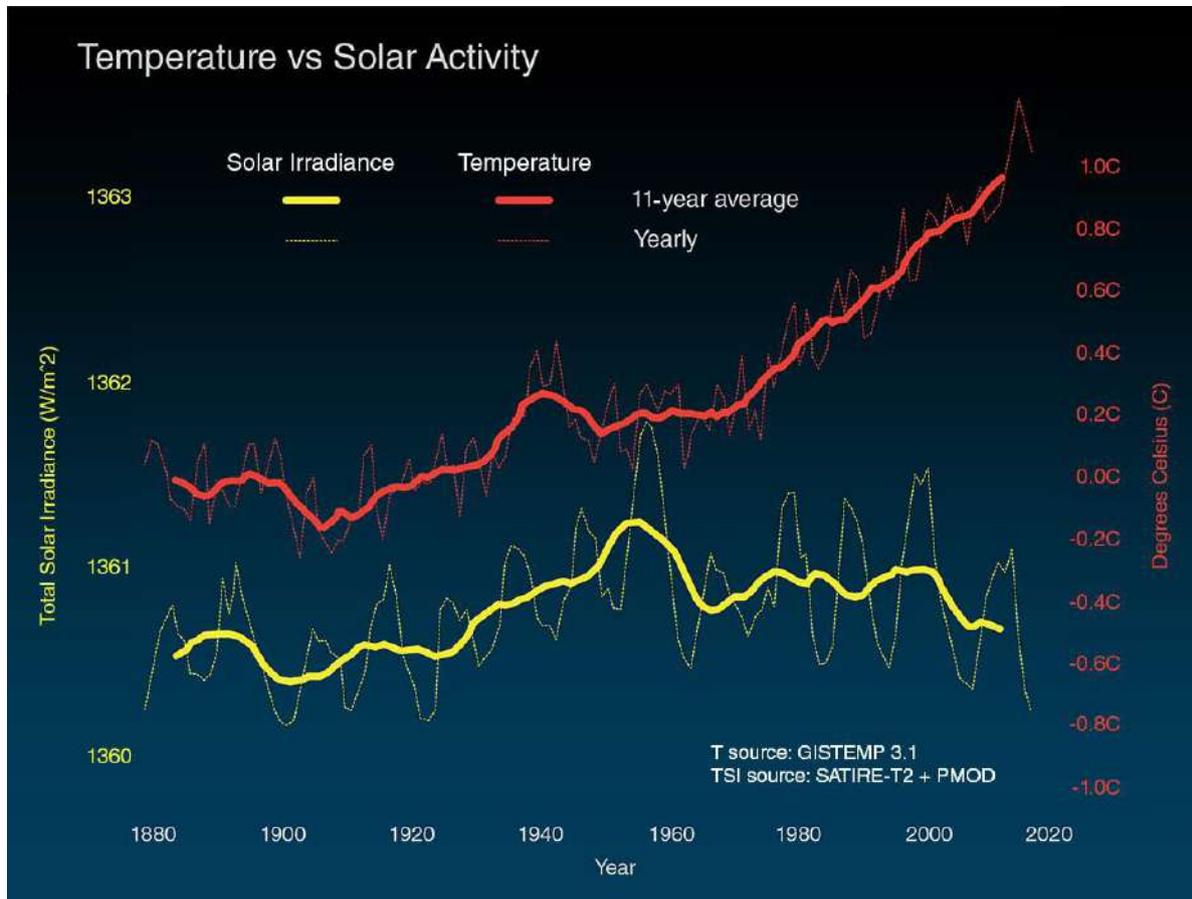
The company ceased British production of domestic appliances in 2003. It has facilities in Malaysia and the Philippines as well. Dyson continued its £31 million investment in higher education in Britain, where its core creative and engineering parts will remain.

Asked about the relocation, the Economic Development Board of Singapore's assistant managing director Kiren Kumar said: "Over the past decade, Singapore's manufacturing sector has been steadily transforming into one that competes based on the deep skills of our workforce, the use of advanced technologies such as robotics and automation, and a strong ecosystem of suppliers locally and in the region." [...]

**Source:** <https://www.straitstimes.com/business/companies-markets/british-manufacturer-dyson-to-relocate-corporate-headquarters-to>

## Resource 10 for Question 4

## Relationship between global temperature and solar activity since 1880

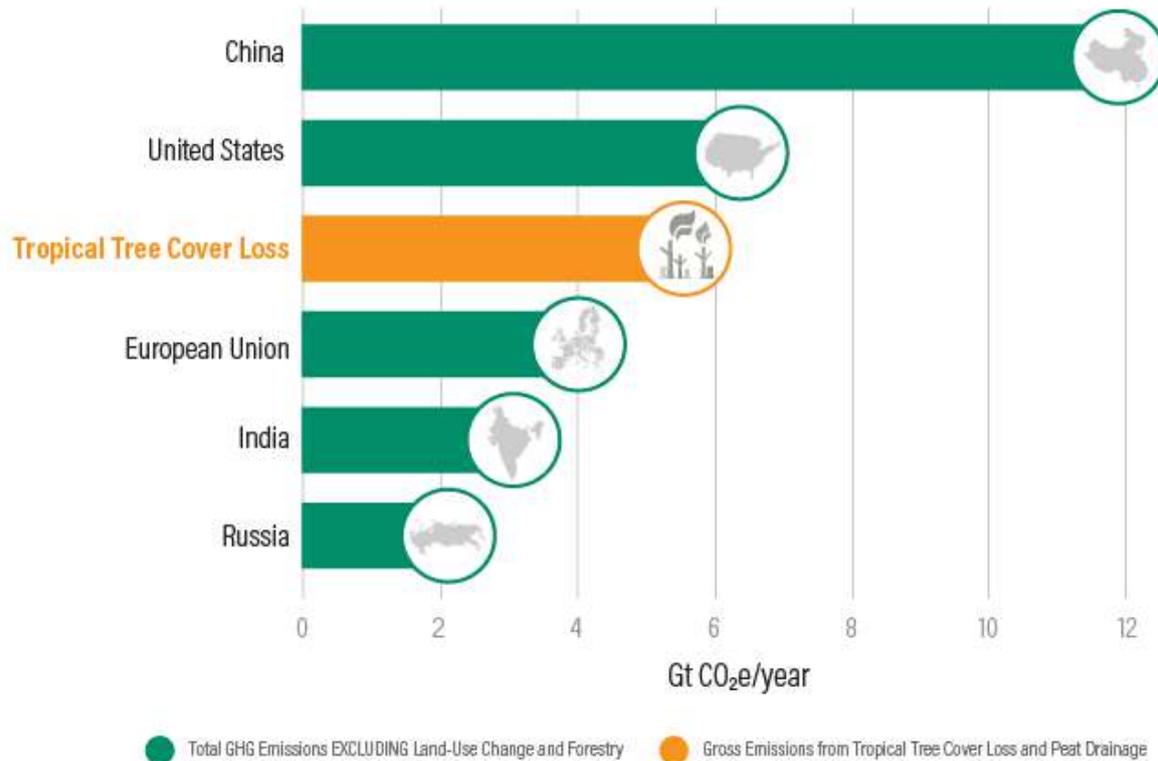


Source: [https://climate.nasa.gov/internal\\_resources/1802/](https://climate.nasa.gov/internal_resources/1802/)

## Resource 11 for Question 4

Comparison of global tropical deforestation and its CO<sub>2</sub>e emissions with the top 5 CO<sub>2</sub>e emitting countries

If Tropical Deforestation were a Country, it Would Rank Third in CO<sub>2</sub>e Emissions



Source: Seymour & Busch, 2016.



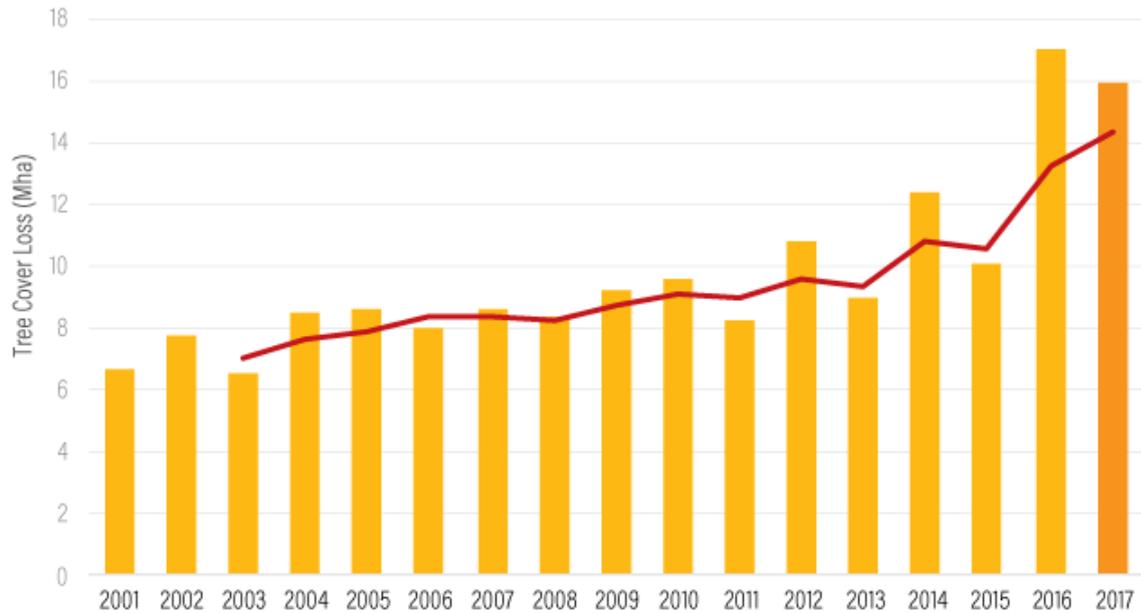
WORLD RESOURCES INSTITUTE

Source: <https://www.weforum.org/agenda/2018/11/chart-of-the-day-what-if-deforestation-were-a-country/>

## Resource 12 for Question 4

## Global tropical tree cover loss from 2001 to 2017

## Tropical Tree Cover Loss



— Three-year moving average. The three-year moving average may represent a more accurate picture of the data trends to uncertainty in year-to-year comparisons. All figures calculated with a 30% minimum tree cover canopy density.

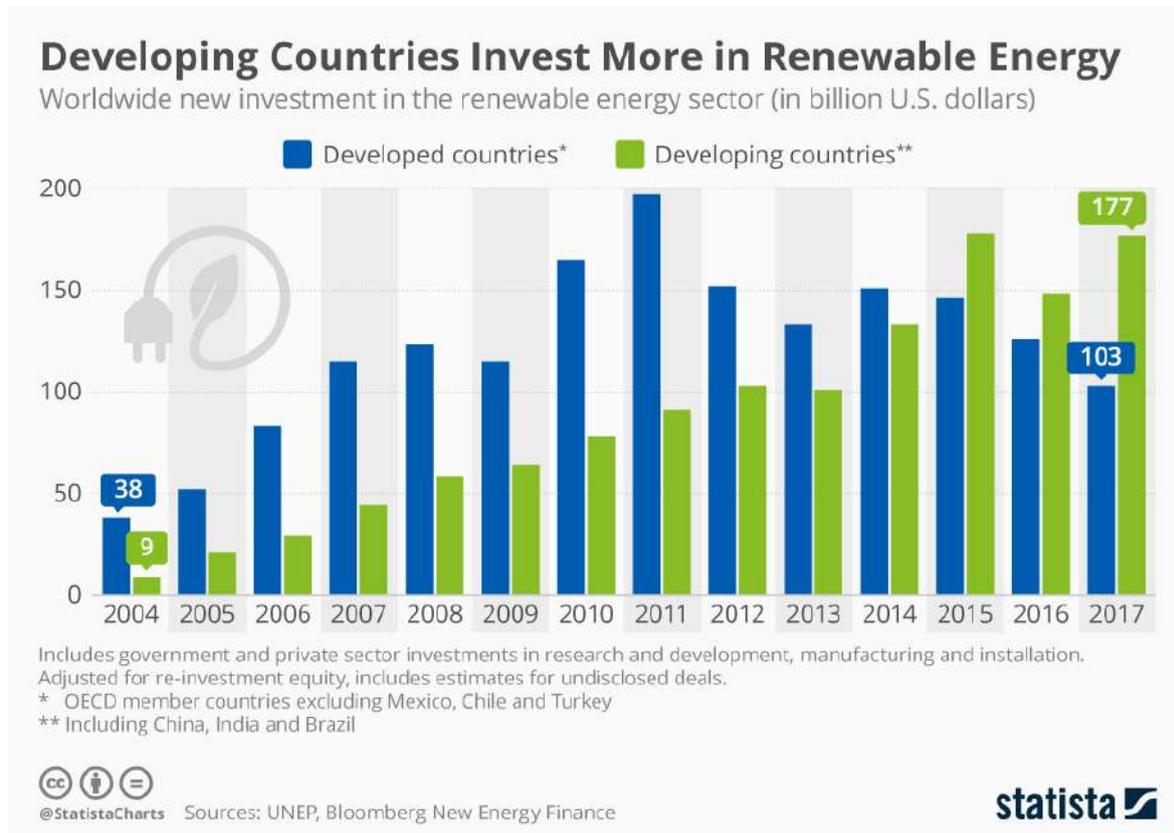


WORLD RESOURCES INSTITUTE

**Source:** <https://www.weforum.org/agenda/2018/06/deforestation-is-accelerating-despite-mounting-efforts-to-protect-tropical-forests-what-are-we-doing-wrong>

## Resource 13 for Question 4

**New worldwide investments in the renewable energy sector between developed and developing countries since 2004**



**Source:** <https://vsrecollective.com/asia-looms-large-as-potential-renewable-energy-superpower/>

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**NATIONAL**  
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**GEOGRAPHY**  
Paper 2 Data Response Questions

**9751/02**

**Higher 2**

**3 hours  
18 September 2019**

**READ THESE INSTRUCTIONS FIRST**

Write your index number and name on the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Answer **all** questions.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your answer scripts securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **5** printed pages and **3** blank pages.

## Section A

## Theme 4: Geographical Investigation

- 1 A group of five junior college students conducted a geographical investigation to study the impacts of urban re-imaging efforts in Kampong Glam, Singapore, on the different groups of dwellers in the area. For their investigation, the students came up with the following hypothesis:

*“The re-imaging efforts in Kampong Glam to cater to tourists have created positive economic and social benefits for the urban dwellers in the area.”*

They chose one weekday during the June Holidays to visit the area. During that weekday, they conducted a questionnaire survey for people in the area to understand their opinions on Kampong Glam. The students chose to collect their data at the Sultan Mosque, one of the tourist attractions in the area. The students approached any person who seemed friendly to answer their questionnaire. The students also took photos of themselves conducting the questionnaire with the respondents, as well as photos of the area around Sultan Mosque to use as data.

Resource 1 shows a map of Kampong Glam, as used by tourists. Resource 2 shows the data collected by the students from their questionnaire.

- (a) With reference to Resource 1, explain why the hypothesis crafted by the students is a suitable one. [4]
- (b) With reference to the students' data collection methods, as well as Resources 1 and 2, describe the limitations of the data collection process and explain how these limitations can be addressed. [6]
- (c) Suggest one way by which the students can present the data they have collected as shown in Resource 2, and outline the strengths and limitations of this data presentation method. [4]
- (d) Describe two ethical issues that may arise with the taking of photos to use as data. [4]
- (e) Using Resource 2 and your own knowledge, explain how the students may use other types of data to better understand the impacts of urban re-imaging on the urban dwellers in Kampong Glam. [7]

**Section B****Theme 1: Tropical Environments****Climate and Landscapes in the Lut Desert**

- 2** The Lut Desert is a large salt desert in Iran that is located between the latitudes of 28 to 32 degrees North of the Equator. It is the world's 27th largest desert, and it was inscribed on UNESCO's World Heritage List in 2016.

Resource 3 is a climograph of Shahdad, a town located within the vicinity of the Lut Desert in Iran. Resource 4 shows a map of the location of the Lut Desert. Resources 5 and 6 depict a landform and a rock found in the Lut Desert respectively.

- (a)** Describe the climatic characteristics of Shahdad in Iran, as shown in Resource 3. [4]
- (b)** With reference to Resource 4, explain the reasons for the aridity observed in the Lut Desert. [5]
- (c)** Identify the landform in Resource 5, and describe its distinctive features. [3]
- (d)** Explain the types of weathering processes which may have occurred on the rock shown in Resource 6. [4]
- (e)** Using Resources 3 and 5, as well as your own knowledge, evaluate the extent to which wind is the dominant agent that shapes landscapes in the Lut Desert. [9]

**Theme 2: Development, Economy and Environment****Research and Development (R&D) and Dyson's operations around the world**

- 3** Resources 7A and 7B show Research and Development (R&D) expenditure (as % of GDP) across the world in 2005 and 2015 respectively. Resource 8 shows Dyson's investment in R&D and Capex (Capital expenditure). Resource 9 is an extract from an article on the relocation of Dyson's corporate headquarters to Singapore.
- (a)** Describe the changes in R&D expenditure (as % of GDP) across the world between 2005 and 2015 as shown in Resources 7A and 7B. [4]
- (b)** Using evidence from Resources 7A and 7B, identify the region with the highest R&D expenditure in 2015 and suggest reasons to account for the region's amount of R&D expenditure. [4]
- (c)** Describe the changes in Dyson's investment in R&D and Capex (i.e. capital expenditure) as shown in Resource 8. [4]
- (d)** With reference to Resource 9 and your own knowledge, account for Dyson's decision to relocate its corporate headquarters to Singapore. [5]
- (e)** Using Resource 9 and your own knowledge, explain the impacts of Dyson's relocation of its corporate headquarters and setting up of electric-car manufacturing facility on the host economy (i.e. Singapore). [8]

### Theme 3: Sustainable Development

#### Contemporary climate change, deforestation and renewable energy

- 4 Resource 10 is a graph documenting the relationship between global temperature and solar activity since 1880. Resource 11 shows a comparison of tropical tree cover loss and its CO<sub>2</sub>e\* emissions, with the five biggest CO<sub>2</sub>e emitters across the world in 2016. Resource 12 shows global tropical tree cover loss from 2001 to 2017. Resource 13 illustrates new worldwide investments in the renewable energy sector between developed and developing countries since 2004.

*\*CO<sub>2</sub>e: Carbon dioxide equivalent is a standard unit for measuring carbon footprints and expresses the impact of each different greenhouse gas in terms of the amount of CO<sub>2</sub> that would generate the same amount of warming*

- (a) With reference to Resource 10, describe the relationship between global temperature and solar activity. [6]
- (b) Explain two ways in which tropical deforestation could have resulted in CO<sub>2</sub>e emissions, as shown in Resource 11, and one other way in which it could have led to an increase in the concentration of greenhouse gases in the atmosphere. [6]
- (c) Explain how other anthropogenic activities, besides tropical deforestation, could possibly account for the relationship between global temperature and solar activity from the 1960s in Resource 10. [4]
- (d) To what extent do you agree that an increase in investments in renewable energy by developing countries, as shown in Resource 13, can mitigate contemporary climate change? You may refer to the resources provided, as well as your own knowledge. [9]

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**National Junior College  
SH2 Preliminary Exam 2019  
Paper 2**

**SUGGESTED MARKING GUIDE**

*Disclaimer:*

*The Suggested Marking Guide  
should be used with discretion.*

## Notes on Marking

### Indicative Content

Indicative content is provided for all levels mark questions. It provides suggested responses and/or approaches to questions. The suggested responses and/or approaches are neither exhaustive nor should they be treated as model answers.

### Marking of Non Open-Ended Data Response Questions

- Data response questions may be **point mark** or **levels mark**.
- **Levels marking** is used when quality of thought, defined by the breadth and/or depth of thinking, is key in awarding marks.
- Where **point marking** is used, the general rule is that each relevant point is awarded one mark.

### Marking of Open-Ended Data Response Questions

All open-ended data response questions will be assessed using the following generic level descriptors:

#### **H2 Generic Level Descriptors for Open-ended 9m DRQ on Themes 1, 2 and 3\***

<b>Level</b>	<b>Marks</b>	<b>Descriptors</b>
3	7 – 9	<p>Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.</p> <ul style="list-style-type: none"> <li>• Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• Makes a decision which clearly addresses different elements of the issue and/or interests of different stakeholders.</li> </ul>
2	4 – 6	<p>A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.</p> <ul style="list-style-type: none"> <li>• Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• Shows some attempt to address different elements of the issue and views of different stakeholders when making a decision but is not well developed.</li> </ul>
1	1 – 3	<p>Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited, relevance to the question. Source(s) is not used or not accurately used to support the response.</p> <ul style="list-style-type: none"> <li>• Provides little or no evaluation.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• Evidence of decision-making, if present, is simple and may be flawed.</li> </ul>

0	0	No creditworthy response.
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*\*The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level*

### **H2 Generic Level Descriptors for Open-ended 9m DRQ on Theme 4\*\***

<b>Level</b>	<b>Marks</b>	<b>Descriptors</b>
3	7 – 9	Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides a logical and well-developed evaluation, which may include perceptive insights for the strongest responses. Reflects strong critical thinking skills and a good understanding of the requirements of the question.
2	4 – 6	Response demonstrates good knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides an evaluation, which may be limited in depth and detail. Response reflects critical thinking skills in general but may not always be relevant to the question.
1	1 – 3	Response shows inadequate knowledge and understanding of geographical investigation skills and methods. Response has some, though limited, relevance to the given context. Provides little or no evaluation. May include material that is irrelevant to the question.
0	0	No creditworthy response.

*\*\*The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.*

*\*\*The descriptors in each level may be worded differently in actual assessment to link them more to the questions set. However, regardless of the wordings used, the quality of responses expected of candidates in each level would not deviate from that stated in the generic level descriptors.*

<b>Section A</b>		
<b>Theme 4: Geographical Investigation</b>		
<b>1</b>	<p>A group of five junior college students conducted a geographical investigation to study the impacts of urban re-imaging efforts in Kampong Glam, Singapore, on the different groups of dwellers in the area. For their investigation, the students came up with the following hypothesis:</p> <p style="text-align: center;"><i>“The re-imaging efforts in Kampong Glam to cater to tourists have created positive economic and social benefits for the urban dwellers in the area.”</i></p> <p>They chose one weekday during the June Holidays to visit the area. During that weekday, they conducted a questionnaire survey for people in the area to understand their opinions on Kampong Glam. The students chose to collect their data at the Sultan Mosque, one of the tourist attractions in the area. The students approached any person who seemed friendly to answer their questionnaire. The students also took photos of themselves conducting the questionnaire with the respondents, as well as photos of the area around Sultan Mosque to use as data.</p> <p>Resource 1 shows a map of Kampong Glam, as used by tourists. Resource 2 shows the data collected by the students from their questionnaire.</p>	
	<p><b>(a)</b> With reference to Resource 1, explain why the hypothesis crafted by the students is a suitable one.</p>	[4]
	<p><u>Possible Responses:</u></p> <ul style="list-style-type: none"> <li>• Suitable scale of research (within the vicinity of Kampong Glam)</li> <li>• Manageable in terms of the 5 students studying this area</li> <li>• Reimaging efforts are clearly defined to refer to efforts catering to tourists</li> <li>• Effects of reimaging efforts are clearly scoped as economic and social benefits</li> </ul> <p><i>Point marked</i> <i>Award 1 mark for each suitable justification for the hypothesis</i></p>	
	<p><b>(b)</b> With reference to the students’ data collection methods, as well as Resources 1 and 2, describe the limitations of the data collection process and explain how these limitations can be addressed.</p>	[6]
	<p><u>Indicative Content:</u></p> <p>Candidates should be able to use the data in the preamble and Resources 1 and 2 to identify and explain the limitations of the methods adopted in this fieldwork process. They should also suggest suitable ways to address</p>	

	<p>these limitations to improve the reliability and accuracy of the data collected.</p> <p><u>Possible Responses:</u></p> <ul style="list-style-type: none"> <li>• No proper sampling was done for the respondents. <ul style="list-style-type: none"> <li>○ The students approached any person that seemed friendly to answer their questionnaire (preamble), and this resulted in a skewed distribution of survey respondents, as too many were international tourists and very few were local residents in the area (Resource 2).</li> <li>○ Students should have conducted a stratified sampling of the population, where there can be equal representation of different groups of people to have a better representation of the population within Kampong Glam.</li> </ul> </li> <li>• Site selection within Kampong Glam. <ul style="list-style-type: none"> <li>○ Students only stood at one site (Sultan Mosque) to collect data, thus not representative of all urban dwellers in the area. There are many other areas in Kampong Glam (as shown in Resource 1) that could be surveyed as well.</li> <li>○ Students should have conducted the questionnaire at multiple sites in the area, such as near the Golden Mile Food Complex, to have a greater representation of views from people utilising various areas within Kampong Glam.</li> </ul> </li> <li>• Timing of data collection might affect the results <ul style="list-style-type: none"> <li>○ Students chose to collect questionnaire data on a weekday, which might have affected the representation of different groups in their data. In particular, the working population might not be present in the area.</li> <li>○ Students could conduct the questionnaire on a weekend to increase the likelihood of having a better representation of the population mix in the area.</li> <li>○ Students also only chose one weekday to conduct their questionnaire. Conducting the questionnaire on multiple days to get multiple data sets might improve the accuracy and reliability of responses.</li> </ul> </li> </ul> <p><i>Point marked</i>  <i>Award 1 mark for the identification of a suitable limitation</i>  <i>Award 1 mark for a suitable suggestion to address the limitation</i></p>	
(c)	Suggest one way by which the students can present the data they have collected as shown in Resource 2, and outline the strengths and limitations of this data presentation method.	[4]
	<u>Possible Responses:</u>	

	<p>Data representation methods include:</p> <ul style="list-style-type: none"> <li>• Composite Bar Graph (With each bar representing a response on the likert scale, and each bar segment representing the type of respondent [tourist, resident...])</li> <li>• Multiple Bar Graphs (With each bar set representing a response on the likert scale, and each constituent bar from a bar set representing the type of respondent)</li> <li>• Pie Chart (with each pie wedge/segment representing a response on the likert scale)</li> </ul> <p>Strengths and limitations of the suggested methods include:</p> <ul style="list-style-type: none"> <li>• Bar Graphs <ul style="list-style-type: none"> <li>○ Visually effective in communicating relative magnitudes</li> <li>○ Simple to construct</li> <li>○ However, it can be too complicated and hard to read with multiple bars</li> <li>○ It may also not be a fair comparison if the number of respondents within each respondent type (tourist, resident) is uneven</li> </ul> </li> <li>• Pie Chart <ul style="list-style-type: none"> <li>○ Visually effective – easy to see the relative contribution of individual segments and relative proportions</li> <li>○ If multiple sites are studied, then pie charts can also be used on a map to provide extra information (usually combined with proportional symbols / circles)</li> <li>○ However, it can be hard to assess the proportion accurately from the pie chart, especially if the individual slices are small</li> <li>○ Also, very small segments (less than 5 degrees) are difficult to draw</li> </ul> </li> </ul> <p><i>Point marked</i>  <i>Award 1 mark for identifying a suitable data representation method</i>  <i>Award 1 mark for each strength/limitation</i>  <i>Award a maximum of 3 marks if only strengths or limitations are mentioned but not both.</i></p>	
	<p><b>(d)</b> Describe two ethical issues that may arise with the taking of photos to use as data.</p>	[4]
	<p><u>Possible Responses:</u></p> <ul style="list-style-type: none"> <li>• Recording a video/image of the respondents in Kampong Glam may be seen as an infringement of their privacy. This is especially so if students do not seek permission from the respondents before taking these photos.</li> <li>• Students are conducting their research at a religious place (mosque), and the taking of photos within the vicinity might be upsetting for</li> </ul>	

	<p>people who are visiting the location for religious purposes, and it may be seen as insensitive.</p> <ul style="list-style-type: none"> <li>Photographs used as data might contain bias from the owner of the photo, and it may not be a fair representation of the actual situation on the ground should it be misused or misconstrued. There is a need for researchers to explore multiple angles from which photographs and videos can be taken, and the implications of each of these angles.</li> </ul> <p><i>Point marked</i>  <i>Award 1 mark for identifying a suitable ethical issue</i>  <i>Award 1 mark for suitable elaboration of the ethical issue</i></p>	
(e)	<p>Using Resource 2 and your own knowledge, explain how the students may use other types of data to better understand the impacts of urban re-imagining on the urban dwellers in Kampong Glam.</p>	[7]
	<p><u>Indicative Content:</u>  Candidates should identify that the data collected in Resource 2 is primary data, that is measured in a quantifiable way. They should then explain how other forms of primary data, as well as secondary data, can help to provide a better understanding of urban re-imagining efforts, such as by providing a comparison of the liveability of the area before and after re-imagining efforts, or to have more qualitative views of the ways re-imagining efforts have affected the urban dwellers.</p> <p><u>Possible Responses:</u></p> <ul style="list-style-type: none"> <li>Secondary Data <ul style="list-style-type: none"> <li>Publications from the government/tourism board to understand the efforts made by the government to rejuvenate the area.</li> <li>Photographs of Kampong Glam before re-imagining efforts to compare the quality of urban space.</li> <li>News reports/articles that may also provide information on local dweller's needs and concerns.</li> </ul> </li> <li>Other forms of primary data <ul style="list-style-type: none"> <li>Non-participant observation to observe how urban dwellers interact with the urban space after urban re-imagining.</li> <li>Environment Quality Assessment to determine if re-imagining efforts have resulted in a more positive environment quality for Kampong Glam</li> <li>Land-Use Mapping to understand the various land uses that may contribute to the urban re-imagining efforts</li> <li>Interviews to gather qualitative data to explain respondents choices</li> </ul> </li> </ul> <p><i>Levels marked</i></p>	

Level	Marks	Descriptors
3	6-7	<p>Response demonstrates accurate knowledge of geographical investigation skills and methods relevant to the given context.</p> <p>Reflects a good understanding of the context of urban re-imaging and an appropriate selection of primary and secondary data required to measure it.</p>
2	3-5	<p>Response demonstrates good knowledge of geographical investigation skills and methods.</p> <p>Description may be limited in depth and detail.</p> <p>Some of the responses may focus on generic types of primary and/or secondary data, and such suggestions may not be relevant to the context of the investigation</p>
1	1-2	<p>Response shows basic knowledge of geographical investigation skills and methods.</p> <p>Explanation may be incorrect, inappropriate or irrelevant to the context of the investigation.</p>

<b>Section B</b>		
<b>Theme 1: Tropical Environments</b>		
<b>Climate and Landscapes in the Lut Desert</b>		
<b>2</b>	<p>The Lut Desert is a large salt desert in Iran that is located between the latitudes of 28 to 32 degrees North of the Equator. It is the world's 27th largest desert, and it was inscribed on UNESCO's World Heritage List in 2016.</p> <p>Resource 3 is a climograph of Shahdad, a town located within the vicinity of the Lut Desert in Iran. Resource 4 shows a map of the location of the Lut Desert. Resources 5 and 6 depict a landform and a rock found in the Lut Desert respectively.</p>	
	<p><b>(a)</b> Describe the climatic characteristics of Shahdad in Iran, as shown in Resource 3.</p>	[4]
	<p><u>Possible Responses:</u></p> <ul style="list-style-type: none"> <li>• Shahdad has a high mean annual temperature of 23.7 Degrees Celsius</li> <li>• It also has a high annual temperature range of about 23 degrees celsius, with temperatures reaching as high as 35 Degrees Celsius in June, and being as low as 12 degrees Celsius.</li> <li>• Shahdad also has a very low annual total rainfall of 69mm.</li> <li>• The rainfall pattern shows some seasonality, with no rainfall recorded from June to September indicating a relatively drier season. The wet season can be said to be between December to April, with January receiving peak rainfall of about 15mm</li> </ul> <p><i>Point marked</i> <i>Award 1 mark for each suitable description of a climatic characteristic as shown in Resource 3.</i></p>	
	<p><b>(b)</b> With reference to Resource 4, explain the reasons for the aridity observed in the Lut Desert.</p>	[5]
	<p><u>Indicative Content:</u> Candidates should be able to explain the various reasons for aridity observed on Earth. In the context of the Lut Desert, candidates should be able to use the information shown in Resource 4 to conclude that the reasons that are applicable to the Lut Desert are namely the influence of the sub-tropical high pressure zone from the Hadley Cell, and the rain-shadow effect provided by the Zagros and Elburz mountain ranges. Candidates should then explain the processes that happen for these two reasons that cause the air to remain dry with little cloud formation,</p>	

	<p>accounting for the aridity observed in the Lut Desert.</p> <p><i>Levels marked</i></p> <table border="1"> <thead> <tr> <th>Level</th> <th>Marks</th> <th>Descriptors</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>4-5</td> <td>Response demonstrates accurate knowledge of the causes of aridity. Reflects a good and detailed understanding of the reasons for aridity, with clear reference to the information provided in Resource 4.</td> </tr> <tr> <td>2</td> <td>2-3</td> <td>Response demonstrates some knowledge of the causes of aridity. Explanation provided is relevant to the context of the Lut Desert, but may be limited in depth and detail. There may be missing references to Resource 4 where necessary.</td> </tr> <tr> <td>1</td> <td>1</td> <td>Response shows little or very basic knowledge of the causes of aridity. Explanation may be incorrect, inappropriate or irrelevant to the context of aridity observed in the Lut Desert.</td> </tr> </tbody> </table>	Level	Marks	Descriptors	3	4-5	Response demonstrates accurate knowledge of the causes of aridity. Reflects a good and detailed understanding of the reasons for aridity, with clear reference to the information provided in Resource 4.	2	2-3	Response demonstrates some knowledge of the causes of aridity. Explanation provided is relevant to the context of the Lut Desert, but may be limited in depth and detail. There may be missing references to Resource 4 where necessary.	1	1	Response shows little or very basic knowledge of the causes of aridity. Explanation may be incorrect, inappropriate or irrelevant to the context of aridity observed in the Lut Desert.	
Level	Marks	Descriptors												
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1	1	Response shows little or very basic knowledge of the causes of aridity. Explanation may be incorrect, inappropriate or irrelevant to the context of aridity observed in the Lut Desert.												
	<b>(c)</b> Identify the landform in Resource 5, and describe its distinctive features.	[3]												
	<p><u>Possible Response:</u></p> <ul style="list-style-type: none"> <li>• Landform in Resource 3 is a yardang, (or yardang field)</li> <li>• Yardangs are characterised as streamlined, sharp and sinuous ridges that extend parallel to the wind, and are separated by parallel depressions</li> <li>• Comprise vertical rock layers of alternately hard &amp; soft rock: Rocks (can be both hard or soft); but should be of different resistance to erosion</li> </ul> <p><i>Point marked</i></p> <p><i>Award 1 mark for identifying the landform as a yardang</i></p> <p><i>Award 1 mark for each distinctive feature described</i></p>													
	<b>(d)</b> Explain the types of weathering processes which may have occurred on the rock shown in Resource 6.	[4]												
	<p><u>Possible Response:</u></p> <ul style="list-style-type: none"> <li>• Physical weathering processes are more likely to have occurred on the rock in Resource 4</li> <li>• Thermal weathering can occur due to the large temperature range observed in the Lut Desert, resulting in thermal expansion and contraction of the rock which can break it down.</li> <li>• Salt weathering can also occur when saline solutions seep into cracks</li> </ul>													

	<p>and joints in rocks and evaporate, leaving salt crystals behind. These salt crystals expand as they are heated up, exerting pressure on the confining rock</p> <ul style="list-style-type: none"> <li>• These processes could cause the rocks in the Lut Desert to crack and split apart, such as the rock shown in Resource 4. The crack lines in the rock suggest that it has weathered via physical weathering processes.</li> </ul> <p><i>Point marked</i>  <i>Award 1 mark for identifying that it is physical weathering</i>  <i>Award 1 mark for identifying and explaining a relevant type of physical weathering associated with the rock</i>  <i>Award 1 mark for describing the type of disintegration as block disintegration.</i></p>	
(e)	<p>Using Resources 3 and 5, as well as your own knowledge, evaluate the extent to which wind is the dominant agent that shapes landscapes in the Lut Desert.</p>	[9]
	<p><u>Indicative Content:</u></p> <p>Candidates should be able to explain the role of wind as a geomorphic agent that shapes aeolian landscapes in the arid tropics. This should include the processes of wind erosion (through deflation, abrasion and attrition) and wind deposition. Such explanations should then be used to illustrate the formation of various types of aeolian landforms (e.g. yardangs, dunes and loess) that result from these processes. Candidates must also consider the role of water in shaping the landscape via fluvial processes (fluvial erosion and deposition), also using various fluvial landscapes in the arid tropics as examples. Candidates will then need to weigh the two agents to determine which is more dominant in the arid tropics. Responses should make clear reference to Resources 3 and 5.</p> <p>A higher level response would include a clear explanation of how wind is a significant agent that can determine the nature of the aeolian landform (e.g. how the direction and strength of the wind can affect the type of sand dune formed). Such responses should also include a clear basis of evaluation between the role of wind and water as geomorphic agents, such as through comparing their prevalence given the climatic conditions of the Lut Desert, or by comparing the extent to which such aeolian and fluvial landscapes are prevalent in the arid tropics.</p> <p><i>Levels marked using the H2 generic level descriptors for open-ended 9m DRQ on Themes 1, 2 and 3.</i></p>	



<b>Theme 2: Development, Economy and Environment</b>		
<b>Research and Development (R&amp;D) and Dyson's operations around the world</b>		
<b>3</b>	Resources 7A and 7B show Research and Development (R&D) expenditure (as % of GDP) across the world in 2005 and 2015 respectively. Resource 8 shows Dyson's investment in R&D and Capex (Capital expenditure). Resource 9 is an extract from an article on the relocation of Dyson's corporate headquarters to Singapore.	
<b>(a)</b>	Describe the changes in R&D expenditure (as % of GDP) across the world between 2005 and 2015 as shown in Resources 7A and 7B.	[4]
	<p><u>Possible Response:</u></p> <ul style="list-style-type: none"> <li>• R&amp;D expenditure has generally increased between 2005 and 2015.</li> <li>• R&amp;D expenditure remained the same for most developed countries/regions between 2005 and 2015:               <ul style="list-style-type: none"> <li>○ USA: 2.5-3%</li> <li>○ Japan: between 3-3.5%</li> <li>○ Northern and Western Europe: Between 1.5 – 3.5%</li> <li>○ Australia: 2-2.5%</li> </ul> </li> <li>• R&amp;D expenditure has increased in countries/regions such as China and African countries:               <ul style="list-style-type: none"> <li>○ China: from 1-1.5% in 2005 to 2-2.5% in 2015</li> <li>○ African countries: from below 0.25% in 2005 to 0.5-1% in 2015</li> </ul> </li> <li>• R&amp;D expenditure has decreased in a handful of countries/regions such as the Middle Eastern countries:               <ul style="list-style-type: none"> <li>○ Middle Eastern countries: from 0.5-1% to 0.25-0.5%</li> </ul> </li> </ul> <p><i>Point marked</i> <i>Award 1 mark for each observation and evidence</i></p>	
<b>(b)</b>	Using evidence from Resources 7A and 7B, identify the region with the highest R&D expenditure in 2015 and suggest reasons to account for the region's amount of R&D expenditure.	[4]
	<p><u>Possible Response:</u></p> <p>Possible regions:</p> <ul style="list-style-type: none"> <li>• North America region [USA: 2.5-3%]</li> <li>• Northern Europe [approx. 3%]</li> <li>• East Asia [3-4%]</li> </ul> <p>Possible reasons (non-exhaustive):</p> <ul style="list-style-type: none"> <li>• Dependence of economy on tertiary and quaternary sector               <ul style="list-style-type: none"> <li>○ With the North America/ Northern Europe region consisting of</li> </ul> </li> </ul>	

	<p>developed economies that are dependent on tertiary and quaternary sectors to drive economic revenue, investment in R&amp;D to improve technical expertise and infrastructure is necessary to drive further revenue growth</p> <ul style="list-style-type: none"> <li>○ For East Asia, the increase in R&amp;D investments is more to do with the ongoing shift towards tertiary and quaternary sectors, thus requiring the investment in R&amp;D</li> <li>• Presence of / locational changes by TNCs (in particular the larger players in the R&amp;D sector): <ul style="list-style-type: none"> <li>○ With the location of some of the world's largest TNCs (or tech companies) such as Apple, Google, Facebook, and Amazon in the US, R&amp;D expenditure is necessary in improving quality of R&amp;D infrastructure and employee quality.</li> <li>○ East Asia has been a favourite destination for some of the more recent relocation decisions by R&amp;D giants in the economy</li> </ul> </li> <li>• Growing competitiveness across the world: <ul style="list-style-type: none"> <li>○ R&amp;D investments would also allow TNCs like Apple and Google to remain competitive amongst the technology and electronics companies by allowing for constant innovation and production of latest products to generate income for the region.</li> </ul> </li> </ul> <p><i>Point marked</i>  <i>Award 1 mark for identification of region</i>  <i>Award 1 mark for each reason</i></p>	
(c)	Describe the changes in Dyson's investment in R&D and Capex (i.e. capital expenditure) as shown in Resource 8.	[4]
	<p><u>Possible Response:</u></p> <ul style="list-style-type: none"> <li>• General increase in both R&amp;D and Capex from 2005 to 2015 <ul style="list-style-type: none"> <li>○ Extent of increase between R&amp;D and Capex different, with the former increasing from about 40 million pounds to about 190 million pounds, and the latter increasing more, from about 20 million pounds to about 280 million pounds</li> <li>○ Rate at which R&amp;D and Capex has increased different, with the former remaining rather consistent from 2005 to 2011 (with a slight dip from 2007 to 2008) before experiencing gradual increases from 2011 to 2015, and the latter experiencing a slight increase from 2005 to 2007, before a slight decrease from 2007 to 2010, and then a rapid increase from 2010 onward</li> </ul> </li> <li>• R&amp;D investments as a percentage of revenues increased between 2005 and 2007 (11% to 16%), followed by a drop between 2007 and 2010 ((16% to 8%), before rising again to 27% in 2015. A slight dip of approximately 4% occurred between 2013 and 2014.</li> </ul>	

	<p><i>Point marked</i></p> <p><i>Award 1 mark for each description of trends in R&amp;D and Capex</i></p> <p><i>Award 1 mark for description of trends in R&amp;D investments as percentage of revenues</i></p>	
(d)	<p>With reference to Resource 9 and your own knowledge, account for Dyson's decision to relocate its corporate headquarters to Singapore.</p>	[5]
	<p><u>Possible Response:</u></p> <ul style="list-style-type: none"> <li>• Being the command and control centres of TNCs, HQs would require locations with high quality transportation and communications network and infrastructure, highly skilled/educated workforce, and economic and political stability – these would be the geographical differences in Singapore which provide the country with its comparative advantage in highly skilled economic activities often found in the quaternary and quinary sectors <ul style="list-style-type: none"> <li>○ High quality of technological/ICT infrastructure that would enable efficient inter- and intra-firm communication, crucial in facilitating coordination of various operations within Dyson</li> <li>○ Highly skilled/educated labour that possesses managerial and advanced technical skills in carrying out command and control roles, R&amp;D and advanced manufacturing processes.</li> <li>○ Economic and political stability in Singapore that provides a conducive environment for the HQ to function, due to the lower likelihood of economic shocks or civil strife.</li> </ul> </li> <li>• Favourable state actions including the incentive schemes offered by Singapore, (with relatively lower corporate tax rate of 17% in comparison with the United Kingdom), with opportunities for further tax concessions as well as the setting up of Science and R&amp;D Parks such as Science Park One</li> <li>• Proximity to market especially since Asia has emerged to become Dyson's main market, generating almost 75% of its revenue growth in 2017; the siting of its corporate HQ in Singapore near its R&amp;D labs would not only facilitate transmission of information and knowledge, but would also facilitate the development of new innovative products that is catered to its Asian market.</li> </ul> <p><i>Point marked</i></p> <p><i>Award 2 marks for each well-explained point; each points must be from a different area (i.e. existing geographical differences, state actions and proximity to market); maximum of 5 marks to be awarded</i></p>	
(e)	<p>Using Resource 9 and your own knowledge, explain the impacts of Dyson's relocation of its corporate headquarters and setting up of electric-car manufacturing facility on the host economy (i.e. Singapore).</p>	[8]

Indicative Content:

Candidates should explain possible impacts on Singapore in various aspects by citing evidence from the resource, as well as knowledge from complementary sources beyond the resource.

## Possible positive impact:

- Employment creation: Boost employment through a variety of functions, including supply chain management, advanced manufacturing, and R&D (*Already employing about 1,100 people in the R&D operations, with plans to double the size in the coming years*)
- Knowledge diffusion/transfer: Commit to developing technology, knowhow and skills in the city state (*Clustering of Singapore Technology Centre within Singapore Science Park One can contribute to the overall increase in scientific knowledge in Singapore.*)
- Local firm stimulation: Generate investment that spills over to the local economy, integration of local firms into supply network (*Ecosystem of local suppliers might benefit.*)
  - Starting an electric-car manufacturing facility in Singapore: attract parts of the supply chain to also be set up in Singapore, creating a new manufacturing network that would have a larger impact on the economy due to the hiring and expansion of the business.
- Environmental impact: setting up an electric-car manufacturing facility in Singapore would be aligned with Singapore's efforts to combat climate change

## Possible negative/limited impact:

- While Dyson pumped millions of dollars into building a R&D facility at Singapore Science Park in 2017, its R&D arm in the UK continued to expand, with millions invested in the R&D infrastructure there and in higher education in Britain, where its core creative and engineering parts will remain.
- The prospects of setting up an electric-car manufacturing facility in Singapore is uncertain. Though Singapore may be an ideal location due to its connectedness to the rest of the world, car manufacturing requires large amounts of space, power and water, and none of which are in abundance in Singapore. This could result in Dyson relocating its electric-car manufacturing facility if success is not achieved that would have negative implications on Singapore's economy (e.g. employment)

*Levels marked*

Level	Marks	Descriptors
3	7-8	Response demonstrates strong knowledge of the impacts of Dyson's relocation of its corporate

			<p>headquarters and setting up of electric-car manufacturing facility on the host economy in various aspects, addressing both positive and limited/negative elements.</p> <p>Good and accurate use of the resource to explain the impacts.</p> <p>Response is clear, detailed and shows focus on the question.</p>	
		2	4-6	<p>Response demonstrates adequate knowledge of the impacts of Dyson's relocation of its corporate headquarters and setting up of electric-car manufacturing facility on the host economy in various aspects.</p> <p>Some use of the resource to explain the impacts.</p> <p>Response is mostly clear, shows some supporting details and is focused on the question.</p>
		1	1-3	<p>Response demonstrates some knowledge of the impacts of Dyson's relocation of its corporate headquarters and setting up of electric-car manufacturing facility on the host economy in various aspects.</p> <p>Limited use of the resource to explain the impacts.</p> <p>Response is somewhat clear, with some details used to support response.</p>

<b>Theme 3: Sustainable Development</b>		
<b>Contemporary climate change, deforestation and renewable energy</b>		
<b>4</b>	<p>Resource 10 is a graph documenting the relationship between global temperature and solar activity since 1880. Resource 11 shows a comparison of tropical tree cover loss and its CO<sub>2</sub>e* emissions, with the five biggest CO<sub>2</sub>e emitters across the world in 2016. Resource 12 shows global tropical tree cover loss from 2001 to 2017. Resource 13 illustrates new worldwide investments in the renewable energy sector between developed and developing countries since 2004.</p> <p><i>*CO<sub>2</sub>e: Carbon dioxide equivalent is a standard unit for measuring carbon footprints and expresses the impact of each different greenhouse gas in terms of the amount of CO<sub>2</sub> that would generate the same amount of warming</i></p>	
	<p><b>(a)</b> With reference to Resource 10, describe the relationship between global temperature and solar activity.</p>	[6]
	<p><u>Possible Response:</u></p> <ul style="list-style-type: none"> <li>• In terms of 11-year average patterns,               <ul style="list-style-type: none"> <li>○ Solar irradiance has not altered much since 1880, hovering between 1360.5 to 1361 W/m<sup>2</sup> whereas global temperature has increased by about 1.0oC since 1880</li> <li>○ From 1880 – 1950s, gradual increase in solar irradiance and global temperature in general</li> <li>○ In between 1950-1960, sudden increase (relatively large) in solar irradiance unmatched by trend in global temperature (gradual increase)</li> <li>○ Since 1960, there has been a divergence in trends - solar irradiance has maintained, declining by quite a fair bit from 2000 onward, whereas global temperature has seen a steady increase</li> </ul> </li> <li>• In terms of yearly patterns,               <ul style="list-style-type: none"> <li>○ The fluctuations appear somewhat similar across the years, except for the years in between 1950-60 when solar irradiance experienced a sudden spike and decline whereas the changes in global temperature were a lot less noticeable</li> <li>○ The frequency of fluctuations in global temperature were also higher than the frequency of solar irradiance</li> </ul> </li> </ul> <p><i>Point marked</i> <i>Award 1 mark each</i></p>	
	<p><b>(b)</b> Explain two ways in which tropical deforestation could have resulted in</p>	[6]

	CO <sub>2</sub> e emissions, as shown in Resource 11, and one other way in which it could have led to an increase in the concentration of greenhouse gases in the atmosphere.	
	<p><u>Possible Response:</u></p> <ul style="list-style-type: none"> <li>• Forests are important carbon sinks and when they are removed either by burning or the processes of decomposition, their stored carbon is released into the atmosphere as carbon dioxide</li> <li>• The removal of forest cover also leads to the exposure of soil surfaces which allows for carbon from decaying organic matter to be released into the atmosphere directly, as opposed to being embedded into rock-forming processes</li> <li>• Given that tropical forests absorb carbon from the atmosphere via the process of photosynthesis, a decline in tropical forest cover will result in less carbon dioxide being removed from the atmosphere, hence contributing to an increase in the concentration of greenhouse gases</li> </ul> <p><i>Point marked</i> <i>Award 1 mark each</i></p>	
(c)	Explain how other anthropogenic activities, besides tropical deforestation, could possibly account for the relationship between global temperature and solar activity from the 1960s in Resource 10.	[4]
	<p><u>Possible Response:</u></p> <ul style="list-style-type: none"> <li>• Increase in the use of fossil fuels across the world, especially with the meteoric rise of economies within the Asian-Pacific region and the increase in energy for industrialisation and the production of goods for services, resulting in the increase in greenhouse gas emissions from energy production</li> <li>• Increase in affluence across the world, in particular, Asia, which has led to changing consumption patterns from lifestyles which are more minimalistic, with lower levels of consumption, to lifestyles which require a lot more consumption; such mass consumption has triggered the increase in greenhouse gas emissions</li> <li>• Increase in food production across the world to feed the rapidly increasing populations, resulting in agricultural activities which produce greenhouse gases, in particular, methane (from rice and cattle production especially)</li> <li>• Increase in urbanisation across the world, resulting in change in surface covers from vegetated to non-vegetated concrete ones; this affects the amount of solar radiation that is absorbed by the surfaces, which results in an overall rise in global temperatures as compared to vegetated surfaces; lifestyle changes associated with urbanisation might also have contributed to this, with the increase in usage of cars</li> </ul>	

	and air-conditioners, which has also led to increased emissions	
	<i>Point marked</i> <i>Award 2 marks for each well-explained point</i>	
(d)	To what extent do you agree that an increase in investments in renewable energy by developing countries, as shown in Resource 13, can mitigate contemporary climate change? You may refer to the resources provided, as well as your own knowledge.	[9]
	<p><u>Indicative Content:</u></p> <p>Candidates should be able to make use of the resources provided to argue whether they believe that an increase in investments in renewable energy by developing countries as shown in Resource 13 can combat climate change, before complementing their arguments with knowledge from beyond the resources.</p> <ul style="list-style-type: none"> <li>• Resource 10: Contemporary climate change – in terms of global warming – is likely to continue given that it has been increasing since 1880s</li> <li>• Resource 12: Global tropical tree loss has been on the rise, despite calls to mitigate climate change</li> <li>• Resource 11: Tropical deforestation is one of the top CO<sub>2</sub>e emitters, second only to China and the United States; the largest CO<sub>2</sub>e emitters are also not differentiated across developed and developing countries – this means that both types of economies are equally responsible for CO<sub>2</sub>e emissions</li> <li>• Resource 13: While investments in renewable energy by developing countries has increased, the amount by developed countries has declined, resulting in the total amount of investments in renewable energy maintaining since 2011</li> <li>• Other knowledge: Other climate change mitigation strategies such as international agreements, initiatives to combat deforestation as well as mindful changes to lifestyles have to be used in conjunction</li> </ul> <p><i>Levels marked using the H2 generic level descriptors for open-ended 9m DRQ on Themes 1, 2 and 3.</i></p>	



# NANYANG JUNIOR COLLEGE

## Year 2 Preliminary Examination

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### H2 GEOGRAPHY

9751/01

Paper 1 Structured Essay Questions

3 September 2019

**3 hours**

Additional Materials:            Answer Paper  
   World outline map

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### READ THESE INSTRUCTIONS FIRST

Write your Centre number, index number and name on the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the questions.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

### Section A – Tropical Environments

Answer **one** question from this section.

- 1 (a)** Explain the ways in which rainfall can be generated in tropical areas. [12]
- 1 (b)** To what extent is the tropical monsoon climate distinctive from other tropical climates? [20]
- 2 (a)** Explain how the characteristics of limestone makes them vulnerable to weathering in the humid tropics. [12]
- 2 (b)** Tropical karst differs in scale and variety. Discuss. [20]

### Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a)** Explain why bottom-up development strategies may sometimes work better than “top down” ones in helping countries progress. [12]
- 3 (b)** To what extent is it possible to measure the development of countries? [20]
- 4 (a)** Explain the various dimensions of resource scarcity. [12]
- 4 (b)** “The extractive industry usually brings more harm than good to a country’s development.” How far do you agree? [20]

**Section C – Sustainable Development**

Answer **one** question from this section.

- 5 (a)** Explain the political and economic challenges in attaining sustainable development for countries at low levels of development. [12]
- 5 (b)** Evaluate the view that human activities exert a greater influence on climate change than natural causes. [20]
- 6 (a)** Explain the issues affecting liveability for the elderly in cities in countries at high levels of development. [12]
- 6 (b)** Assess the extent to which strategies to meet the needs of the elderly in urban areas have been adequate. [20]

## NYJC 2019 JC2 Prelims Mark Scheme for H2 Paper 1

### Section A – Tropical Environments

**1 (a)** Explain the ways in which rainfall can be generated in tropical areas. [12]

Indicative content:

Responses should explain the three ways in which rainfall is formed e.g. convection, orographic and convergent lifting via the concept of atmospheric instability resulting in adiabatic cooling. Diagrams should be included to illustrate how each type of rainfall is formed.

A higher response will include the impact of the human activities in affecting rainfall on a local scale via the heat island effect. The urban environment has an impact on convective rain formation and the presence of skyscrapers also helps to induce orographic rainfall.

Note that the question isn't about the types of rainfall (or climates even) but how rainfall is formed.

Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)

**1 (b)** To what extent is the tropical monsoon climate distinctive from other tropical climates? [20]

Indicative content:

Arguably no other part of the global climate system affects more people directly than the tropical monsoon climate. Responses will show the seasonality of rainfall as the hallmark of the Monsoon climate (Am) with its onshore wet monsoon in summer and offshore dry monsoon in winter. Reference will be made to the migration of the ITCZ and the differences in heat capacities between land and sea in accounting for the reversals of winds. In comparing rainfall patterns, Aw's distinct wet and dry season is also influenced by the migration of the ITCZ; similar to that of the monsoons. However, the amount of rainfall is much lesser due to its continental location and being at higher latitudes. As for Af and B climates, rainfall patterns are largely influenced by latitude rather than the short term factor of seasonal changes influencing Am and Aw. In comparing temperature patterns, the tropical monsoons are more similar than different from the rest in terms of mean annual temperature. As part of the tropics, mean annual temperature is high (above 18°C) as it is located within the belt of insolation surplus. These places also experience more consistent hours of daylight throughout the year. Slight differences are however seen in terms of annual and diurnal range due to factors such as latitudinal location (long term factor) as well as the presence or absence of cloud cover (local factor) that affect Af and B climates.

Higher level responses will show the influence of other factors such as topography and El Niño in affecting tropical monsoons. The effects of current warming trends due to the enhanced greenhouse effect may too have a future influence on the tropical monsoons and the other parts of the tropics. Tropical monsoon areas may become even more

distinctive or we may see a convergence in terms of rainfall and temperature patterns with the rest of the tropics.

Possible synoptic links: Topic 1.1 Deforestation, Topic 2.1 Development and Topic 3.1 Enhanced greenhouse effect

**2 (a) Explain how the characteristics of limestone makes them vulnerable to weathering in the humid tropics. [12]**

Indicative Content:

Responses will describe the characteristics of limestone (hardness, texture, geology, and structure) and show how these characteristics makes them vulnerable to weathering in the humid tropics. As the question is set in the context of the humid tropics, responses will make reference to how these characteristics are exposed to chemical weathering as seen in Peltier's model. Physical weathering though less influential because of the presence of a protective vegetation cover can still occur during the dry season of Am and particularly Aw climate (8 months of drought). Its effectiveness is however lower than arid tropics due to a smaller diurnal temperature range.

A higher level response will include the *interplay* of factors - topography, vegetation, geology and rock structure in causing limestone to be vulnerable to weathering in the humid tropics.

**2 (b) Tropical karst differs in scale and variety. Discuss. [20]**

Indicative Content:

Responses will show how tropical karst landscapes differ in scale and variety. Scale includes the measure of the landscapes (height and angle as seen in the differences between cockpit, tower and isolated karst). Variety relates to diversity which include both surface and sub-surface features including large cave systems. In explaining the differences in scale, responses will make reference to the intensity of denudational processes (weathering, surface erosion and mass movement) and fluvial dissection that a piece of limestone has been subjected to over time. Reference can be made to Sweeting's theory of karstic formation to illustrate this point i.e. the evolvement of cockpit karst to tower karst and isolated karst through the stages of formation from youth to maturity. As for variety, responses will explain how karstic landforms may be modified by local environmental influences such as volcanic activity, joints and changes in sea levels.

Higher responses will include how human activities such as mining and deforestation though may not have directly influenced the development of limestone landforms in the tropics, have certainly led to the demise of some of them. The current warming trend due to the enhanced greenhouse effect may also be included in the discussion on how it may affect karstic formation in the future.

Possible synoptic links: Topic 1.1 Past climates in the tropics and geomorphic processes in the Tropics, Topic 2.2 Extractive industries and Topic 3.1 Effects of the enhanced greenhouse effect

## Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a)** Explain why bottom-up development strategies may sometimes work better than “top down” ones in helping countries progress. [12]

Indicative content:

Responses should consider the failures of “Top down” approaches by drawing reference to the power which supranational bodies exert on states via the structural adjustment programmes (SAPs) which were unhelpful towards the poor, women and children. Criticism against the Core Periphery model can also be brought into the discussion. The principal idea of the model is that the system tends towards equilibrium and equalisation between the second and third stages with income gaps expected to close. However, in reality there was evidence of persistent disequilibrium as explained by Gunnar Myrdal’s model of cumulative causation when back wash effect is stronger than spread effects with developed regions (core areas) developing at a faster rate at the cost of the backward region (periphery).

Owing to the imperfections of “top down” approaches, the bottom up approaches offer a viable alternative to development i.e. sometimes work better. Bottom up approaches are premised on the idea that urban locations and cities are not the only drivers of development; hence development need not always depend on the decisions made in the core. Some of the strengths include being more ecologically sensitive and the principles of public participation. In addition, as bottom up approaches allow work to be carried out in smaller units (e.g. neighbourhoods, towns, community), they tend to be closely related to the social, historical and cultural conditions of communities and hence have a higher chance of achieving sustainable development.

A higher level response will include contextualised examples of strategies employed by the community via bottom-up approaches and the positive outcomes achieved despite the challenges. Indeed, as society progresses and literacy rate increases, bottom up approaches become even more important. Gaining feedback from the ground not only helps the government to have fresh ideas but it also ensures that the policies rolled out are better suited in meeting the needs of the people.

Levels marked using H2 generic level descriptors for 12m SEQ sub part (a).

- 3 (b)** To what extent is it possible to measure the development of countries? [20]

Indicative content:

Development geography is a branch of geography which refers to the standard of living and its quality of life of its human inhabitants. In this context, development is a process of change that affects people's lives. Responses should include a discussion of the usefulness of development indicators such as the GNP per capita, Human Development Index (HDI) and the Multidimensional Poverty Index (MPI) as tools to measure development. Responses should highlight the limitations of these indicators such as the comparison between single (GNP per capita) vs multiple indicators (HDI) with the latter being definitely more holistic as it takes into consideration not only the economic but also two social indicators such as literacy rate and life expectancy. In addition, responses

should also show that progression has been made in the development of measurement tools as MPI is regarded as an improvement from HDI. It is regarded as a high resolution lens on poverty measures capable of reflecting both the incidence of multidimensional poverty in developing countries. Important that responses do not rattle off the usefulness and limitations of GNP per capita/HDI/MPI, without making a link to its usefulness in measuring development holistically – social, economic, environment, health, etc. They should also be able to comment that for an effective measurement of development, HDI and MPI can complement each other.

Higher responses will recognise development as a process and see that these indices may change over time as the definition of development widens beyond the traditional indicators like economic, literacy and life expectancy. With the current emphasis on SD, other indicators such as ecological footprint and happiness index have gained greater traction for them to be considered though there are some difficulties in quantifying them such as the Happiness Index. The limitations for these alternatives need not be discussed in this essay though.

Possible links: Topic 2.2 Management of resources, Topic 3.1 Different realms of development, Topic 3.2 Difficulty of measuring SUD in relation to social indicators such as happiness index.

Levels marked using H2 generic level descriptors for 20m SEQ sub part (b).

**4 (a)** Explain the various dimensions of resource scarcity. [12]

Indicative content

The primary concern of this topic is that there could come a day when resources do become scarce or even unavailable. Responses should include the different dimensions of scarcity – physical, geopolitical, economic, renewable and environmental supported by examples to better illustrate the points. Rees (1990) further category of resource scarcity include *scarce 'qualities' of resources* such as those with respect to attractive landscapes, wildlife or clean air could also be incorporated.

A higher response will recognise that the definition of resource scarcity can be a relative term shaped by the differing population-resource theories. For the pessimists, overuse and abuse of resources will result in resources becoming increasingly scarce and costly with conflicts over resources likely to increase e.g. water conflicts. For the optimists, resource scarcity leading to price increases will stimulate human response such as *resource substitution*, the *exploration* of new areas and innovations in technology to raise efficiency.

Similarly, for non-renewable minerals and fossil fuels, the physical existence of a resource does not ensure its availability for development – *access may be difficult* or there may be a *lack of sufficient capital or appropriate skills and technology* to bring the location into production. Conversely, a resource which exists only in small quantities in a few locations may not be scarce if demand is low. This further establishes the fact that questions of resource scarcity is indeed varied and they may be shaped by factors not only of supply, but also of demand, the economics of the market, technology, political decision making and beliefs as seen in population-resource theories.

- 4 (b)** “The extractive industry usually brings more harm than good to a country’s development.” How far do you agree? [20]

### Indicative Content

The statement “more harm than good” could be interpreted to mean that these resource rich countries have suffered from underperformance rather than having achieved socio-economic development. Evidence of underperformance include occupying the **lowest ranks of the Human Development Index** and **Human Poverty Index**, **highly indebted**, face higher **export earning instability etc.** It appears ironical that being resource rich has contributed little to national, local and regional development and the alleviation of poverty. Responses should allude the root cause of the underperformance of these countries in relation to the resource-curse thesis owing to factors such as capital intensity, volatile nature of mineral sector revenues, reliance on expat specialist labour, weak forward and backward production linkages, economic leakage due to repatriation of revenue earned/ large external revenue flows and the neglect of diversification of mining sectors including the Dutch Disease. These countries also tend to have low investment in education too.

In the counterargument, responses could verify that not all mineral-rich developing countries have fallen prey to the resource curse. Notably Botswana and Chile have managed to successfully apply their mineral income to facilitate development. Good governance and institutional quality has helped these countries avoid the pitfalls. Importantly, the mineral sector should not be regarded as the backbone of the economy; but viewed as a bonus with which to accelerate economic growth and healthy structural change.

A higher response will include students recognising the role played by other factors in affecting development. These may include the role of the state (in infrastructural development, setting up of Sci, Tech and Business Parks, skills training and re-training), trade blocs such as ASEAN in promoting trade and civil societies in promoting development via bottom up approaches. Physical factors relating to climate, coastal location, deep water for the building of ports, shielded from natural hazards like tropical cyclones, earthquakes are good starting factors affecting a country’s developmental potential.

Possible synoptic links: Topic 1.1 Tropical climates in affecting the attraction of FDI, Topic 1.2 Impacts of Tropical cyclones and monsoons on flooding and the management of tropical deforestation, Topic 2.1 Indicators of development, exploitative nature of TNCs (Topic 2.1) and Topic 3.1 Issues affecting SUD e.g. slums, waste

## **Section C – Sustainable Development**

Answer **one** question from this section.

- 5 (a)** Explain the political and economic challenges in attaining sustainable development for countries at low levels of development. [12]

### Indicative content

The challenges of attaining SD affect both DCs and developing countries alike with each facing a unique set of difficulties. To begin, there is a dichotomy of conflicting ideals

regarding the definition of SD. For the environmentalist, SD was recommended to developing countries as a developmental path that would not replicate the environmental degradation that had incurred in the DCs. For the developmentalist, political leaders in developing countries would want to replicate the success of DCs.

Responses will explain the various political and economic challenges faced by countries at low levels of development. These challenges need not be explained separately as they may be linked. Responses should make reference to examples from countries at low levels of development.

A higher level response should identify traits or characteristics associated with countries at low levels of development and make explicit links to how these traits or characteristics contribute to the challenges in attaining sustainable development.

Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a).

**5 (b)** Evaluate the view that human activities exert a greater influence on climate change than natural causes. [20]

Indicative content

Climate change is understood currently to present the most complex challenges for sustainable development that 'span science, economics and international relations.' In evaluating whether human activities exert a greater influence on climate change or that of natural causes, responses will explain the impact of human activities in affecting climate on both the local and global scale via the urban heat island effect and the enhanced greenhouse effect due to the effect of large-scale deforestation, agricultural activities and fossil fuel combustion. This will be supported by evidence to show the urban heat island effect and the enhanced greenhouse effect has an impact on climate change. The former will include a comparison of temperature and rainfall data between cities and rural areas. The latter will be supported by the 4<sup>th</sup> and 5<sup>th</sup> IPCC assessment as it revealed that humans are responsible for current warming trends.

For counterarguments, responses will surface the controversies of human-induced climate change by alluding to the unbalanced nature of past data (unreliability of data collection methods) as well as Stossel's argument that CO<sub>2</sub> increase lags behind temp increase by 800 years. In fact, climate change sceptics often use the natural variability argument to suggest that Earth's climate had changed many times before and who could say for sure that the current warming was not one of them? In supporting this argument, responses will explain the effects of natural cycles and natural events in causing climate change. There should be a combination of long term (orbital forcing and the feedback mechanism), short term cycles (younger dryas, sunspots, last ice age) and natural events (El Nino, La Nina and volcanic eruptions) to provide a more balanced approach to their essays.

In determining whether human activities exert a greater influence on climate change than natural causes, responses may argue that human activities exert a greater impact on climatic change as compared to natural cycles and events – human impacts are more long term i.e. more GHGs can only trap more heat whilst natural cycles and natural events may be short term such as volcanic eruptions and El Nino/La Nina. For human activities, the rise of global population and the rapid pace of industrialisation and urbanisation in many of the developing countries makes it difficult to even slow down the rate of greenhouse gas

emission. The growth of private car ownership leading to traffic congestions and the emissions of greenhouse gases from landfills and incinerators due to higher waste generation in cities offer little chance of reversing or even slowing down current warming trends. This stems from the bigger challenge as seen in part (a) whereby no country is willing to forgo economic development for a “cooler” earth – reference to developing countries’ interpretation of the definition of SD.

A higher response will argue that the degree of influence varies over time. Past climate changes, those before the pre-industrial period were likely to be part of cyclical fluctuations in solar input to the Earth while current warming reflects a high degree of correspondence between the increase in CO<sub>2</sub> level and anthropogenic causes with the increase in global temperature.

**Synoptic links:** Topic 1.1 Natural cycles of climate change, Topic 1.2 Deforestation and its impact on climate change, Topic 2.1 Neo-Malthusians and Harvey’s contradiction 16, Topic 3.2 Impacts of urbanisation, traffic congestion in cities affecting urban heat island and emission of greenhouse gases from landfills and incineration in waste management strategies.

**6 (a)** Explain the issues affecting liveability for the elderly in cities in countries at high levels of development. [12]

Indicative content

Responses should make reference to examples from cities in countries at high levels of development and outline relevant challenges faced by the elderly. Challenges faced by the elderly include mobility and safety issues, social isolation and loneliness, financial, health including air and noise and congestions in cities, ageism and elder abuse.

Responses could also include the feeling of alienation faced by the elderly in large cities with the influx of younger people and the influx of immigrants bringing with them different attitudes and culture. This form of “invasion and succession” has the effect of encouraging many long term residents to leave. Those that are left behind see their neighbourhoods change both socially and physically and are unable to adopt and consequently also decide to move away.

A high level response should identify traits or characteristics associated with cities in countries at high levels of development and make explicit links to how these traits or characteristics contribute to the challenges faced or exceptions. Another possible approach is to demonstrate how these challenges could vary across, and within social groups, over a period of time.

Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a).

**6 (b)** Assess the extent to which strategies to meet the needs of the elderly in urban areas have been adequate. [20]

Indicative Content

Having explained the issues affecting the elderly, responses will now consider the extent to which governmental strategies have met the varying needs of the elderly in urban areas. Answers should address a variety of needs such as mobility and safety issues, social isolation and loneliness, financial, health including air and noise and congestions in cities, ageism and elder abuse.

In comparing the level of adequacy in meeting the needs of the elderly, responses should include at least the experience of low and high income countries of urban areas. As a quick comparison, **DCs** tend to be able to meet some of the needs of the elderly in particular the creation of age-friendly cities, employment opportunities in terms of legislative laws to protect the elderly as well as keeping the elderly healthy. However, it is important to qualify that **DCs** have their own set of challenges in relation to their health care systems, social protection and social inclusion and civic participation.

For the developing countries, the break-up of the traditional family unit poses a big challenge to governments being able to care for the elderly apart from the lack of financial ability to provide the various service provisions. Developing countries inadvertently are less able to meet the needs of the elderly as compared to higher income countries.

A higher level response could provide detailed examples to illustrate the points. A discussion of what is considered as adequate response from the governments could be included. For example, people generally expect the government to provide physical infrastructures (e.g. lifts at MRT stations, wheel-chair friendly buses) to support the elderly with mobility issues. However, the elderly also have other needs such as love and belonging. They also want to live their life with dignity. Physical infrastructures do not respond to this need. This is something the government cannot provide and is where the role of the civil society comes in.

There may even be an offer of further solutions or improvements that can be made for the future.

Possible synoptic links: Topic 2.1 HDI, MPI and role of the state and Topic 3.1 Concept of sustainable development and essential needs of the poor.

Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b).



# NANYANG JUNIOR COLLEGE

## Year 2 Preliminary Examination

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**H2 GEOGRAPHY**

**9751/02**

Paper 2 Data Response Questions

17 September 2019

INSERT

**3 hours**

Additional Materials:      Answer Paper  
   1 Insert  
   World outline map

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### **READ THESE INSTRUCTIONS FIRST**

This Insert contains all the Resources referred to in the questions.

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This document consists of **12** printed pages.

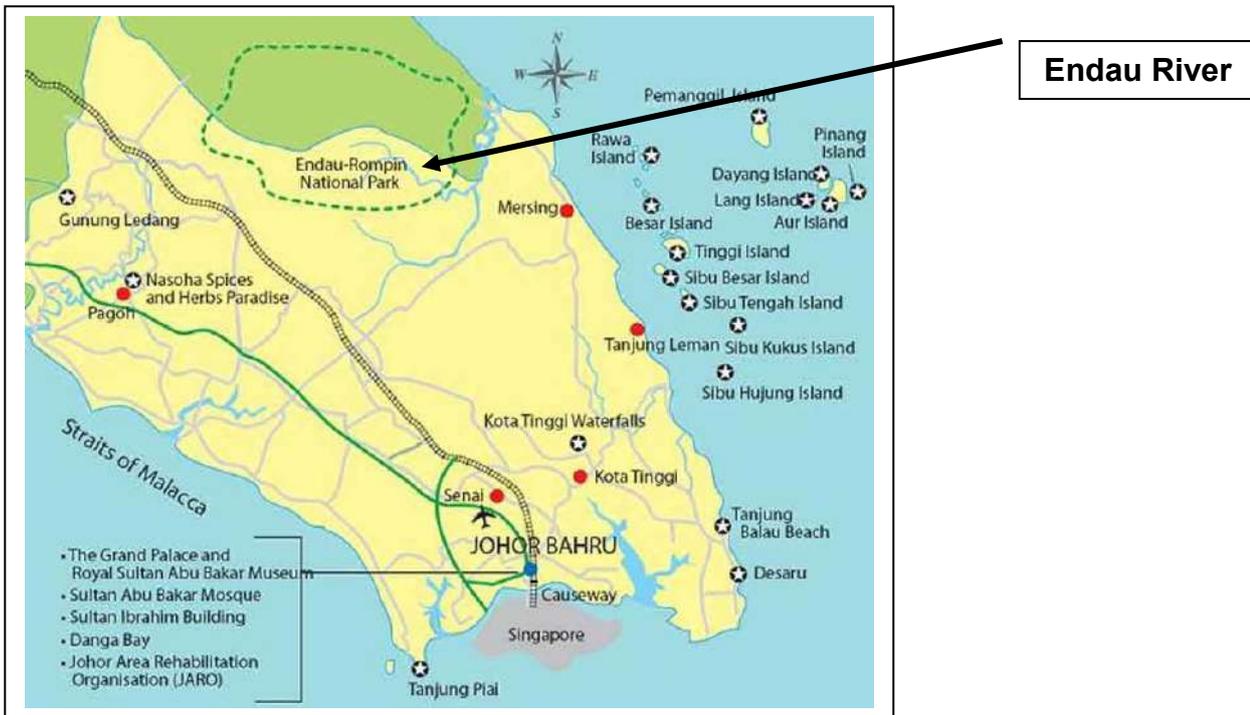
**[Turn over**

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### Resource 1 for Question 1

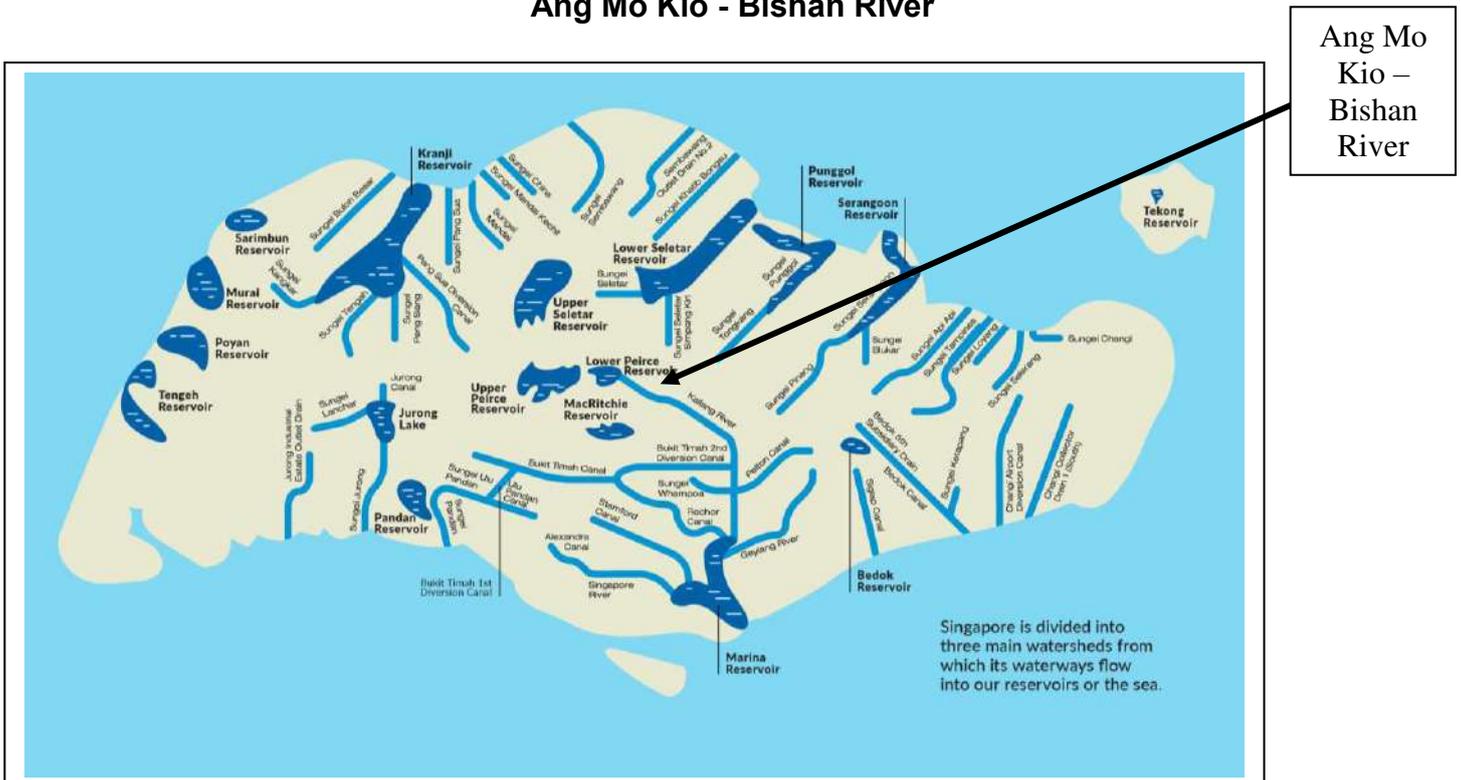
#### Drainage basin of River A

Endau River located within the Endau Rompin National Park, Peninsular Malaysia



[https://www.google.com.sg/search?q=endau+river&tbm=isch&imgil=uWulxdYYqsJhdM%253A%253B4hi2CO9s3BRmaM%253Bhttps%25253A%25252F%25252Fen.wikipedia.org%25252Fwiki%25252FEndau-Rompin\\_National\\_Park&source](https://www.google.com.sg/search?q=endau+river&tbm=isch&imgil=uWulxdYYqsJhdM%253A%253B4hi2CO9s3BRmaM%253Bhttps%25253A%25252F%25252Fen.wikipedia.org%25252Fwiki%25252FEndau-Rompin_National_Park&source)

#### Drainage basin of River B Ang Mo Kio - Bishan River

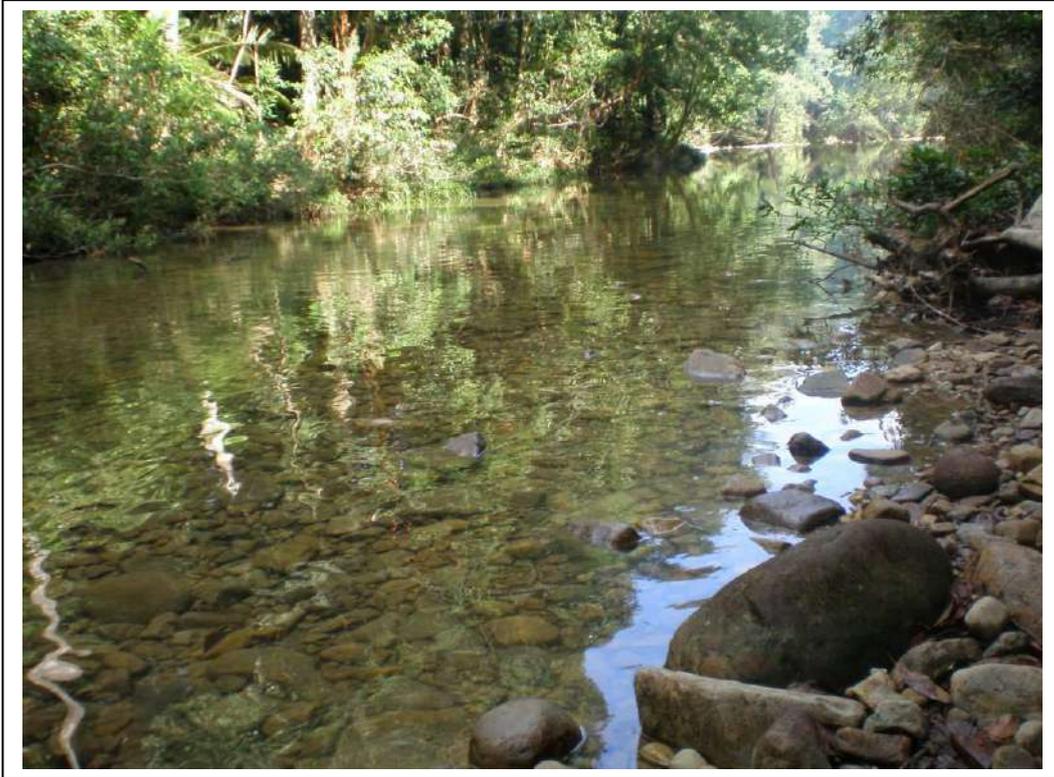


<http://joyloh.com/blog/?p=10679>

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Higher 2 Geography / 9751 / 02

**Resource 2 for Question 1**

**River A**



[https://www.google.com.sg/search?q=endau+river&tbm=isch&imgil=uWulxdYYqsJhdM%253A%253B4hi2CO9s3BRmaM%253Bhttps%25253A%25252F%25252Fen.wikipedia.org%25252Fwiki%25252FEndau-Rompin\\_National\\_Park](https://www.google.com.sg/search?q=endau+river&tbm=isch&imgil=uWulxdYYqsJhdM%253A%253B4hi2CO9s3BRmaM%253Bhttps%25253A%25252F%25252Fen.wikipedia.org%25252Fwiki%25252FEndau-Rompin_National_Park)

**River B**



<https://www.google.com.sg/search?q=bishan+park&espv=2&biw=1366&bih=662&tbm=isch&imgil=eCN>

## Resource 3 for Question 1

Data collected to calculate the velocity of Rivers A and B

River A					River B			
Velocity (m/s)					Velocity (m/s)			
Time	1	2	3	average	1	2	3	average
10:00	0.42	<del>0.52</del> 0.48	0.46	0.45	<del>0.36</del> 0.40	0.40	0.45	0.40
11:00	0.50	0.50	0.48	0.49	0.52	0.58	0.56	0.55
12:00	0.56	0.58	0.55	0.56	0.62	0.63	0.66	0.67
13:00	<del>0.52</del> 0.53	0.52	0.54	0.53	0.51	0.53	0.56	0.53
14:00	0.48	0.46	<del>0.48</del> 0.45	0.46	0.48	0.49	0.50	0.49

G.C.E. A Level Specimen Paper

**Resource 4 for Question 2**

A type of mass movement in the humid tropics



<https://www.cp24.com/world/philippine-villages-at-risk-forcibly-evacuated-1.4103547>

**Resource 5 for Question 2**

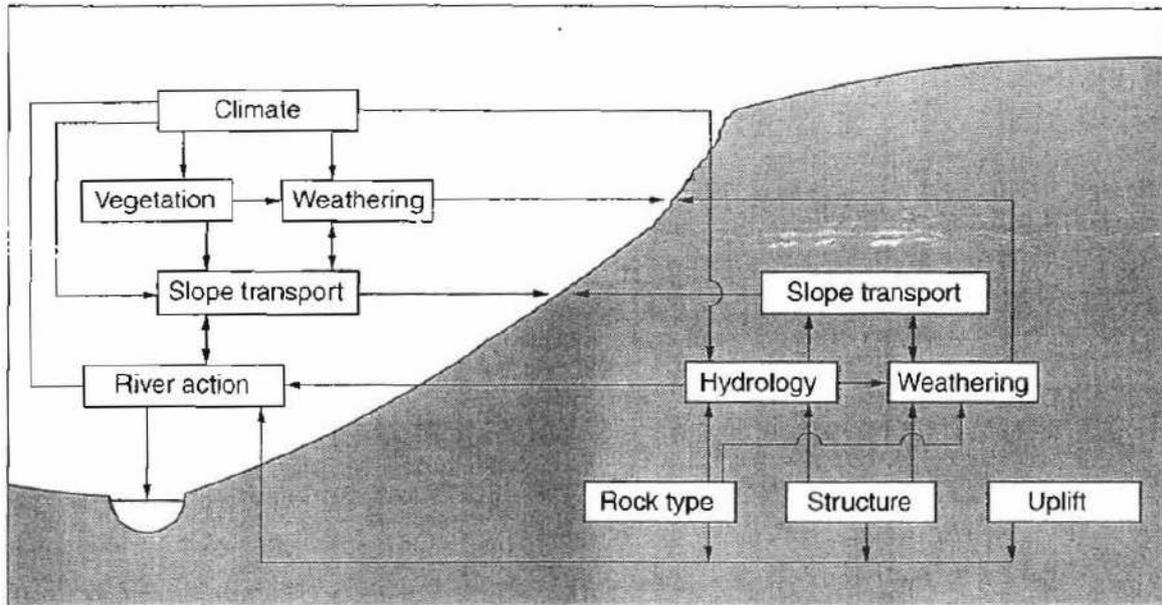
A type of mass movement in the arid tropics



<https://www.shutterstock.com/video/search/red-cliffs-recreation-utah%27>

### Resource 6 for Question 2

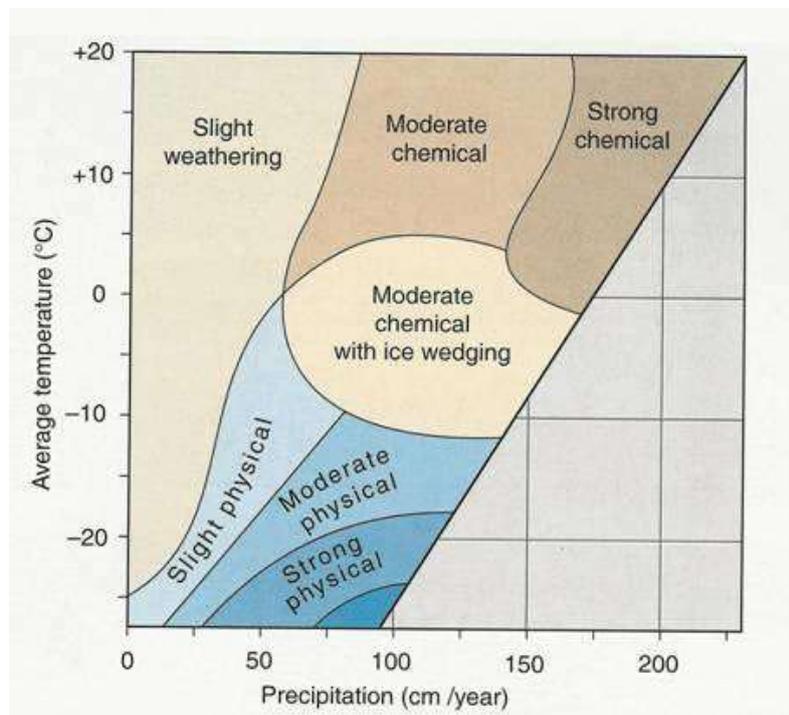
A system of slope processes



G. C. E. A Level Nov 2000

### Resource 7 for Question 3

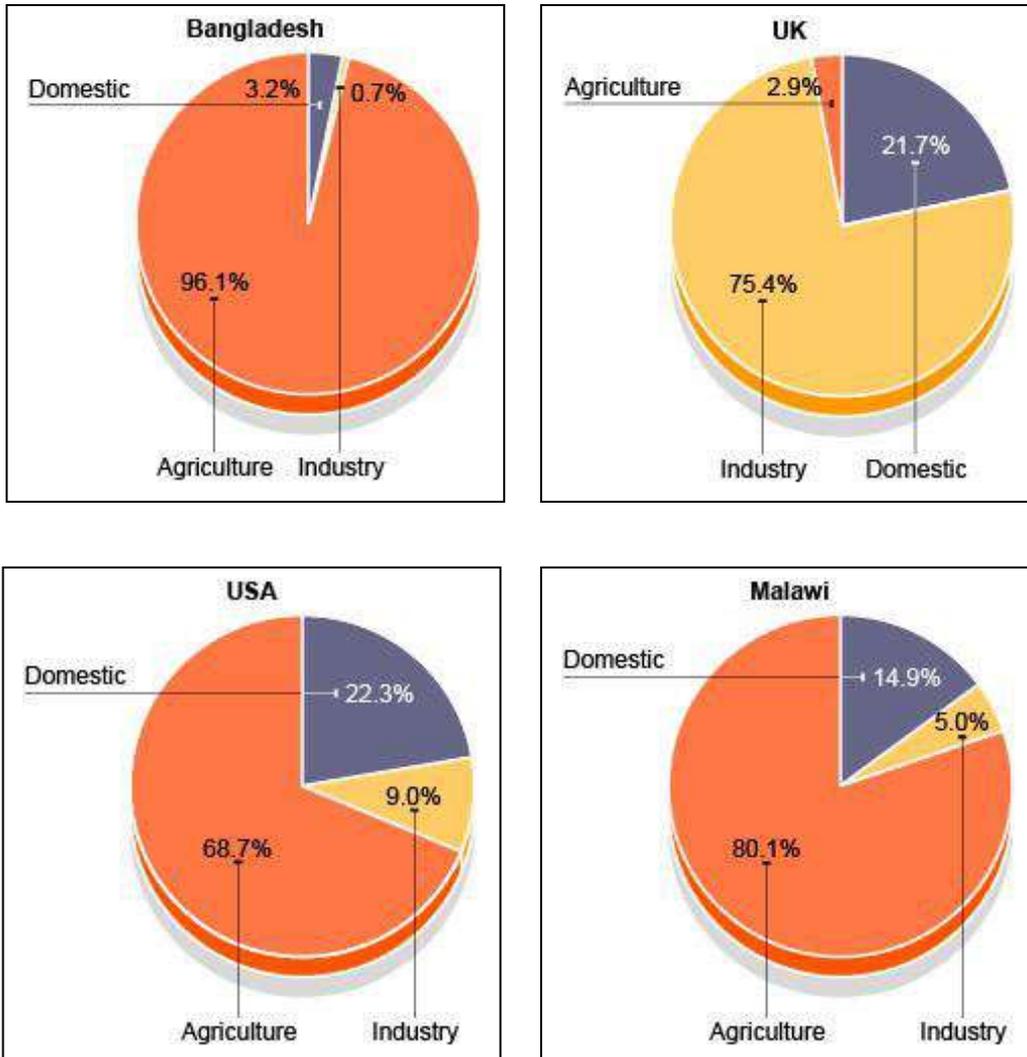
The type and intensity of weathering processes in relation to the annual rainfall and mean annual temperature



<http://igcseandalevelgeography.blogspot.com/2012/08/peltier-diagram.html>

**Resource 8 for Question 3**

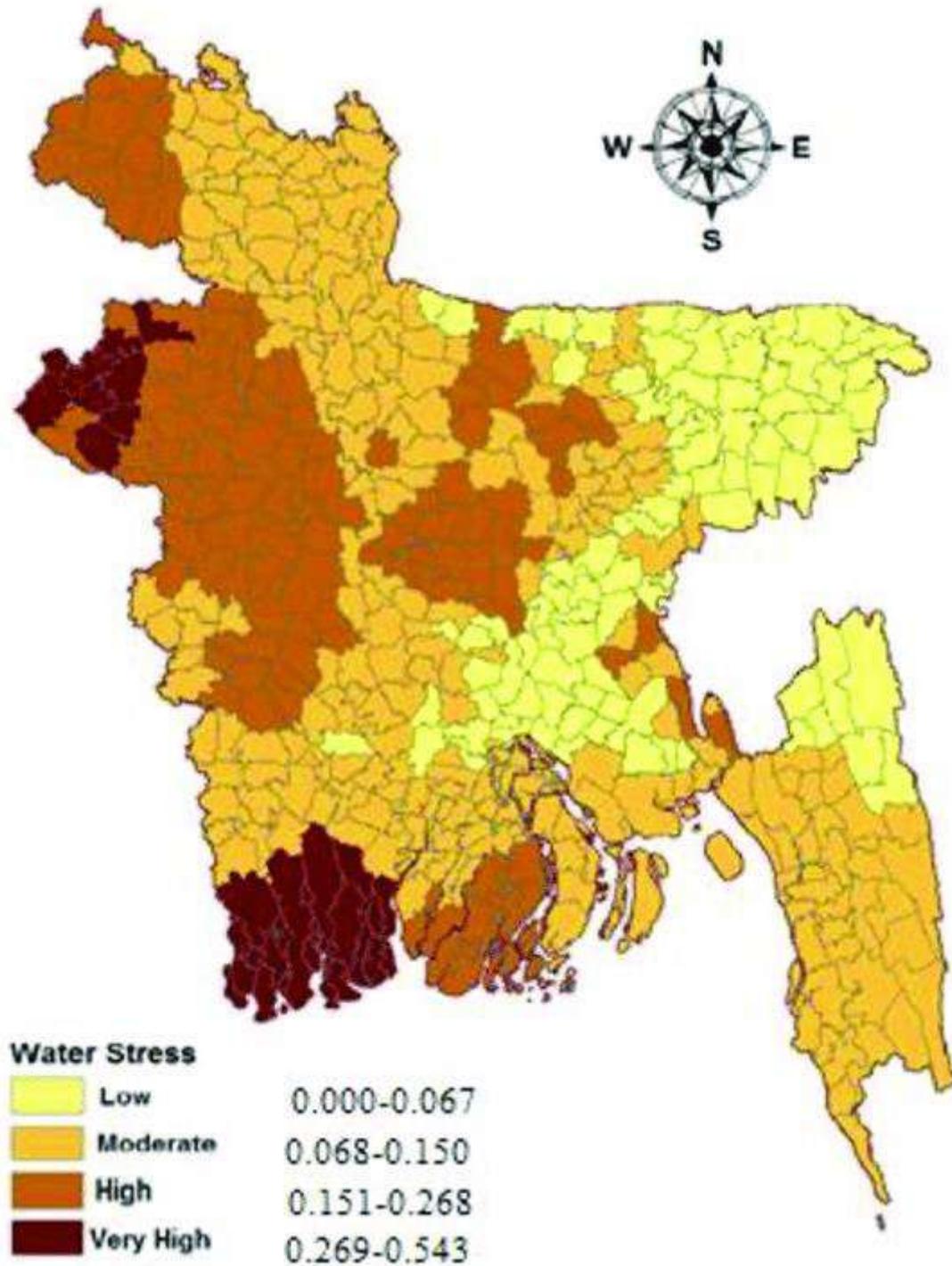
The difference in water usage in four countries.



[http://www.bbc.co.uk/schools/gcsebitesize/geography/water\\_rivers/water\\_usage\\_rev1.shtml](http://www.bbc.co.uk/schools/gcsebitesize/geography/water_rivers/water_usage_rev1.shtml)

## Resource 9 for Question 3

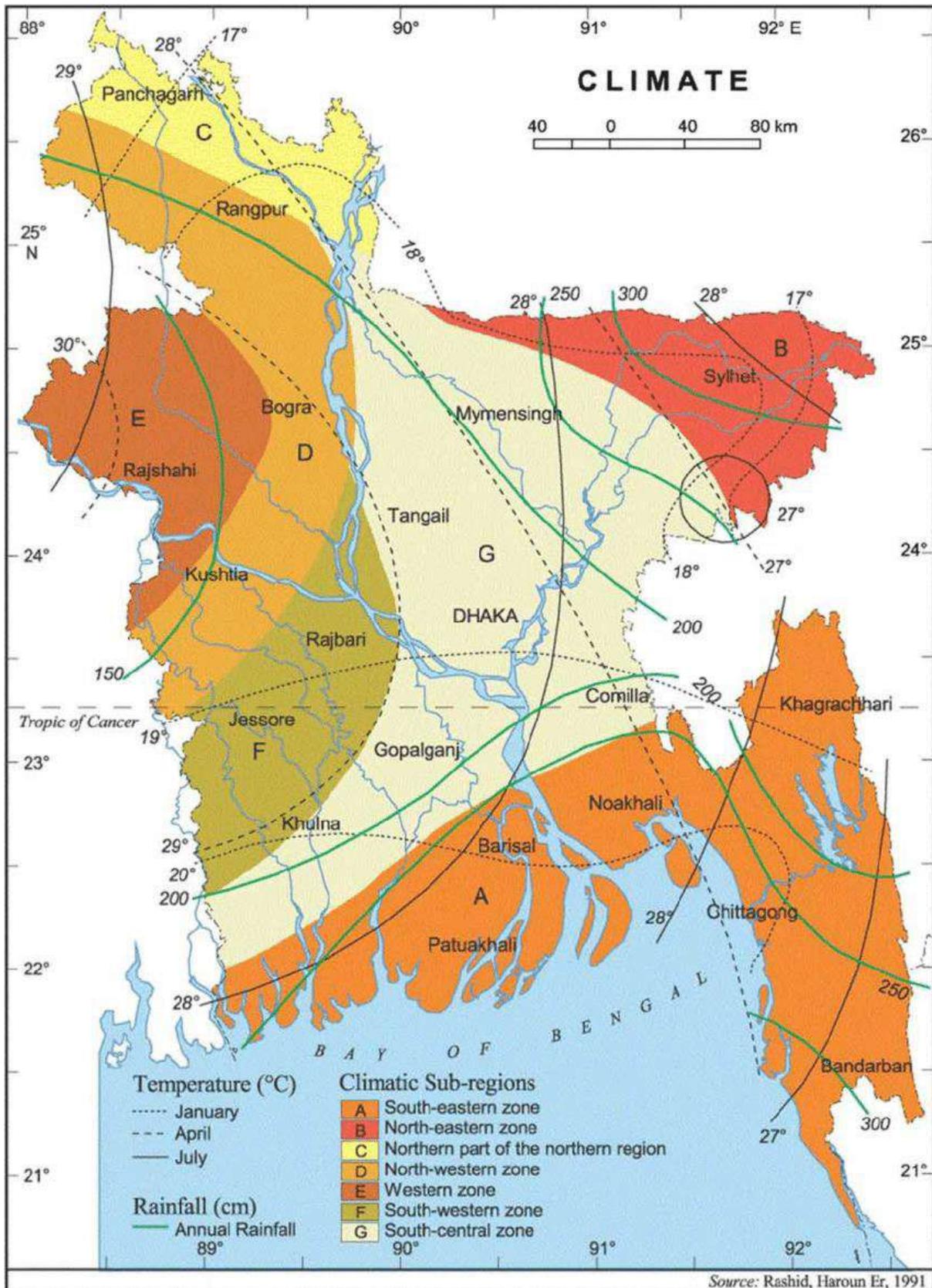
The geographical distribution of agricultural water scarcity in Bangladesh



[https://www.researchgate.net/figure/Geographical-distribution-of-agricultural-water-scarcity-during-the-pre-monsoon-season-in\\_fig2\\_323791035](https://www.researchgate.net/figure/Geographical-distribution-of-agricultural-water-scarcity-during-the-pre-monsoon-season-in_fig2_323791035)

Resource 10 for Question 3

The seven climatic zones of Bangladesh



[https://www.researchgate.net/figure/Seven-climatic-zones-of-Bangladesh-Source-Prime-MinistersO-f-fice-database\\_fig2\\_311930293](https://www.researchgate.net/figure/Seven-climatic-zones-of-Bangladesh-Source-Prime-MinistersO-f-fice-database_fig2_311930293)

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Higher 2 Geography / 9751 / 02

Resource 11 for Question 4

Congestion statistics during morning and evening peaks in 2017 and 2018 for Paris



Congestion statistics during morning and evening peaks in 2017

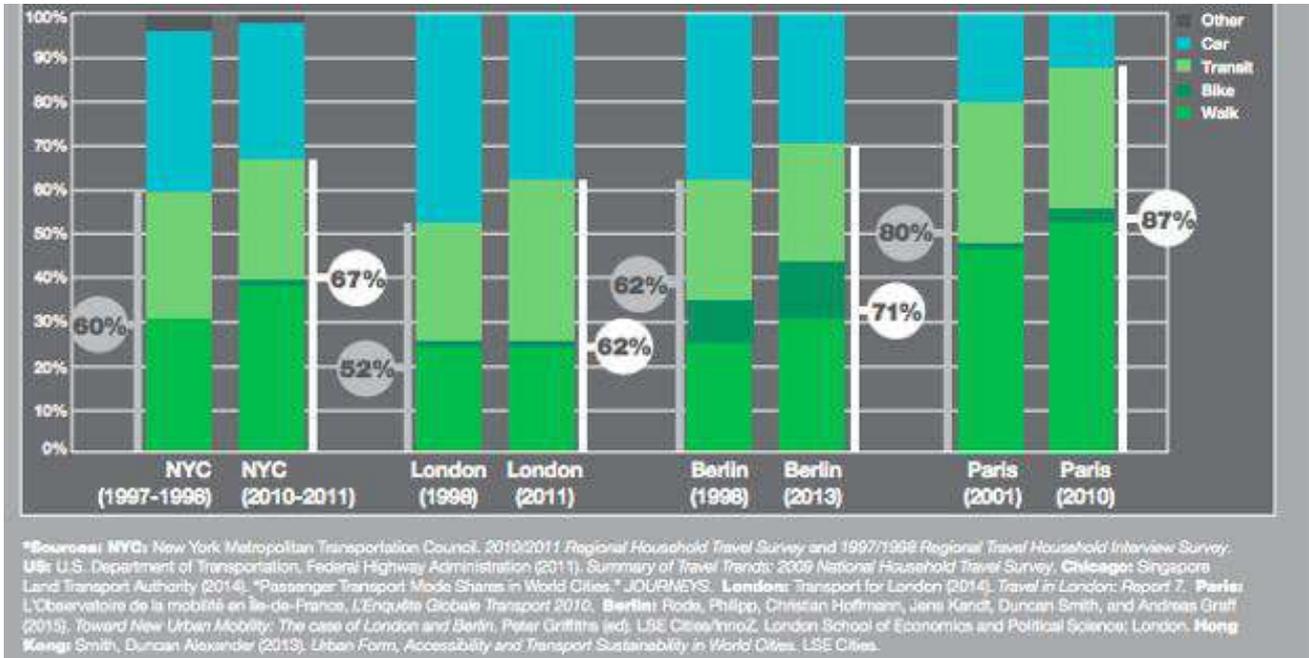


Congestion statistics during morning and evening peaks in 2018

[https://www.tomtom.com/en\\_gb/traffic-index/paris-traffic](https://www.tomtom.com/en_gb/traffic-index/paris-traffic)

## Resource 12 for Question 4

Mode share over time between Paris and other peer cities.



<https://www.citylab.com/transportation/2018/01/the-automotive-liberation-of-paris/550718/>

**Resource 13 for Question 4****A proposed plan for a car-lite street in Paris**

A rendering of how the Rue de Rivoli might look after its bike lanes have been installed. It is one of the most famous streets in Paris, a commercial street whose shops include the most fashionable names in the world.

<https://www.citylab.com/transportation/2017/01/paris-car-ban-seine-anne-hidalgo/512534/>



# NANYANG JUNIOR COLLEGE

## Year 2 Preliminary Examination

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### H2 GEOGRAPHY

**9751/02**

Paper 2 Data Response Questions

17 September 2019

**3 hours**

Additional Materials:            Answer Paper  
   1 Insert  
   World outline map

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### READ THESE INSTRUCTIONS FIRST

Write your Centre number, index number and name on the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Candidates answer **all** questions.

The Insert contains all the Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the questions.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

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This document consists of **6** printed pages.

**[Turn over**

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## Section A

### Theme 4 – Geographical Investigation

- 1 You and a group of classmates were tasked with undertaking a fieldwork exercise on two contrasting river channels to ascertain the flood risk in these locations associated with the nature of channels at each site.

The group was divided up into teams of four to measure river velocity and wetted perimeter of each river. One site (River A) was along a river in an area of protected environment status. The other site (River B) was along a managed river channel. Discharge is calculated by multiplying the cross sectional area of the channel by the velocity of the water.

Your team took measurements on two consecutive Tuesdays in March during the dry season and were given 4 hours between 10 a.m. and 2 p.m. at each site to complete the river velocity and wetted perimeter measurements.

Teams were each given the following equipment to gather the primary data on river velocity:

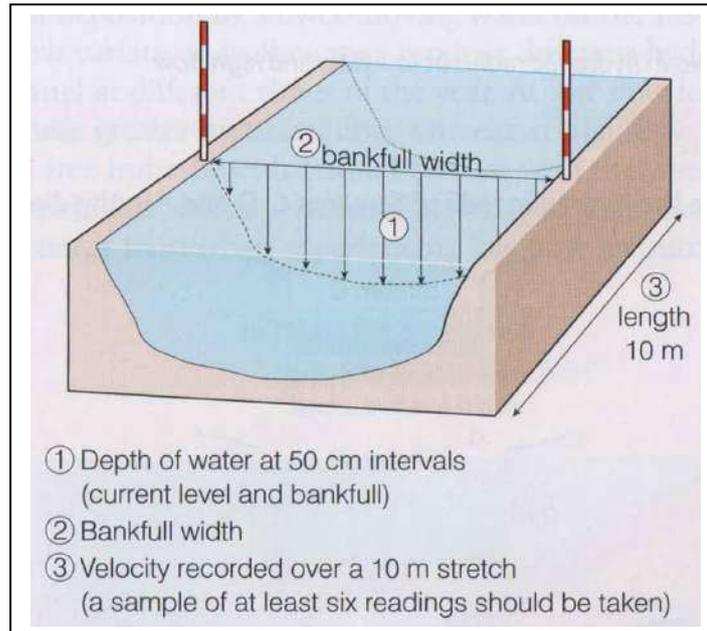
- Ping pong balls
- Tape measure
- Stop watch

The time taken for the floating object (ping pong ball) to cover a pre-determined distance defined by the position of two students standing by the side of the river was recorded. At river B, the group found that the floating object often gets blown to the sides of the channel bank as it was windy on both days. The data collected was recorded using a data collection sheet (see Resource 3).

To measure the river's wetted perimeter your team used the following equipment:

- Tape measure
- Meter rulers

Your team laid an unweighted tape measure along the river bed and took depth measurements at equal distances across the river. This data is used to plot the river's wetted perimeter and then the cross sectional areas of the two rivers were calculated.



Resource 1 shows land use in drainage basins associated with Rivers A and B. Resource 2 shows two photographs, one of a river in an area of protected environment status (River A) and one of a managed river channel (River B). Resource 3 shows the data collected by your team to calculate the velocity of Rivers A and B.

- (a) With reference to Resource 1, suggest a suitable hypothesis for your group's investigation. [1]
- (b) Explain how your group would minimise the impact of your investigation differently at the two rivers shown in Resource 2. [5]
- (c) Suggest **two** limitations of the data representation method shown in Resource 3 and use an alternative method to represent the average velocity of Rivers A and B over time. [4]
- (d) Your group concluded that some of the discharge data collected may not be completely reliable and/or accurate.
- Explain how the process of data collection could be improved. [6]
- (e) Evaluate the usefulness of the river velocity data shown in Resource 3 in helping to ascertain the flood risk at each of the two rivers. [9]

## Section B

### Theme 1: Tropical Environments

#### Mass movement hazards in the Tropics

- 2** Resource 4 shows a type of mass movement in the humid tropics. Resource 5 shows a type of mass movement in the arid tropics. Resource 6 shows a system of slope processes. Resource 7 shows the type and intensity of weathering processes in relation to the annual rainfall and mean annual temperature.
- (a) Draw an annotated diagram of the mass movement in Resource 4 to show its characteristics. [5]
- (b) Compare the characteristics of the mass movements as shown in Resources 4 and 5. [3]
- (c) Using Resources 6 and 7, explain the role of climate in contributing to the mass movement in Resource 4. [7]
- (d) Apart from climate, explain **one** physical and **one** human factor that may influence the type of mass movement in Resource 4. [4]
- (e) With reference to Resources 4 and 5 and your own knowledge, discuss the impacts of mass movements on the physical and human environment. [6]

**Theme 2: Development, Economy and Environment****Water scarcity in Bangladesh**

- 3** Resource 8 shows the difference in water usage in four countries. Resource 9 shows the geographical distribution of agricultural water scarcity in Bangladesh. Resource 10 shows the seven climatic zones of Bangladesh.
- (a) Compare the pattern of water usage for the countries shown in Resource 8. [4]
- (b) With reference to Resource 8, explain the pattern of water usage for the countries shown. [5]
- (c) With reference to Resource 9, describe the geographical distribution of agricultural water scarcity in Bangladesh. [3]
- (d) Using Resource 10 and your own knowledge, account for the two regions with the highest water stress as shown in Resource 9. [7]
- (e) Explain **three** adaptation strategies that may be undertaken for the two regions with the highest water stress as shown in Resource 9. [6]

### Theme 3: Sustainable Development

#### Traffic congestion management in Paris

- 4 Resource 11 shows the congestion statistics during morning and evening peaks for 2017 and 2018 for Paris. Resource 12 shows the mode share over time between Paris and other peer cities. Resource 13 shows a proposed plan for a car-lite street in Paris.
- (a) Describe the congestion statistics during morning and evening peaks for Paris in 2018 as shown in Resource 11. [3]
- (b) With reference to Resource 11, explain the possible reasons for the traffic congestion problem in Paris. [4]
- (c) Compare the mode share over time between Paris and other peer cities as shown in Resource 12. [4]
- (d) With reference to Resources 11 and 12, would you say that the traffic congestion problem in Paris is worse off as compared to 2017 and other peer cities? [5]
- (e) With reference to Resource 13 and your own knowledge, assess whether the implementation of car-lite streets is a good solution to solving the traffic congestion problem in Paris. [9]

## NYJC 2019 Prelims H2 Geog 9751 P2 Mark Scheme

### Theme 4 – Geographical Investigation

- 1 You and a group of classmates were tasked with undertaking a fieldwork exercise on two contrasting river channels to ascertain the flood risk in these locations associated with the nature of channels at each site.

The group was divided up into teams of four to measure river velocity and wetted perimeter of each river. One site (River A) was along a river in an area of protected environment status. The other site (River B) was along a managed river channel. Discharge is calculated by multiplying the cross sectional area of the channel by the velocity of the water.

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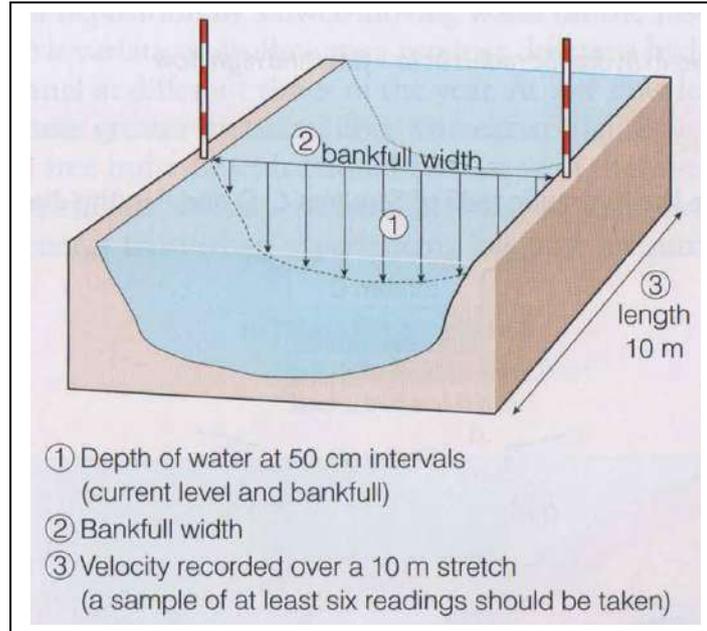
- Ping pong balls
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- Stop watch

The time taken for the floating object (ping pong ball) to cover a pre-determined distance defined by the position of two students standing by the side of the river was recorded. At river B, the group found that the floating object often gets blown to the sides of the channel bank as it was windy on both days. The data collected was recorded using a data collection sheet (see Resource 3).

To measure the river's wetted perimeter your team used the following equipment:

- Tape measure
- Meter rulers

Your team laid an unweighted tape measure along the river bed and took depth measurements at equal distances across the river. This data is used to plot the river's wetted perimeter and then the cross sectional areas of the two rivers were calculated.



Resource 1 shows land use in drainage basins associated with Rivers A and B. Resource 2 shows two photographs, one of a river in an area of protected environment status (River A) and one of a managed river channel (River B). Resource 3 shows the data collected by your team to calculate the velocity of Rivers A and B.

(a) With reference to Resource 1, suggest a suitable hypothesis for your group investigation. [1]

Award 1 mark for any testable and sensible hypothesis related to flood risk associated with nature of channels.

Possible responses include:

- River B has a higher flood risk than River A.
- An area with a higher proportion of vegetation is less prone to flooding than an area with lower proportion of vegetation
- Build-up areas tend to experience a higher risk of flooding than naturally vegetated areas.
- Managed rivers have a lower flood risk than natural ones.

(b) Explain how your group would minimise the impact of your investigation differently at the two rivers shown in Resource 2. [5]

Indicative Content:

- Do not leave litter – At River B, student could suggest using litter bins. At River A student could suggest bagging litters and taking it away with them
  - Avoid unnecessary damage to trees and plants such as cutting down overhanging branches at River A.
  - Avoid unnecessary disturbance to wildlife at River A such as disturbance of riverside nesting sites, river banks and the river channel itself.
  - Avoid making excessive noise at River B due to close proximity to residents.
  - Conduct their investigation at a place with lower human traffic so as not to deprive other park users from using the facilities.
- (c) Suggest **two** limitations of the data representation method shown in Resource 3 and use an alternative method to represent the average velocity of Rivers A and B over time. [4]
- Award 1 mark for each valid limitation to a maximum of 2 marks. Award 2 marks for sketching using an alternative method.

Possible limitations could include:

- Difficulty in visualising change in velocity over time at each site.
- Difficulty in visual comparison between sites.

An alternative method may be a line graph. Award one mark for each of the following:

- Title
- Relative accuracy of the line graph
- Appropriate labels for both axes

- (d) Your group concluded that some of the discharge data collected may not be completely reliable and/or accurate. Explain how the process of data collection could be improved. [6]

Indicative Content:

- At river B, as the floating object often gets blown to the sides due to the weight of the ping pong balls, suggest replacing them with orange peels that are heavier and semi-submersible. To ensure greater accuracy, repeated measurements and averages can be taken to reduce the margin of error.
- With depth measurements ensure that the tape measure is weighted so that it sinks in to just touch the river bed and take care to record any anomalies in depth caused by irregularities in the river bed.

- Measurements were taken during the dry seasons. Flows tend to be lower during this time owing to lesser input and lower base flow. Suggest taking two other measurements during the wetter season before taking the averages. However, caution must be taken to avoid endangering the lives of the participants during high flows.
  - Students' position by the river may change due to movements and hence is not an accurate way of determining the start and finish lines. Should use tape measures or ranging poles to mark the position of recorders so as to help minimise errors.
  - Obtain measurements from at least another two more segments along the long profile of the river – ideally one each from the upper, middle and lower course where possible.
- (e) Evaluate the usefulness of the river velocity data shown in Resource 3 in helping to ascertain the flood risk at each of the two rivers. [9]

Indicative Content:

Usefulness points could include the fact that the data gives some idea of river response to rainfall event. In general, higher velocity due to an increase in  $Q$  would increase the risk of flooding (direct relationship) i.e. higher peak  $Q$  and shorter lagtime.

They could also include the relative difference in response between River A and River B. River B appears more responsive to the rainfall episode as seen by the steeper rising limb.

However response should refer to the other information that would be useful in ascertaining flood risk. These could include the following:

- Nature of catchment area (landuse, relief, vegetation cover, drainage density, shape of drainage basin).
- Nature of river channel (gradient, channel pattern, wetted perimeter, and sinuosity).
- Nature of rainfall event (duration, amount of rainfall).
- Geology or surrounding area (levels of permeability).
- Flood mitigation measures put in place by the authorities.

Response could also recognise that there are limitations related to the methods involved in the collection of velocity data. The improvised method is definitely less accurate as compared to mechanical methods such as a proper gauging station equipped with a mechanised flow metre.

A higher response will present evaluation of usefulness of resource and of knowledge of river velocity measurements as well as a detailed discussion of other information that is useful in being able to assess flood risk. For example, reference will be made to the nature of both rivers as shown in the resource (River A rainforest

area, River B more urban, apartment blocks seen in resource), usefulness of Resource 3 (shows difference in river response to rainfall event) as well as limitations (does not show other useful data about river such as discharge or contain data over time, no information on nature of rainfall event, geology of surrounding area) and a full range of most of the factors listed above.

Levels marked using H2 generic level descriptors for 9m open-ended DRQ for Theme 4.

## Section B

### Theme 1: Tropical Environments

#### Mass movement hazards in the Tropics

**2** Resource 4 shows a type of mass movement in the humid tropics. Resource 5 shows a type of mass movement in the arid tropics. Resource 6 shows a system of slope processes. Resource 7 shows the type and intensity of weathering processes in relation to the annual rainfall and mean annual temperature.

(a) Draw an annotated diagram of the mass movement in Resource 4 to show its characteristics. [5]

- annotated diagram (2m) to show rotational slide and
- characteristics - curved concave shear plane; multiple layers of slide; scar that marks the point of slippage, thick deeply weathered regolith reduces shear strength. (3m)

(b) Compare the characteristics of the mass movements as shown in Resources 4 and 5. [3]

#### Similarity

- Both are slides occurring along defined planes

#### Differences

- Climatic differences – rotational slide (Resource 4) occurs in humid tropics as seen by the thick vegetation cover; rock slide occurs in arid conditions
- Speed – rock slide is expected to be faster than rotational slide due to the vertical cliff face and the lack of vegetation cover to hold the rocks in place (Resource 5)
- Shape of the plane – curved concave shear plane resulting in rotational slide (Resource 4) vs well defined inclined surface resulting in translational slide (Resource 5)
- Type of regolith involved – fine clay/kaolin material (Resource 4) vs individual blocky masses (Resource 5)

#### Point marked

(c) Using Resources 6 and 7, explain the role of climate in contributing to the mass movement in Resource 4. [7]

#### Indicative content

Mass movement occurs when the safety factor is less than 1 (that is, Shear Strength < Shear Stress).

In the occurrence of the rotational slide (Resource 4), climate plays a direct role in affecting the safety factor. As seen in Resource 6, climate affects the various types of geomorphological processes operating on the slope. Shear strength is reduced when rocks are being broken down by weathering processes (Resource 6). Resource 7 shows that strong to moderate CW is promoted in the humid tropics with rainfall reaching 2000mm per year. This helps to break down the rocks by causing them to decompose; making them ready for movement via slope transport processes such as mass movements and/or overland flow. Responses can bring in the effects of Van't Hoff's law in the decomposition of the parent material.

According to Resource 6, climate also has a direct influence on vegetation. High mean annual rainfall and temperature in the humid tropics help to promote a thick vegetation cover which in turn facilitates infiltration and hence sub-surface flows. This promotes deep CW; breaking down parent rock into regolith such as clay/kaolin which decreases its shear strength. The availability of water in the humid tropics also helps to increase shear stress as water adds weight to the soil as well as decrease shear strength with water acting as a lubricating factor (pore water pressure). This promotes the occurrences of rotational slides like those in Resource 4 as friction between the layers of regolith is being reduced.

However, Resource 6 also shows that climate alone does not determine mass movement processes. In promoting rotational slides other factors such as structure also plays a part. The presence of a curved concave shear plane is essential in causing the rotation unlike translational slides. The rotational movement moves material from the higher part of the slope to the lower, and the sediment that was at the lower end of the slope is pushed outwards, forming a lobe.

Level marked

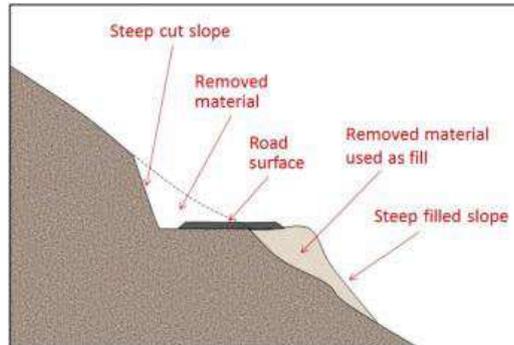
(d) Apart from climate, explain **one** physical and **one** human factor that may influence the type of mass movement in Resource 4. [4]

Physical:

- Geological Structure
  - rocks inclined (dipping) in the same direction as the slope are more prone to mass movement than rocks in other orientations. Bedding planes and fractures serve as zones of weakness along which weathering and movement can take place.
- Topography
  - steep slopes as seen in Resource 4 increases stress whilst reduces strength.
  - presence of large trees as seen in Resource 4 further adds weight to the slope increasing the driving forces
- Tectonic hazards
  - earth movements due to earthquakes or large volcanic eruptions
  - shock waves loosens the unstable material for transportation downslope

Human:

- road cut → decreases the stability of a slope by reducing shear strength. Removal of material to create a flat level surface for roads increases the steepness of slopes and reduces the shear strength as there is undercutting at the base of the slope.



- mining or deforestation – removal of protective vegetation cover and the destabilisation of the slope → increases the tangential component.

Point marked

- (e) With reference to Resources 4 and 5 and your own knowledge, discuss the impacts of mass movements on the physical and human environment. [6]

Human – lives are lost when settlements are located too near the site of mass movement.

- In Resource 4, earth and debris can be dislodged when the slope fails and buries entire towns or settlements (e.g. the Philippines during a monsoon season when high P reduces the shear strength of slopes that have layered regolith).
- In Resource 5, the huge boulders that slide off the steep slope is so fast there is no way one can escape from it if one is in the vicinity. Often triggered by events like earthquakes, these rock slides often involves large-scaled movements with slabs of rocks being removed in at short span of time. (e.g. Kota Kinabalu earthquake in 2015).
- On 17th February 2019, a significant and potentially hazardous rockslide occurred in Longjing village, in Xingyi, Guizhou province, Southwest China. This rockslide, which is primarily dolomite, had a volume of about 1.4 million cubic metres.

Physical – the landscape is affected and changed by mass movement and the biodiversity it supports will be affected.

- In Resource 4, if water ponded between the blocks at the back of the slide seeps through the weakened failed material, subsequent failures may occur. Biodiversity that depends on the vegetation that grown on those disturbed

landscapes can also be affected. Eg. 23<sup>rd</sup> April 2019, a slope collapsed at a jade mine at Balakh village in Myanmar.

- In Resource 5, rock strata are being disturbed and processes like weathering and erosion can be increased due to exposed layers of underlying rock. Regolith brought down may accumulate at the base to form a scree slope.

Point marked

## **Theme 2: Development, Economy and Environment**

### **Water scarcity in Bangladesh**

- 3** Resource 8 shows the difference in water usage in four countries. Resource 9 shows the geographical distribution of agricultural water scarcity in Bangladesh. Resource 10 shows the seven climatic zones of Bangladesh.

(a) Compare the pattern of water usage for the countries shown in Resource 8. [4]

Similarity

- agriculture sector consumes the most water; 3 out of 4 countries shown.

Differences

- In general LDCs (like Bangladesh and Malawi) use most of their water for agriculture (more than 80%) with the remaining shared between industry and domestic use.
- DCs (like the UK and USA) have a more significant use of water for domestic and industrial use.
- There are exceptions. The USA is a DC, but it uses a high amount of water (close to 70%) for agriculture; liken than of LDCs.

Point marked

(b) With reference to Resource 8, explain the pattern of water usage for the countries shown. [5]

- According to Resource 8, LDCs tend to have a greater proportion of water used for agricultural purposes as their economies are still largely agrarian in nature with a dominating primary sector.
- In terms of domestic consumption, DCs tend to use more water vis-à-vis the LDCs. In DCs, affluence allows citizens to be able to afford modern day appliances such as washing machines and dish washers. These are water guzzlers as compared to the humble handwashing done in LDCs. Lifestyle

fixtures and amenities such as home bath tubs and private swimming pools in DCs also consume a lot of water.

- the high consumption in DCs could further be explained by the fact that these countries use piped water with the amount of usage captured by water metres affixed within each household. The data is captured and households are charged according to the amount of water used. The highly subsidised water in some of the DCs would only encourage higher per capita consumption. Unlike DCs, many households in LDCs do not have access to piped water. The sources of water in LDCs usually come from natural sources such wells or nearby rivers. These sources of water being “commons” are free for use by the communities and hence not formally captured in the data as seen in Resource 8. Even if they have piped water, access may be restricted or even disrupted due to poor water management.
- The higher amount of industrial water use in DCs could be accounted for by the larger secondary sector in comparison to LDCs. For UK, its secondary sector accounts for as much as 75% of its total water usage as compared to Malawi (5%) and Bangladesh (0.7%).
- USA as a DC consumes a lot of water for its agricultural sector though its economy is mainly tertiary in nature. In DCs, irrigation is mechanised. Sprinklers or timed irrigation feeds are used. Vast amounts of water can be released at a touch of a button. As water supplies are not an issue, they are less water efficient and need not be selective in their choice of crops i.e. high water demanding crops may be grown. Poor maintenance of the systems also lead to water wastage. In LDCs, the irrigation system is less sophisticated and they do not come with water saving features. LDCs are still using the centre pivoting system rather than the drip system used by DCs which is more water conserving.

Point marked

(c) With reference to Resource 9, describe the geographical distribution of agricultural water scarcity in Bangladesh. [3]

- Lowest water stress mainly in the eastern part
- High water stress areas are predominantly in the western, northwest and central parts. Two pockets of high stress regions can also be found in the southeastern and southern part of Bangladesh.
- Highest water stress located in two pockets – northwest and southwest with the latter occupying a slightly larger area.

Point marked

(d) Using Resource 10 and your own knowledge, account for the two regions with the highest water stress as shown in Resource 9. [7]

- NW – water quantity – low rainfall of 150 cm and high summer temp of 29°C resulting in a double whammy. Low rainfall can be explained by the influence of the sub-tropical high pressure cell located close to 30°N. These subtropical latitudes (sometimes called horse latitudes), result in normally clear skies and minimal precipitation. This subsiding air is relatively dry for it has released its moisture near the equator. In addition, the effect of adiabatic heating during descent further reduces the relative humidity of the air. Results in semi-arid or arid conditions of B climates.
- SW – no problem with quantity as rainfall is between 200 to 250cm. More likely an issue with water quality. Being located besides the Bay of Bengal, salt water intrusion at SW may occur due to rising sea level owing to climate change. Its coastal location also puts it right in the path of tropical cyclones. These effects may result in water contamination. Delta region hence attract farming communities to take advantage of the rich alluvium leading to high pop density further exacerbates the demand for the water.

Level marked

(e) Explain **three** adaptation strategies that may be undertaken for the two regions with the highest water stress as shown in Resource 9. [6]

Joint effort of both the government and farmers

- digging canals to flush freshwater through fields in order to reduce salinity
- cultivation of salinity tolerance crops
- government support should be provided toward excavation and re-excavation ponds or canals to store monsoon rain for irrigation during the dry period.
- rainwater harvesting
- expanding food storage facilities so that community has contingency supplies to help tie through the years of poor harvest due to droughts or floods
- promoting backyard farming to supplement food supplies from market source
- promoting microcredit and educating people about its use

Point marked

### Theme 3: Sustainable Development

#### Traffic congestion management in Paris

4 Resource 11 shows the congestion statistics during morning and evening peaks for 2017 and 2018 for Paris. Resource 12 shows the mode share over time between Paris and other peer cities. Resource 13 shows a proposed plan for a car-lite street in Paris.

(a) Describe the congestion statistics during morning and evening peaks for Paris in 2018 as shown in Resource 11. [3]

- Greater congestion during morning peak (71%) as compared to evening peak (67%)
- For morning peak, greatest congestion occurs on Tuesday. Friday is most congested for evening peak.
- Extra travelling time of one minute between peaks; 21mins during morning peak as compared to 20mins during evening peak.

Point marked

(b) With reference to Resource 11, explain the possible reasons for the traffic congestion problem in Paris. [4]

- High private car ownership due to greater affluence
- Insufficient highways leading to bottlenecks during peak hours
- Lack of traffic management system such as electronic road pricing system in restricting car usage during peak hours or simply a case of car users undeterred by the higher price they had to pay just to get to work in the most direct and shortest way.
- Inadequate public transport service or poor service quality i.e. public transport not considered a good alternative to private cars.
- Non-work travel adding to the already congested roads.

Point marked

(c) Compare the mode share over time between Paris and other peer cities as shown in Resource 12. [4]

Similarity

- Reduction in car travel for all cities. Increasing trend for non-car modes such as biking and walking

Differences

- Paris non-car share is the highest amongst the four cities for both years with 2010 experiencing a further improvement of 7%. However, the country that

experiences the greatest improvement in the percentage of non-car mode is London followed by Berlin.

- Paris has the highest number of people choosing to walk as the most common mode of travel for both time periods. In fact, the percentage has increased from 48% in 2001 to 52% in 2010.
- For cycling, although Paris experienced a two folds increase from 2001 and 2010, the increase was negligible as compared to Berlin which remained on top for both time periods amongst the 4 cities.

(d) With reference to Resources 11 and 12, would you say that the traffic congestion problem in Paris is worse off as compared to 2017 and other peer cities? [5]

- Comparing between 2017 and 2018 in Paris, traffic congestion has slightly worsened as seen in Resource 11
  - morning peak in Paris has worsened by 3% in 2018 though evening peak has improved by 1%.
  - for both years, Tuesday and Friday remained the most congested day for both morning and evening peak respectively.
  - extra travelling time of one minute during morning peak in 2018
- Comparing with peer cities, traffic congestion is presumably better
  - Travelling by car is the lowest amongst the 4 cities. Only 12% travelled by car as compared to 32% for NYC, 38% for London and 30% for Berlin based on the latest figures. Fewer cars means less chock-a-block hence traffic is comparatively smoother.
  - Instead a very high percentage of Parisians either walk or cycle around Paris. 52% chose to walk as compared to 39% for NYC being the next highest. Such alternative modes of travel reduces the number of vehicles on the road as well as cut down on air and noise pollution.
  - Possible counterargument – hard to determine if congestion is lesser than the other three cities as data is presented in percentages. Absolute values may have provided a better assessment of the situation.

Level marked

(e) With reference to Resource 13 and your own knowledge, assess whether the implementation of car-lite streets is a good solution to solving the traffic congestion problem in Paris. [9]

#### Indicative content

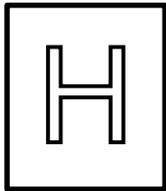
Car-lite streets as seen in Resource 13 is an attempt to reduce car dependency whilst moving towards more sustainable modes of transportation. As a good solution to solving the traffic congestion problem in Paris, responses will argue that fewer cars means less traffic congestion, less air and noise pollution, and more land for public spaces and amenities. In addition, cities designed for walking (wider side-walks) and cycling as seen by the proposed designated paths also create a better quality of life for their residents, who gain the health benefits of exercise and a stronger sense of community. However, the solution will not work in isolation as drastically reducing car usage would mean substituting it for public transport,

bicycles, personal mobility devices and even walking. Moreover, the cycling community remains small at only 5% as seen in Resource 12.

In the counter-argument, responses will highlight that it is better and necessary to wean commuters off over-dependence on the car over time, and encourage them to try alternatives instead of just putting on a restriction on cars entering a particular street. For the former, this means making car ownership and car usage in city centres more costly and inconvenient. Examples of measures to dissuade people from driving include the implementation of COEs and ERP and drastic measures of raising parking fees and cutting down of parking facilities in city centres. Alternatives to driving will include public transport, cycling and walking. Public transportation such as buses and trains must be made affordable and efficient such as the introduction of all day bus lanes in city centres such as the ones in Singapore's Orchard Road and Shenton Way. In addition, carparks can be built outside the car-lite zones, making it easier for drivers to switch to public transport to enter the city centre. The procurement of clean electric buses is an added step to making the city centre less pollutive and hence more liveable. In nurturing a bicycle culture, initiatives may include the design of park connectors leading in and out of the city centres for people to commute between home and work, multi-storey bike garages, public shower facilities and laws that protect the safety and legal right of way for cyclists and pedestrians alike. In Singapore, government policies now include new rules on the use of footpaths and shared/cycling paths, introducing speed limits, as well as size and weight restrictions for devices. Personal mobility devices (PMDs) for example are now allowed on footpaths and shared paths, with speed limits of 15km/h and 25km/h respectively. PMDs are currently also allowed on public transport. Indeed, the assimilation of good governance, public attitudes and infrastructure is key to moving towards a less car-dependent future in the attempt to reduce traffic congestion in city centres and elsewhere.

A higher response will include the need for a change in mindsets and attitudes towards a reduced car dependency. This requires a re-focusing on the benefits of healthier lifestyles, improving air quality and on people's well-being and overlooking the status-symbol of owning a car.

Level marked using H2 generic level descriptors for open-ended 9m DRQ on Themes 1, 2 and 3.



RIVER VALLEY HIGH SCHOOL  
General Certificate of Education Advanced Level  
Preliminary Examination 2019  
Higher 2

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**GEOGRAPHY**  
**Paper 1 Structured Essay Questions**

**9751/01**  
**18 September 2019**

**3 hours**

Additional Materials:      Answer Booklet  
   World outline map

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**READ THESE INSTRUCTIONS FIRST**

Write your name, index number and class on the Answer Booklet.  
Write in dark blue or black pen on both sides of the paper.  
HB pencil may be used for graphs and diagrams only.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

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The number of marks is given in brackets [ ] at the end of each question or part question.

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This document consists of **3** printed pages and **1** blank page.



[Turn over

### Section A – Tropical Environments

Answer **one** question from this section.

- 1 (a) Explain how the weakening of the Walker Circulation and the El Niño Southern Oscillation (ENSO) phenomenon can impact rainfall in the tropics. [12]
- (b) To what extent is topography the main factor affecting the characteristics of rainfall at a location? [20]
- 2 (a) Explain the causes of tropical deforestation in countries at lower levels of development. [12]
- (b) 'High income countries play pivotal roles in the management of tropical deforestation.'
- Discuss the validity of the statement above. [20]

### Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a) Explain the different ways of thinking about development in the context of countries at lower levels of development. [12]
- (b) 'Development indicators such as the HDI and the MPI are highly valuable in measuring differences in development.'
- Evaluate the statement above. [20]
- 4 (a) Explain how countries at different levels of development manage issues of water scarcity. [12]
- (b) 'International water agreements are crucial to ensure water security for countries.'
- Discuss the validity of this statement. [20]

**Section C – Sustainable Development**

Answer **one** question from this section.

- 5** (a) Explain the challenges faced by countries at low levels of development in pursuing sustainable development. [12]
- (b) Responses to mitigate and adapt to climate change are crucial for sustainable development. Discuss. [20]
- 6** (a) Explain how urban liveability can be measured for countries at higher levels of development. [12]
- (b) To what extent can the reimagining of cities help raise the quality of urban living space and meet the needs of different social groups in the city? [20]





## RVHS H2 GEOGRAPHY PAPER 1 PRELIMS 2019

- 1 (a) Explain how the weakening of the Walker Circulation and the El Niño Southern Oscillation (ENSO) phenomenon can impact rainfall in the tropics. [12]

Indicative Content:

*The Walker Circulation is a conceptual model of air flow in the tropics over the South Pacific Ocean. The ENSO phenomena (also known as the weakening of the Walker Circulation) is a disturbance that occurs periodically in the South Pacific Ocean. More precisely, ENSO refers to an reversal of atmospheric circulation in the southern Pacific Ocean. This atmospheric change can have tremendous impact on the rainfall conditions and storminess across the tropics. However, beyond the tropical regions of the south Pacific, ENSO can also indirectly disrupt the climatic conditions of countries much further afield largely because of the distortions to the global jet stream circulation. This is known as the concept of teleconnections. A good answer to this question would display accurate and detailed knowledge about ENSO alongside the use of relevant examples.*

- (b) To what extent is topography the main factor affecting the characteristics of rainfall at a location? [20]

Indicative Content:

*The characteristics of rainfall at a location is first and foremost an outcome of the location's latitude. However, other factors like topography, continentality, and the effect of ocean currents can significantly alter the idealised precipitation regime one would expect solely from the latitude and prevailing wind circulation systems occurring at a location.*

*For example, the presence of topographic barriers on windward locations can significantly alter the characteristics of rainfall at a location. Large-scale topographic barriers in the form of mountains or coastal cliffs can cause the development of orographic or relief rain. Examples of such topographic barriers include that of the Western Ghats of India and the Himalayas. Despite topography being a significant factor in some localities, it is difficult to unequivocally assert that it is the main factor that determines the rainfall characteristics of many other locations. Latitude is perhaps a more macroscopic factor that determines the conditions of rainfall. Other factors such as ocean currents and continentality can also alter the rainfall characteristics of different localities.*

- 2 (a) Explain the causes of tropical deforestation in countries at lower levels of development. [12]

Indicative Content:

*There are multiple causes behind tropical deforestation. Some of these include the conversion of forest to cattle pasture, development of new land from forested areas to accommodate the growing populations in the developing countries, international logging, fuelwood consumption, and the development of hydropower. Examples from countries such as Brazil, Indonesia and Ghana can be used to substantiate discussions.*

- (b) 'High income countries play pivotal roles in the management of tropical deforestation.' Discuss the validity of the statement above. [20]

Indicative Content:

*While high income countries can play pivotal roles in the management of tropical deforestation, we must not neglect the equally important and often complementary roles played by other*

stakeholders, such as governments of lower income countries and local communities, given the diversity of ways at present in management tropical deforestation.

Some strategies to manage tropical deforestation that can be discussed include payment for environmental services, REDD+, Debt-for-Nature swap as well as population planning policies.

Opportunities to make synoptic links include references to the SDGs as well as the broader goals of sustainable development and the role that forests play as a vital carbon sink in mitigating climate change.

- 3 (a)** Explain the different ways of thinking about development in the context of countries at lower levels of development. [12]

Indicative Content:

*Development is a wide-ranging concept which is difficult to pin down.*

*It suggests advances in demographic (population) conditions such as falling birth rates and increasing life expectancies, economic progress such as increased gross domestic product (GDP), gross national income (GNI), and social improvement such as greater equality for women, better race relations, and greater participation in the political process.*

*In the context of countries at lower levels of development, the more apt approaches to thinking about development would be the modernisation theory, dependency theory and bottom-up development.*

*A good response to this question should exhibit in-depth relevant knowledge and sound understanding of the above three approaches. For eg, in the discussion of the dependency theory, the work of Andre Frank and the concept of the ‘development of underdevelopment’ should be included to support explanations.*

- (b)** ‘Development indicators such as the HDI and the MPI are highly valuable in measuring differences in development.’ Evaluate the statement above. [20]

Indicative Content:

*Though development is a wide-ranging and contested concept, composite indicators such as the HDI and the MPI have been crafted to monitor improvements in the various domains of life.*

*Since 2010, the HDI contains four indicators of development, namely life expectancy at birth, mean years of schooling for adults aged 25 years, expected years of schooling for children of school entering age and GNI per capita (PPP\$). It is expressed on a scale from 0 to 1, with the value being a geometric mean of the four dimension indices. The MPI identifies deprivations across the dimensions of health, education as well as standard of living. It shows the number of people who are multi-dimensionally poor and the number of deprivations with which poor households typically contend with.*

*The HDI and MPI are valuable in measuring differences in development because they can reflect temporal and spatial differences in development, and provide decision-makers with important information with which they can use to guide future actions. For example, the MPI enables comparisons of development at smaller spatial scales such as the differences between the urban and rural location. Moreover, it can also reflect differences between different segments of the population, such as between ethnic groups. Such information can enable decision-makers to make better use of resources in the development of policies to address the development imbalance. In this sense, the use of MPI in measuring differences in development can help in addressing MDGs strategically and monitoring of impacts of policy intervention.*

*Though useful, HDI and MPI are, nevertheless, not able to fully encompass and measure differences in all dimensions of development such as the amount of freedom citizens of a country enjoy and the disparity in achievement between men and women.*

*In light of the risks posed to societies by climate change, the need to adopt a more sustainable way of life and embrace sustainable development has also become more pressing. In this*

*regard, it is argued the HDI and MPI will be of less value in measuring differences in development should one seek to infuse the notion of sustainability.*

- 4 (a)** Explain how countries at different levels of development manage issues of water scarcity. [12]

Indicative Content:

*Water scarcity is a perennial issue and often a major concern for countries that are water stressed, whether a result of geography or changing water consumption profiles. The global trend of increasing population size and consumption patterns means an ever growing demand for water, which is in tandem with the ramifications that global climate change has on rainfall patterns at the smaller scale.*

*While water is a universal need, its management varies across countries at different levels of development because of different contexts with different threats, opportunities and capacities to ensure water security.*

*The methods that can be discussed for this response include that of dam building, accessing groundwater through wells and boreholes, desalination and the foreign sources of water in the form of bottled water to meet the demand from the local community.*

*Examples from countries at different levels of development such as Singapore, Thailand, Croatia and Mexico can be included to support discussions.*

- (b)** 'International water agreements are crucial to ensure water security for countries.' Discuss the validity of this statement. [20]

Indicative Content:

*For riparian states sharing transboundary water catchments with other riparian states, international water agreements are crucial to ensure a riparian country's fair access to the shared resource, but also to maintain good multilateral relations with fellow riparians.*

*At the same time, farsighted internal governance of water infrastructure through judicious investment in construction of amenity and in R&D to discover potential new sources of water is just as important for countries to ensure their water security, especially since agreement and equity is extremely difficult to attain in some catchments, and for countries whose threats to water security are more internal than external.*

*Case studies that can be discussed for this essay include the Colorado River Agreement between USA and Mexico, the Nile Basin Cooperative Framework Agreement as well as China's role in the Mekong River Basin.*

*Opportunities to make synoptic links can include discussions of the threat of climate change and how this global challenge affects the water security for countries.*

- 5 (a)** Explain the challenges faced by countries at low levels of

**development in pursuing sustainable development.**

[12]

Indicative Content:

*As defined in the Brundtland Report in 1987, the concept of sustainable development refers to 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. This concept takes into account the various social, environmental and economic dimensions holistically.*

*A good answer to this question should include discussions of both the political and economic challenges in pursuing sustainable development.*

*For example, a key issue in the sustainable development debate is the relative roles of economic growth (the quantitative expansion of economies) and development (the qualitative improvement of society). Sustainable development can be interpreted by the level of throughput not exceeding the ability of the environment to replace resources and withstand the impacts of wastes. This does not necessarily mean that further economic growth is impossible, but it does mean that growth should be achieved by better use of resources and improved environmental management rather than by the traditional method of increased throughput.*

*It should also be noted that sustainable development is a highly contestable concept. In other words, there are many sources of contestation in the debates over the meaning of sustainable development. It is not an identifiable 'end point' or 'state' but requires ongoing critical consideration of the processes of development and decision making across all spheres of life. There is no blueprint for how to achieve sustainable development; rather the nature of sustainable development will be specific to particular places and points in time. It requires constant debate and resolution of different interests that challenges policy-makers and researchers alike.*

**(b) Responses to mitigate and adapt to climate change are crucial for sustainable development. Discuss.**

[20]

Indicative Content:

*Responses to mitigate and adapt to climate change are definitely crucial for sustainable development, especially if we want to continue providing for the 'needs' of future generations. Some of these responses include moving towards a low-carbon economy, carbon capture and other forms of accommodation, protection and adaptation strategies to collectively manage the negative effects of climate change.*

*For example, at the international scale, negotiations of the Kyoto Protocol (1997), the Hague Conference (2000), the Copenhagen Summit (2009), and the more recent Paris Climate Conference (2015) are all attempts to commit countries legally to the decarbonising of their economies. However, limiting carbon emissions through the use of such international treaty or multilateral environmental agreements (MEAs) is never a simple task. Many developing countries that are currently undergoing rapid urbanisation and industrial growth resent the idea of curbing carbon dioxide emissions.*

*In addition, scientists and engineers around the world are testing alternative geoengineering ideas such that large quantities of CO<sub>2</sub> can be pumped underground into abandoned oil reservoirs or removed from the atmosphere by fertilizing oceans with iron to stimulate phytoplankton growth. Concepts of these carbon capture and development of carbon sinks are relatively new and are being piloted in various countries like the US to test their feasibility and efficiency. However, the unsure nature of geological capacities, coupled with the unknown risk of carbon leakage and the issue of ocean acidification remains potential pitfalls of such large-scale mitigation approaches.*

*Opportunities to make synoptic links include references to reforestation and forest conservation strategies to slow climate change.*

- 6 (a) **Explain how urban liveability can be measured for countries at higher levels of development.** [12]

Indicative Content:

*Urban liveability is a complex, contested and plural concept. To obtain a proper understanding of the concept it is necessary to employ both objective and subjective evaluations. In other words, how liveable a city is cannot merely be measured and rated according to the measurable indicators such as air quality and average income, but must also take into consideration subjective evaluations and perceptions of the urban lifespaces. This makes the measure and rating of the concept complex and contentious.*

*A good response to this question should make mention of the tried and tested measurements of urban liveability such as the Global Liveability Ranking of the EIU and the Global Liveable Cities Index introduced by the Asia Competitiveness Institute.*

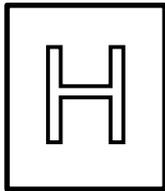
- (b) **'To what extent can the reimagining of cities help raise the quality of urban living space and meet the needs of different social groups in the city?** [20]

Indicative Content:

*Urban reimagining refers to attempts by the urban authorities to purposefully reconfigure and change the image of a city and the way people view it. It commonly involves making physical changes to the built environment or implementing urban regeneration schemes designed to modernize and make the urban spaces better places to live, work and visit. It also involves finding new ways and new technologies to enhance the local environment, and is often associated with the current need to create more sustainable settlements.*

*Using examples from various cities such as the reimagining of London Docklands, Glasgow's City Reimagining Campaign, as well as the reimagining efforts in Colombo, Sri Lanka, a good response to this question should be perceptive, logical and has strong evaluative elements.*

*While reimagining efforts will almost certainly improve the physical quality of the city, the city may not be rated as being more liveable by some segments of the urban population like the elderly or the urban poor.*



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Preliminary Examination 2019  
Higher 2

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**GEOGRAPHY**  
**Paper 2 Data Response Questions**

**9751/02**  
**24 September 2019**

**3 hours**

Additional Materials:      Answer Booklet  
   1 Insert  
   World outline map

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**READ THESE INSTRUCTIONS FIRST**

Write your name, admission number and class on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Candidates answer **all** questions.

The Insert contains all the Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work below the cover page securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

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**This document consists of 4 printed pages.**



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**Section A**  
**Theme 4 – Geographical Investigation**

Answer **one** question from this section.

- 1** A group of students from a junior college in Singapore decided to work with counterparts from a Cambodian high school to investigate the impact of a factory on the local economy in Cambodia. The garment factory, New Fuma (Cambodia) Pte Ltd. is a subsidiary of a Chinese company that hires about 360 local workers. Set up in 2018 in Por Sen Chey district, Phnom Penh, the factory does cutting and sewing work for C&A, a Dutch owned global apparel retailer.

The students wanted to gather information to evaluate the impacts of the factory's opening on the local population and local economic activity so far. Their research interest was inspired by a news report of a mass fainting case in the factory, as shown in Resource 2.

Their research question is 'Has the new garment factory provided positively to the local workforce in Por Sen Chey district since its opening?'

They divided themselves into 4 teams of 5, each team having at least 1 Cambodian student.

The students had 3 days to collect their data. They planned to survey 80 factory workers using a questionnaire survey.

Study Resources 1 to 4.

Resource 1 shows a map extract of the area surrounding the factory in the Por Sen Chey district, Phnom Penh, and the potential study area for the students.

Resource 2 shows an extract of a news article about a recent incident of workers fainting in the factory.

Resource 3 shows the questionnaire the students designed to survey factory workers.

Resource 4 shows the collated survey findings.

- (a) With reference to Resource 1, suggest how the students might plan their fieldwork procedure to gather the data they seek. [6]
- (b) With reference to Resource 2, outline two challenges the students might face in their geographical investigation and suggest how they might be overcome. [4]
- (c) With reference to Resource 3, evaluate the usefulness of the questionnaire for answering the research question. [5]
- (d) Construct a bar chart to present the data about respondents' perception of work environment safety shown in Resource 4. [3]
- (e) 'Foreign-owned factories are more of a bane than a boon to the local community.'

Discuss the extent to which the students' field study supports this notion. [7]

**Section B**  
**Theme 1: Tropical Environments**  
**Geomorphic Processes and Landforms in Morocco and Asia**

- 2** Resource 5 shows the mass movement susceptibility of Chefchaoeun Province, northern Morocco. Resources 6A and 6B show the elevation and total annual rainfall of Chefchaoeun Province respectively. Resource 7A shows a landform in the Gobi Desert. Resource 7B shows a landform in Western China.
- (a) With reference to Resource 5, describe the distribution of mass movement susceptibility in Chefchaoeun Province, northern Morocco. [4]
- (b) Discuss the extent to which Resources 6A and 6B can help explain the distribution described in (a). [7]
- (c) With reference to Resource 7A, identify and describe the characteristics of the landform shown. [3]
- (d) Suggest two weathering processes that may be operating on the landform shown in Resource 7A. [4]
- (e) Compare the geomorphic processes underlying the formation of the landforms shown in Resources 7A and 7B. [7]

**Theme 2: Development, Economy and Environment**  
**Trade and Investment in Asia**

- 3** Resource 8 shows the pattern of trade for Japan in 2012. Resource 9 shows the FDI by region in China in 2006 and 2011. Resource 10 shows a survey result on the various social media marketing tactics that media agency professionals in China will pay attention to in 2019.
- (a) Using Resource 8, describe the trade pattern of Japan in 2012. [4]
- (b) Describe the percentage changes in FDI across regions in China, giving evidence from Resource 9. [3]
- (c) Suggest reasons for the changes in FDI in China shown in Resource 9. [7]
- (d) By 2019, China will have 855 million internet users. Compare the importance of the types of social media marketing tactics shown in Resource 10. [2]
- (e) Using the resources and your own knowledge, explain the involvement of non-state actors in influencing a country's outlook for trade and FDI. [9]

**Theme 3: Sustainable Development**  
**Ecological Footprint and Urban Waste Management**

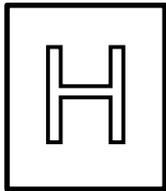
- 4 Resource 11 shows the findings of the ecological footprint and biological capacity of selected countries compared to the global average in 2002.

Resource 12 shows an infographic based on a study conducted by the Earth Engineering Center of Columbia University in 2011. The infographic highlights the potential of converting municipal solid waste into energy and fuel.

Resource 13 shows the trend of urbanisation in India from 1961 to 2011.

Most of the recyclable non-hazardous solid waste in India is collected by the informal recycling sector before it is processed by the formal system. The informal sector comprises waste pickers, itinerant waste buyers, dealers and recycling units. The recyclables collected are separated by pickers and collectors on a daily basis and transferred to small, medium and large dealers shown in Resource 14.

- (a) Describe the pattern of ecological footprint and ecological deficit or reserve shown in Resource 11. [4]
- (b) How useful can the tracking of the ecological footprint of countries be in promoting sustainable urban development and in improving the liveability of cities? [7]
- (c) With reference to Resource 12, explain how the conversion of municipal solid waste into an alternative form of energy can help change the ecological footprint of the US. [4]
- (d) Describe the trend of urbanisation shown in Resource 13 and suggest how it will impact the management of non-hazardous solid waste in India. [4]
- (e) With reference to Resource 14 and your own knowledge, assess the benefits and challenges in relying on the informal sector to manage and recycle non-hazardous solid waste in India. [6]



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Higher 2

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## **GEOGRAPHY**

**9751/02**

**Paper 2 Data Response Questions**

**24 September 2019**

**INSERT**

**3 hours**

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### **READ THESE INSTRUCTIONS FIRST**

This Insert contains all the Resources referred to in the questions.

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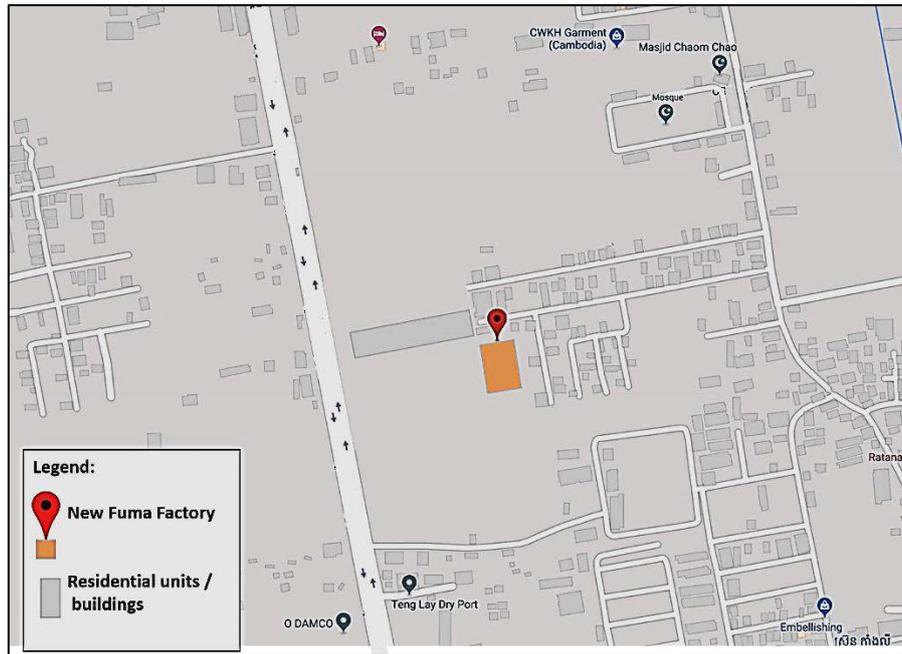


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## Resource 1 for Question 1

### Study Area in Por Sen Chey District, Phnom Penh, Cambodia



## Resource 2 for Question 1

### News Clipping

#### Garment Workers Faint in Phnom Penh Factory

Nearly 40 garment workers at the New Fuma Costume factory in Phnom Penh's Por Senchey district yesterday fainted and were sent to hospital due to exhaustion, in a statement given by Chom Chao commune police chief Captain Theng Kosal.

Cap Kosal added that the factory gave them the day off but expects them to return to work today.

New Fuma Costume factory officials could not be reached for comment yesterday.

Kaing Monika, deputy secretary-general of the Garment Manufacturers Association in Cambodia, yesterday said that there were problems in the factory, such as heat levels and air flow.

He added that a Labour Ministry committee has monitored the case carefully and advised immediate corrective actions be taken.

Mr Kaing said that among the corrective actions, there should be more of a focus on health and education for the workers conducted in the factory. The ministry's committee will also take part in the relevant scheduled training courses.

Pav Sina, president of the Collective Union of Movement of Workers, yesterday said that cases of workers fainting have reduced.

However, he urged all relevant officials to pay more attention to prevent workers from fainting and continue to lower the number of cases.

*(extracted from: Khmer Times / 23 July 2019)*

### Resource 3 for Question 1 Survey Questionnaire

**Survey on Workplace Welfare**

Age: \_\_\_\_\_  
Gender: \_\_\_\_\_

Level of highest education:

- Finished Primary school
- Finished Secondary school
- Diploma
- University Degree

Position at New Fuma: \_\_\_\_\_

Years of working at New Fuma: \_\_\_\_\_

Is your current job at New Fuma your first job?  
Y / N

If not, what was the reason for the change?  
\_\_\_\_\_

On a scale of 1 to 6 how would you rate your current job in terms of :

	1	2	3	4	5	6	
<b>Salary</b> Too low							More than enough
<b>Work environment safety</b> Very dangerous							Very safe
<b>Work environment comfort</b> Very uncomfortable							Very comfortable
<b>Working hours</b> Too long							Too short
<b>Medical benefits</b> Insufficient							Sufficient
<b>Rest and off days</b> Too little							Good enough

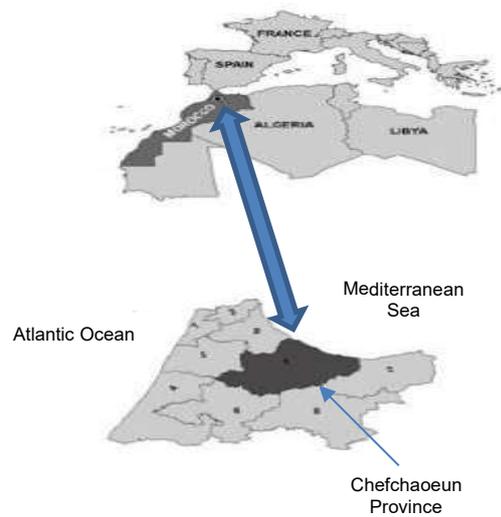
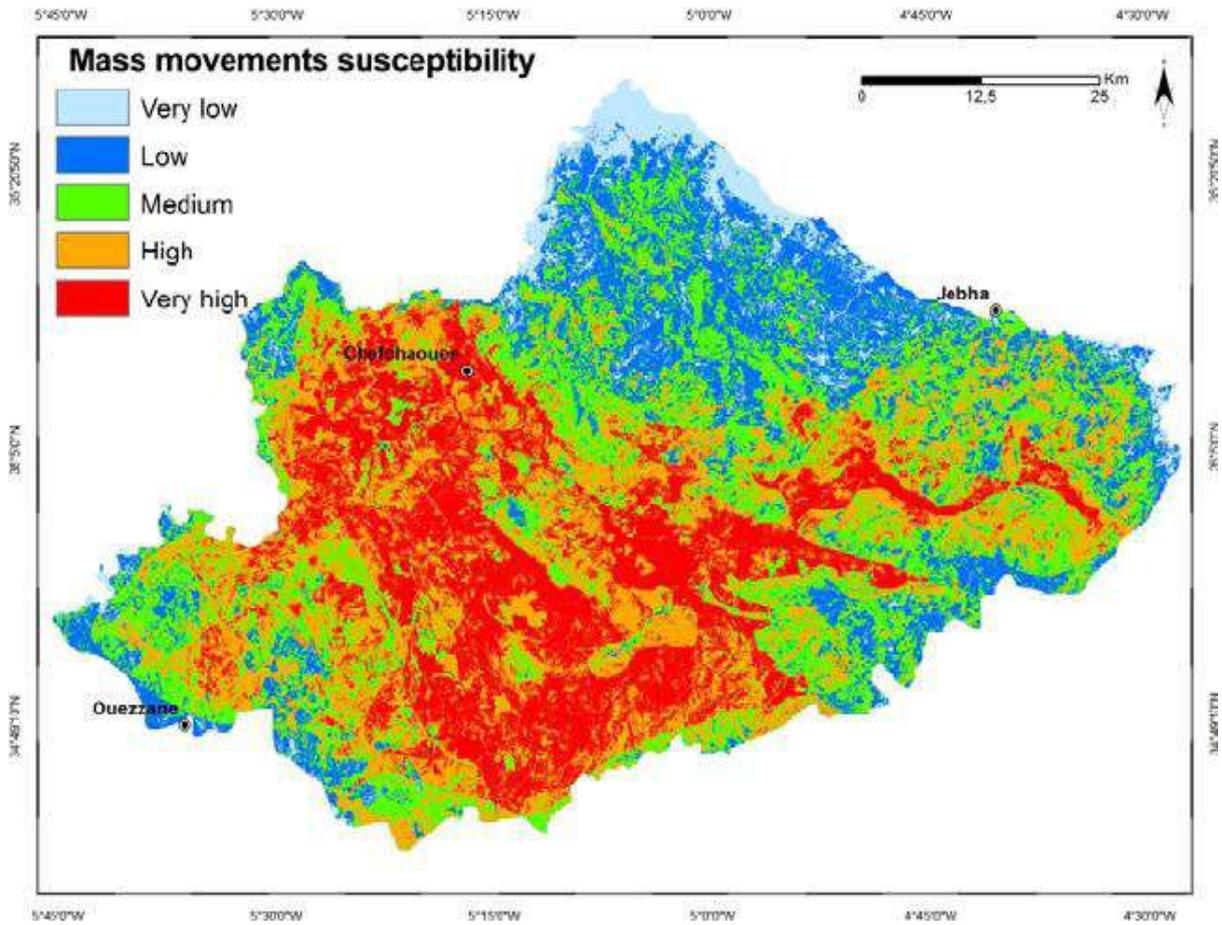
### Resource 4 for Question 1 Collated Survey Findings

On a scale of 1 to 6 how would you rate your current job in terms of :

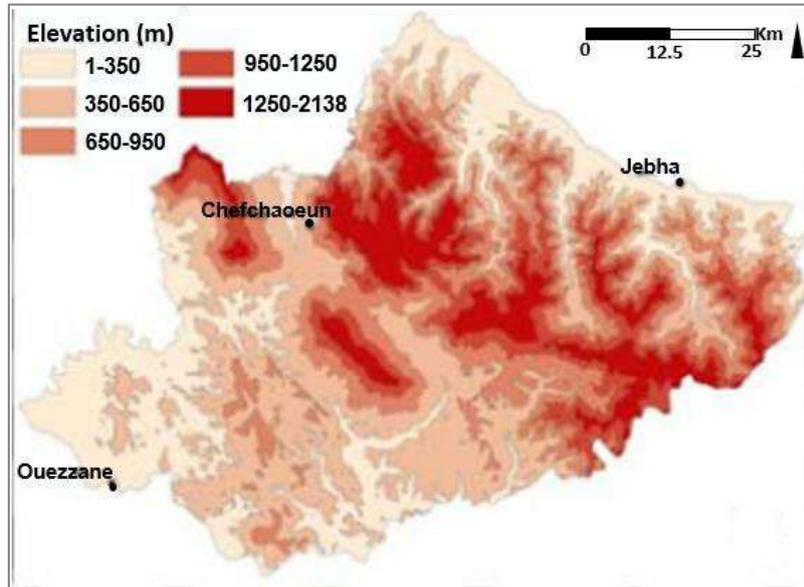
	1	2	3	4	5	6	
<b>Salary</b>							
Too low	1	5	12	18	34	10	More than enough
<b>Work environment safety</b>							
Very dangerous		15	23	27	15		Very safe
<b>Work environment comfort</b>							
Very uncomfortable	11	28	17	19	5		Very comfortable
<b>Working hours</b>							
Too long	3	20	35	22			Too short
<b>Medical benefits</b>							
Insufficient	10	15	22	20	5	8	Sufficient
<b>Rest and off days</b>							
Too little	15	20	24	17	4		Good enough
Total number of respondents: 80							

### Resource 5 for Question 2

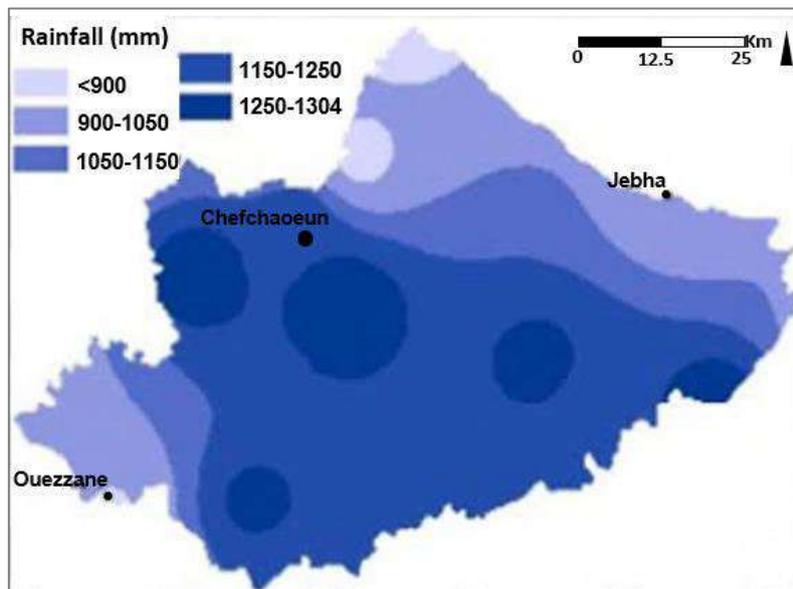
#### Mass movement susceptibility of Chefchaoeun Province, northern Morocco



**Resource 6A for Question 2**  
**Elevation of Chefchaoeun Province, northern Morocco**



**Resource 6B for Question 2**  
**Total annual rainfall of Chefchaoeun Province, northern Morocco**



7

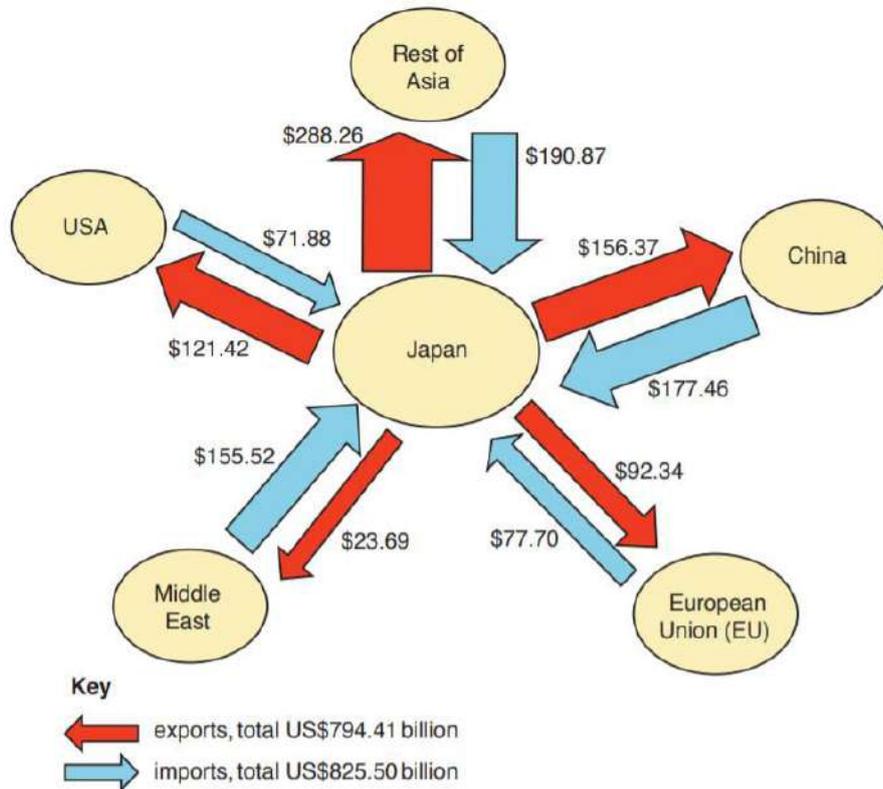
**Resource 7A for Question 2  
Landform in the Gobi Desert**



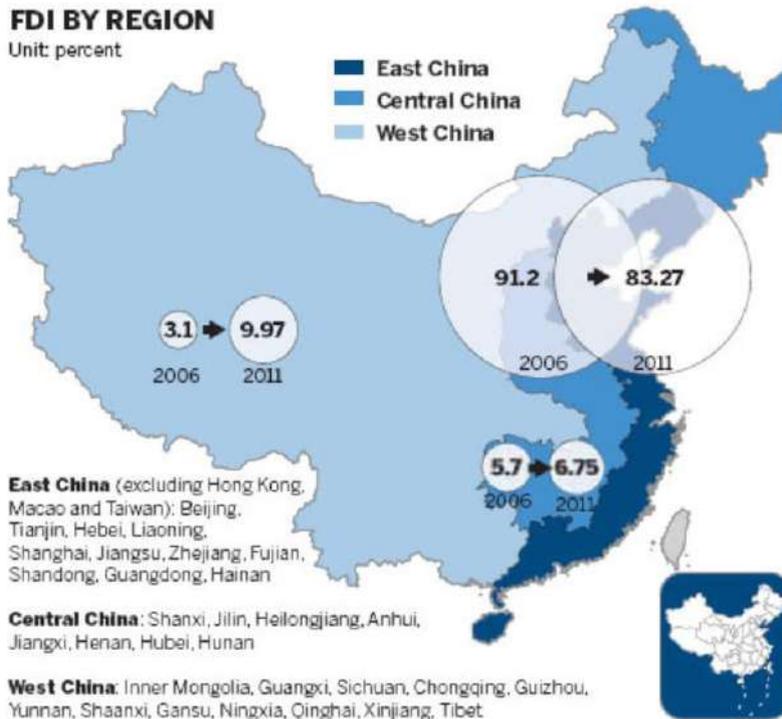
**Resource 7B for Question 2  
Landform in Western China**



**Resource 8 for Question 3**  
**Pattern of Trade for Japan, 2012**

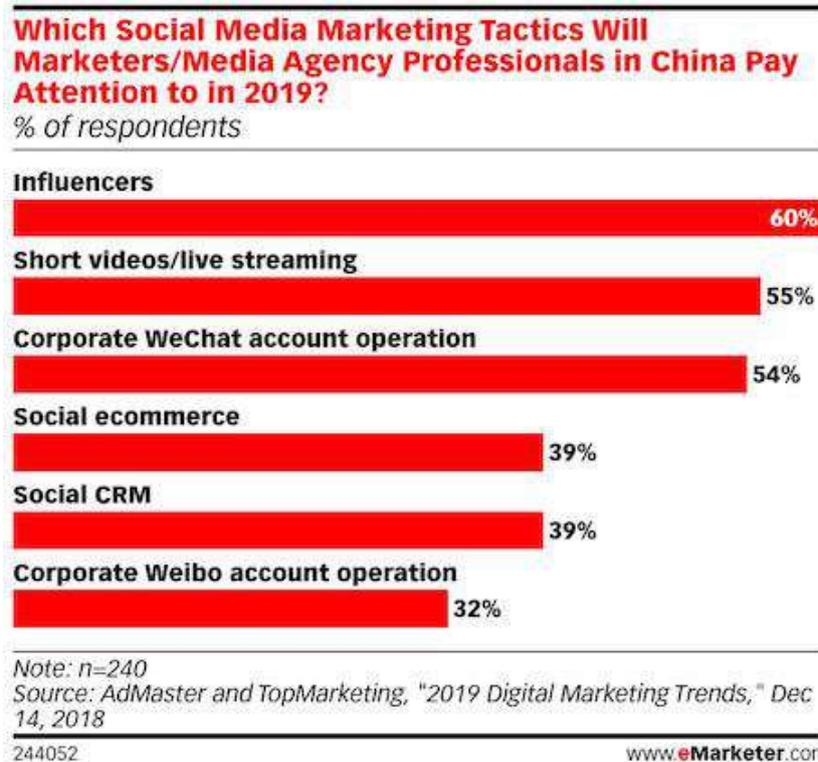


**Resource 9 for Question 3**  
**Foreign Direct Investment (FDI) by region, in China**



## Resource 10 for Question 3

## Survey on the various social media marketing tactics that media agency professionals in China will pay attention to in 2019



\*Note: Social CRM refers to social customer relationship management, where the use of social media services, techniques and technology enables organisations to engage with their customers.

Weibo refers to microblogging in the Chinese market

## Resource 11 for Question 4

Comparison of the Ecological Footprint and the biological capacity of selected countries.  
(The difference between the biological capacity and the Ecological Footprint is the ecological deficit/reserve)

Results for 2002	Population (millions)	Ecological Footprint (global ha/cap)	Biological capacity (global ha/cap)	Ecological deficit (-) or reserve (+) (global ha/cap) <sup>(a)(b)</sup>
WORLD	6,225.0	2.2	1.8	-0.4
Argentina	38.0	2.2	6.7	+4.5
Australia	19.5	7.0	11.3	+4.3
Brazil	176.3	2.1	10.1	+8.0
Canada	31.3	7.5	14.3	+6.5
China	1,302.3	1.6	0.8	-0.8
Egypt	70.5	1.4	0.5	-0.9
France	59.8	5.6	3.2	-2.4
Germany	82.4	4.4	1.8	-2.6
India	1,049.5	0.7	0.4	-0.4
Indonesia	217.1	1.0	1.0	-0.2
Italy	57.5	4.0	1.1	-2.9
Japan	127.5	4.3	0.8	-3.6
Korea Republic	47.4	4.3	0.6	-3.8
Mexico	102.0	2.4	1.7	-0.7
Netherlands	16.1	4.4	0.8	-3.6
Pakistan	149.9	0.6	0.4	-0.2
Philippines	78.6	1.0	0.6	-0.5
Russia	144.1	4.4	7.0	+2.6
Sweden	8.9	5.5	9.8	+4.3
Thailand	62.2	1.4	1.0	-0.5
United Kingdom	59.1	5.4	1.5	-3.9
USA	291.0	9.7	4.7	-5.1

<sup>(a)</sup> Negative numbers indicate an ecological *deficit*, positive numbers an ecological *reserve*. Results are reported per person and are expressed in global hectares, hectares of biologically productive land and sea area with world average productivity.

<sup>(b)</sup> N.B. Numbers may not always add up due to rounding. These Ecological Footprint results are based on 2002 data from the European Environment Agency and Global Footprint Network (2005) or [org.eea.eu.int/news/Ann1132753060](http://org.eea.eu.int/news/Ann1132753060).

Resource 12 for Question 3

Study of the potential to recover energy from municipal solid waste in the US

# The Power of Waste

A recent study from the Earth Engineering Center at Columbia University assessed the energy value of municipal solid waste that is currently sent to U.S. landfills. It demonstrates the tremendous potential of modern technologies that convert waste into energy to help boost energy security, reduce landfill waste and lower greenhouse gas emissions.



If current capacity were to be expanded so that all of the non-recycled municipal solid waste that is currently sent to U.S. landfills each year could instead be converted to energy, we could generate enough electricity to supply 13.8 million homes with power.



If current capacity were to be expanded so that the U.S. could convert all its non-recycled plastics into oil each year, we could produce 5.7 billion gallons of gas annually. That's enough to fuel nearly 9 million cars each year.

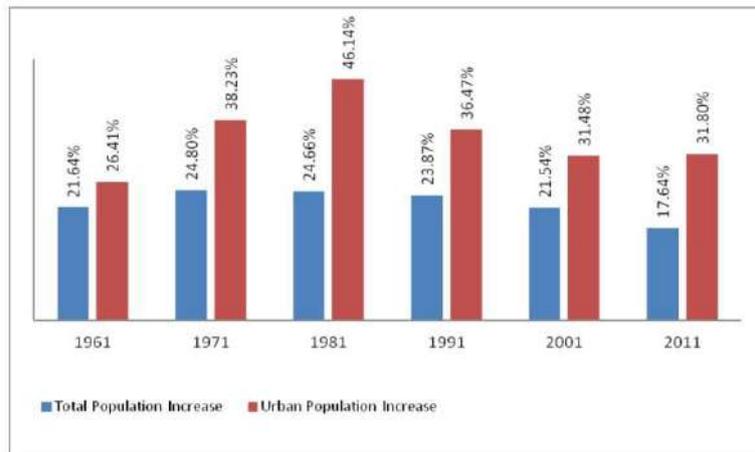


If capacity were to be expanded so that we could convert our non-recycled waste to alternative energy instead of landfilling it, we would have the opportunity to preserve more than 6,000 acres of open space every year that would otherwise be used to store garbage.



If capacity were to be expanded so that we could convert all of our non-recycled waste into energy instead of landfilling it, we could reduce greenhouse gas (GHG) emissions by nearly 123 million tons of carbon dioxide equivalents. This is comparable to removing 23 million cars from our roads.

### Resource 13 for Question 4 Trend of Urbanisation in India



### Resource 14 for Question 4 Recycling in India



First stage of separation of recyclables into plastics, metals and glass, after collection by waste pickers



Second stage of separation of plastics into different types



Plastic bottles after second stage of separation



Sorted metal after second stage of separation

## RVHS H2 GEOGRAPHY PAPER 2 PRELIMS 2019

1

- (a) With reference to Resource 1, suggest how the students might plan their fieldwork procedure to gather the data they seek. [6]

Indicative content

The students should consider the following areas in their fieldwork procedure:

- Sampling and location (eg. vicinities close to the factory entrance using random quota sampling)
- Timing
- Safety and Ethics

Levels marked:

Level	Marks	Descriptors
3	5-6	<ul style="list-style-type: none"> <li>○ Response demonstrates insight into the nature of field sampling for questionnaire survey methods, and issues of coverage and representation.</li> <li>○ Reflects a good understanding of the context of the investigation and of data collection techniques.</li> <li>○ Response signals sensible awareness of logistic constraints and the need for good timing and location choices.</li> <li>○ Response explicitly explains the rationale for each aspect of the fieldwork plan</li> </ul>
2	3-4	<ul style="list-style-type: none"> <li>○ Response demonstrates good knowledge of questionnaire survey methods.</li> <li>○ Provides an explanation of issues relating to reliability and/or accuracy with some reference to possible improvements. Description may be limited in depth and detail.</li> <li>○ Some of the response may focus on generic fieldwork logistics issues and improvements and not be relevant to the context of the investigation.</li> </ul>
1	1-2	<ul style="list-style-type: none"> <li>○ Response shows some knowledge of relevant data collection methods. Some reference is made to issues with accuracy and reliability but may recommend inappropriate or irrelevant improvements or provide incorrect explanation of methods.</li> <li>○ Response may be of limited relevance to the given context.</li> <li>○ Response is merely a description of a plan with little or no justification.</li> </ul>

- (b) With reference to Resource 2, outline two challenges the students might face in their geographical investigation and suggest how they might be overcome. [4]

Possible responses:

- Language barrier / Translate the questionnaire into Khmer
- Difficulty of accessing information / Assure the respondents that their anonymity would be protected

- (c) With reference to Resource 3, evaluate the usefulness of the questionnaire for answering the research question. [5]

Indicative content

- The questionnaire is of a suitable length, and could easily be answered in less than 5 minutes.
- The use of the Likert scale is helpful for guiding respondents to know how to gauge their responses
- Although the questionnaire survey is functionally designed, it is insufficient for students to have a more objective picture of how well the factory treats her employees. The findings need to be triangulated with more empirical data, possibly gathered through other research processes.

Levels marked:

Level	Marks	Descriptors
3	4-5	<ul style="list-style-type: none"> <li>○ Response demonstrates accurate and comprehensive knowledge of how a survey recording sheet should look like in its evaluation of its merits and limitations especially with reference to the research objectives in question.</li> <li>○ Reflects a good understanding of the context of the investigation and of the work in the field.</li> <li>○ Response suggests improvements to limitations that are informed by research objectives and resource information.</li> </ul>
2	2-3	<ul style="list-style-type: none"> <li>○ Response demonstrates some knowledge of desirable characteristics of a survey recording sheet and evaluate the resource accordingly.</li> <li>○ Some evaluation points may be overly generic and are not be linked to the context of the investigation.</li> </ul>
1	0-1	<ul style="list-style-type: none"> <li>○ Response shows little knowledge of how a survey recording sheet should look like.</li> <li>○ Evaluation points are focused on the trivial and cosmetic.</li> <li>○ Response makes little reference to the context of the question.</li> </ul>

- (d) Construct a bar chart to present the data about respondents' perception of work environment safety shown in Resource 4. [3]

Point Marked: 1 mark for title, 1 mark for correct axis labels, 1 mark for correct graph values



- (e) 'Foreign-owned factories are more of a bane than a boon to the local community.' [7]  
Discuss the extent to which the students' field study supports this notion.

Indicative content

FDI from TNCs can potentially inject capital inflow, provide employment, raise the tax base and trigger off multiplier effects that are beneficial to the local economy. However, such opportunities inevitably come with threats and unwanted side effects as well.

- For example, as mentioned in the preamble and in Resource 2, 40 garment workers allegedly succumbed to exhaustion. The students' study sought to confirm this by probing workers' perceptions of workplace safety, medical benefits and number of rest days.

A good response to this question should make reference to information in Resources 1-4 to support articulated stand.

Levels marked:

Level	Marks	Descriptors
3	6-7	<ul style="list-style-type: none"> <li>○ Response provides a logical and well-developed evaluation of the impacts of foreign-owned factories on local communities, which may include perceptive insights for the strongest responses.</li> <li>○ Response is well supported by reference to the Resources</li> <li>○ Reflects strong critical thinking skills and a good understanding of the requirements of the question.</li> </ul>
2	3-5	<ul style="list-style-type: none"> <li>○ Response provides an evaluation of the issue at hand, which may be limited in depth and detail.</li> <li>○ Response reflects critical thinking skills in general but may not always be relevant to the question.</li> <li>○ Response is supported by some reference to the Resources</li> </ul>
1	1-2	<ul style="list-style-type: none"> <li>○ Response shows inadequate knowledge of the issue at hand</li> <li>○ Response has some, though limited, relevance to the given context.</li> <li>○ Provides little or no evaluation. May include material that is irrelevant to the question.</li> </ul>

## Theme 1: Tropical Environments Geomorphic Processes and Landforms in Morocco and Asia

**2**

- (a) With reference to Resource 5, describe the distribution of mass movement susceptibility in Chefchaoeun Province, northern Morocco. [4]

*Possible responses:*

- Areas with very high and high mass movement susceptibility are largely concentrated in the central and western parts of Chefchaoeun Province.
- Areas of medium mass movement susceptibility tend to border areas of very high and high mass movement susceptibility with the exception of the region in the northern part of the province.
- Areas of low mass movement susceptibility are largely found in the eastern parts of the province.
- Areas of very low mass movement susceptibility are concentrated along the northern coast of the province.

- (b) Discuss the extent to which Resources 6A and 6B can help explain the distribution described in (a). [7]

Indicative content

*How the Resources can help:*

- From Resource 6A: with elevation of at least 650-950m in elevation, this can suggest the prevalence of steep slopes. The latter increases the susceptibility of mass movements because slope materials will be more prone to the pull of gravity, increasing shear stress.
- From Resource 6B: With rainfall being high at 1260-1304mm, mass movements become more likely through the increase in shear stress and the decrease in shear strength.

How the Resources may not help:

- The notion that increased elevation suggesting increased slope steepness is not always a given, for locations of increased elevation could refer to plateaus.
- Chefchaoeun city and its immediate surrounds has very high mass movement susceptibility as seen in Resource 5. However, while Resource 6B indicates the area having the same total annual rainfall of 1150-1250mm, Resource 6A indicates elevation ranges from 350-650m to 1250-2138m. These characteristics make it tough to properly account for this area's mass movement susceptibility.

Levels marked:

Level	Marks	Descriptors
3	6-7	<ul style="list-style-type: none"> <li>o Response demonstrates a clear knowledge and understanding of how Resources 6A and 6B can explain the distribution in mass movement susceptibility as well as demonstrates clarity in how they can be limited in doing so through the use of additional information.</li> <li>o Resources are used comprehensively to substantiate arguments and points of view.</li> </ul>
2	3-5	<ul style="list-style-type: none"> <li>o Response demonstrates adequate knowledge and understanding of how Resources 6A and 6B can explain the distribution in mass movement susceptibility as well as demonstrate awareness of how they can be limited in doing so.</li> <li>o However, it lacks details, examples and depth, or exhibit a lack of focus on the question.</li> </ul>
1	1-2	<ul style="list-style-type: none"> <li>o Response shows limited knowledge.</li> <li>o Little or no use of resources is demonstrated in response.</li> <li>o Response lacks detail and focus on the question.</li> </ul>

- (c)** With reference to Resource 7A, identify and describe the characteristics of the landform shown. [3]

Possible responses:

The landform shown in Resource 7A is a yardang.

- It has steep sides.
- These occur in clusters in Resource 7A
- The yardangs lie parallel to one another.

- (d)** Suggest two weathering processes that may be operating on the landform shown in Resource 7A. [4]

Possible responses:

- Insolation weathering
- Salt Weathering

- (e)** Compare the geomorphic processes underlying the formation of the landforms shown in Resources 7A and 7B. [7]

Indicative content:

Resource 7A depicts yardings while Resource 7B depicts loess.

Similarities in geomorphic processes:

- Both landforms are similar in that fluvial erosion processes are responsible for kick-starting their development.
- For yardangs, fluvial processes such as gullying and sheetwash are active during irregular but intense rainfall events.
- For loess, the silt-sized particles required in its formation can be obtained through comminution by rivers.

Differences in geomorphic processes:

- The development of loess is far more dependent upon the processes of transportation and deposition as compared to yardangs.
- For example, in the formation of loess, aeolian transportation in the form of short-term suspension and saltation occurs prior to deposition of medium and coarse silt. These particles will be trapped and deposited once vegetation, topographic obstacles and water bodies are encountered.

Levels marked:

Level	Marks	Descriptors
3	6-7	<ul style="list-style-type: none"> <li>○ Response demonstrates a <b>clear knowledge and understanding</b> of the similarities and differences in geomorphic processes in the development of yardangs and loess. Areas of similarities and differences are expressed succinctly.</li> <li>○ Resources are used comprehensively to substantiate or illustrate arguments and points of view.</li> </ul>
2	3-5	<ul style="list-style-type: none"> <li>○ Response demonstrates adequate knowledge and understanding of the similarities and differences in geomorphic processes in the development of yardangs and loess, with variations in quality between the treatments of both landforms.</li> <li>○ However, it lacks details, depth or references to the Resources, or exhibit a lack of focus on the question.</li> </ul>
1	1-2	<ul style="list-style-type: none"> <li>○ Response shows limited knowledge.</li> <li>○ Little or no use of resources is demonstrated in response.</li> <li>○ Response lacks detail and focus on the question.</li> </ul>

## Theme 2: Development, Economy and Environment Trade and Investment in Asia

3

- (a) Using Resource 8, describe the trade pattern of Japan in 2012. [4]

Possible responses:

In 2012, Japan traded globally with the exception of Australia and South America.

In addition, most of the trade relations were with Asian countries, especially that of China.

- Response should include extracted information from Resource 8 to support descriptions.

- (b) Describe the percentage changes in FDI across regions in China, giving evidence from Resource 9. [3]

Possible responses:

Percentage FDI in Central China and West China increased but decreased for East China.

- Response should include extracted information from Resource 9 to support descriptions.

- (c) Suggest reasons for the changes in FDI in China shown in Resource 9. [7]

Indicative content

- Changing demographic characteristics across China
- China's Western Development Strategy
- Improvements in telecommunications technologies and lowered transport costs

Levels marked:

Level	Marks	Descriptors
3	6-7	<ul style="list-style-type: none"> <li>○ Response demonstrates a clear knowledge and understanding of the causes that has led to the changes in FDI in China and</li> </ul>

		<p><i>address the question's emphasis comprehensively.</i></p> <ul style="list-style-type: none"> <li>○ <i>Examples are provided to add depth and contextualize explanations.</i></li> <li>○ <i>Response also uses the resource adequately and accurately to support reasoning.</i></li> </ul>
2	3-5	<ul style="list-style-type: none"> <li>○ <i>Response demonstrates adequate knowledge and understanding of the causes that has led to the changes in FDI in China.</i></li> <li>○ <i>However, it lacks details, examples and depth, or exhibit a lack of focus on the question.</i></li> <li>○ <i>Use of resource may be limited or lack accuracy at times.</i></li> </ul>
1	1-2	<ul style="list-style-type: none"> <li>○ <i>Response shows limited knowledge.</i></li> <li>○ <i>Little or no use of resources is demonstrated in response.</i></li> <li>○ <i>Response lacks detail and focus on the question.</i></li> </ul>

- (d) By 2019, China will have 855 million internet users. Compare the importance of the types of social media marketing tactics shown in Resource 10. [2]

*Possible answers include:*

- *Of all the social media marketing tactics, the largest proportion of respondents (at 60%) feel that media agency professionals in China will pay the most attention to influencers.*
- *Contrastingly, the corporate Weibo account operation will attract the least attention of the markets, at only 32%.*

- (e) Using the resources and your own knowledge, explain the involvement of non-state actors in influencing a country's outlook for trade and FDI. [9] [9]

Indicative content

- *Non-state actors, such as media agencies, watchdogs and standards organisations should be included in the response.*
- *For example, business magazines such as Forbes, Fortune, and Business Week and business newspapers such as The Financial Times often play a de facto monitoring role in the business world.*
- *Likewise, the increasing influence of social media marketing tactics in China (Resource 10) like that of influencers or short video live streaming may potentially further escalate the foreign direct investment in China. Trade with Japan may also potentially increase beyond the current levels of US\$156.37 for imports and US\$177.46 for exports (Resource 8).*

*Marked by levels on the generic mark scheme.*

### **Theme 3: Sustainable Development Ecological Footprint and Urban Waste Management**

**4**

- (a) Describe the pattern of ecological footprint and ecological deficit or reserve shown in Resource 11. [4]

*Possible responses:*

- *Descriptions of various countries ecological footprint and pattern of ecological*

- deficit in comparison with the world average.
- Exceptions to the stated observations should be included,

**(b)** How useful can the tracking of the ecological footprint of countries be in promoting sustainable urban development and in improving the liveability of cities? [7]

Indicative content

*Ecological footprinting is a quantitative assessment of all the biophysical resources needed to support the consumption of particular groups of people (such as a country or city) in terms of the raw materials and energy used to extract, produce and transport manufactured goods and for their disposal.*

*When countries show high records of ecological footprint (such as that of the USA, UK and France listed in Resource 11), efforts should then be put into strategies to reduce their ecological footprints to promote sustainable urban development.*

*Thus, the tracking and reduction of the ecological footprint of countries can assist countries in the promotion of sustainable urban development practices.*

*In addition, the tracking and reduction of the ecological footprint of countries can help to improve the liveability of cities in several objective and measurable ways.*

*However, analyses of ecological footprint rest on the fundamental premise that it is possible to estimate with reasonable accuracy the resources consumed and waste generated, and in turn whether these can be converted to an equivalent biologically productive area necessary to support those functions.*

Levels marked:

Level	Marks	Descriptors
3	6-7	<ul style="list-style-type: none"> <li>○ Response demonstrates a comprehensive and robust understanding of the concept of ecological footprint and its relationship to the notions of sustainable urban development and urban liveability.</li> <li>○ Substantiating example(s) and use of resource(s) are also incorporated into response.</li> </ul>
2	3-5	<ul style="list-style-type: none"> <li>○ Response demonstrates a decent understanding of the concept of ecological footprint and its relationship to the notions of sustainable urban development and urban liveability.</li> <li>○ Explanations, however, may lack some depth or detail.</li> </ul>
1	1-2	<ul style="list-style-type: none"> <li>○ Response shows some to little knowledge of understanding of the concept of ecological footprint and its relationship to the notions of sustainable urban development and urban liveability.</li> <li>○ Response may be too generic and has limited reference to the resource(s).</li> </ul>

**(c)** With reference to Resource 12, explain how the conversion of municipal solid waste into an alternative form of energy can help change the ecological footprint of the US. [4]

*Possible responses:*

- By turning the municipal solid waste into energy, more than 6000 acres of open space would be preserved every year which would otherwise be turned into landfill sites.
- In addition, there is the potential to reduce nearly 123 million tons of carbon dioxide equivalents if all of the non-recycled waste is converted into energy in the US. This is comparable to removing 23 million cars from the roads and will help to reduce the ecological footprint of the country.
- If the US can convert all of its non-recycled plastics into oil each year, it can

*produce 5.7 billion gallons of gas annually. This can help reduce the extraction and use of fossil fuels such as coal, oil and natural gas and reduce the ecological footprint of the country.*

- (d) Describe the trend of urbanisation shown in Resource 13 and suggest how it will impact the management of non-hazardous solid waste in India. [4]

*Possible responses:*

*From Resource 13, it can be observed that from 1961 to 2011, the rate of urban population increase has always been higher than India's total population increase. Such rapid urbanisation will place much pressure on the city authorities to manage the growing urban waste in cities. Much of the urban waste will end up being dumped and landfilled.*

- (e) With reference to Resource 14 and your own knowledge, assess the benefits and challenges in relying on the informal sector to manage and recycle non-hazardous solid waste in India. [6]

Indicative content

*Benefits:*

- *provides a much needed source of livelihood for the urban poor*
- *work performed by these waste-pickers augments the collection efficiency of formal systems*

*Challenges:*

- *health risks posed to these waste-pickers*
- *informal recycling often lacks structure and is seldom systematic*

Levels marked:

<i>Level</i>	<i>Marks</i>	<i>Descriptors</i>
<i>3</i>	<i>5-6</i>	<ul style="list-style-type: none"> <li>○ Response demonstrates accurate and insightful knowledge of the benefits and challenges of the informal recycling sector.</li> <li>○ Good use of the resource to back up decision and explanation.</li> </ul>
<i>2</i>	<i>3-4</i>	<ul style="list-style-type: none"> <li>○ Response demonstrates decent knowledge of the benefits and challenges of the informal recycling sector.</li> <li>○ Use of resource is present in response but lacks depth in explanation.</li> <li>○ Response may lack clarity, detail, and relevance to question.</li> </ul>
<i>1</i>	<i>1-2</i>	<ul style="list-style-type: none"> <li>○ Response shows limited understanding of the benefits and challenges of the informal recycling sector.</li> <li>○ Response lacks detail, clarity and focus on the question with limited use of the resource.</li> </ul>



**ST ANDREW'S JUNIOR COLLEGE**  
**Preliminary Examinations**  
**Higher 2**

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**Geography**

**9751/02**

Paper 2 Data Response Questions

**16 September 2019**

**INSERT**

**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

This insert contains all the Resources referred to in the questions.

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This document consists of **12** printed pages.

**[Turn over**

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Resource 1 for Question 1

Location map of Sites X and Y



- Key
- site of the river fieldwork
  - roads
  - built up areas

Resource 2 for Question 1

Photograph of Site X



Photograph of Site Y



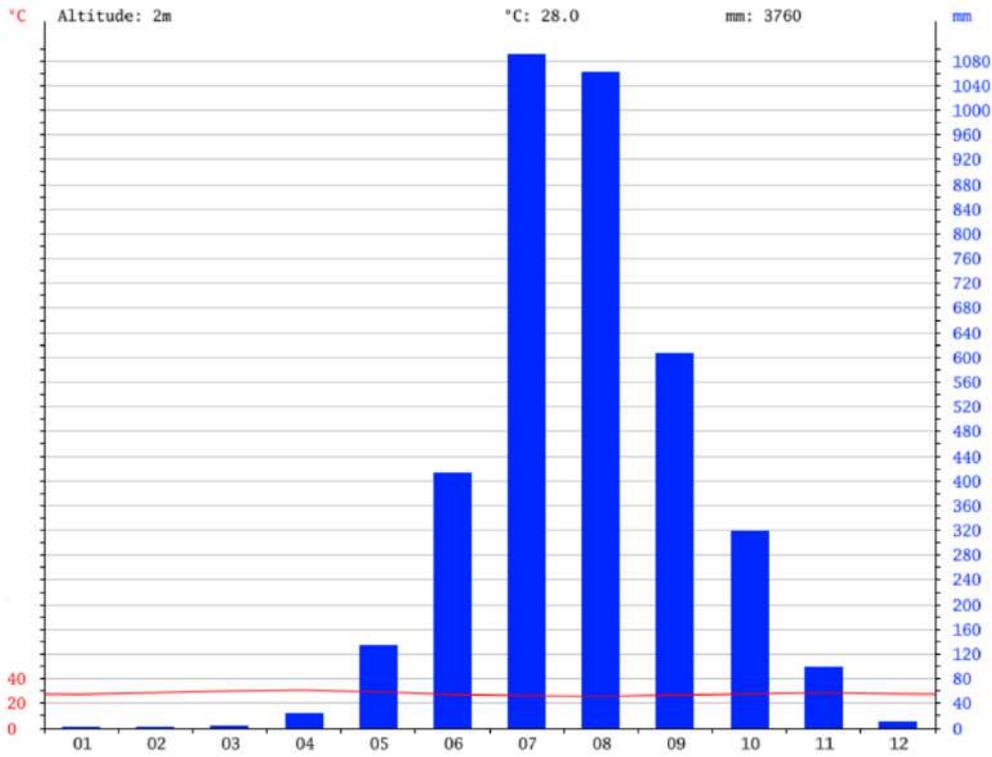
→ Direction of flow

**Resource 3 for Question 1****Discharge data of Kallang River in Sites X and Y**

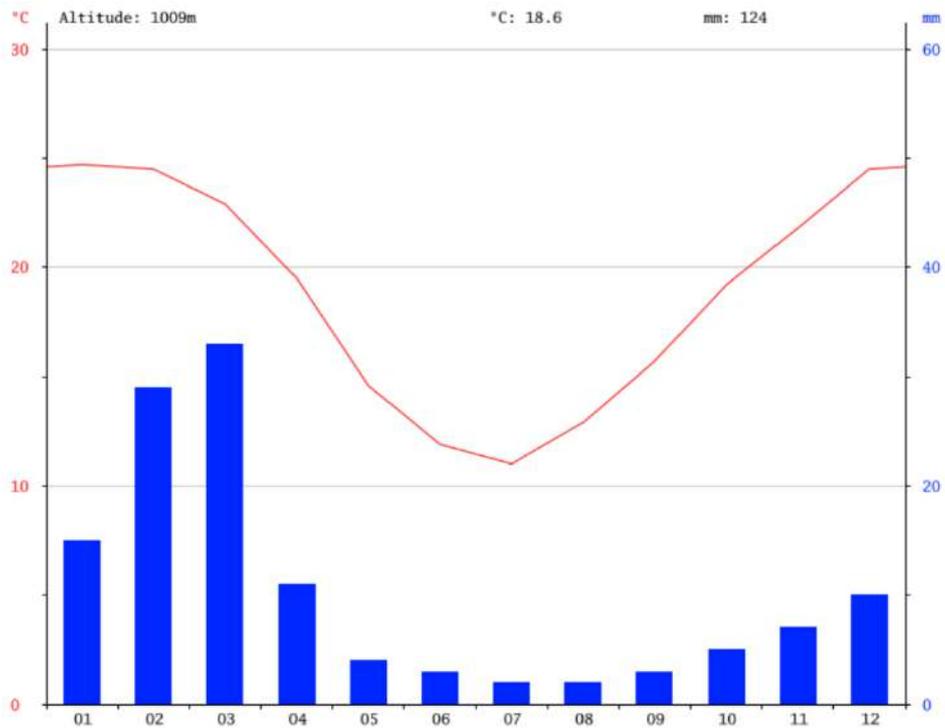
	Site X (Cumeecs)	Site Y (Cumeecs)
8 am	0.5	0.7
9 am	0.5	0.7
4 pm	1.5	-
5 pm	1.8	-

## Resource 4 for Question 2

## Climate graph of Conakry, Guinea

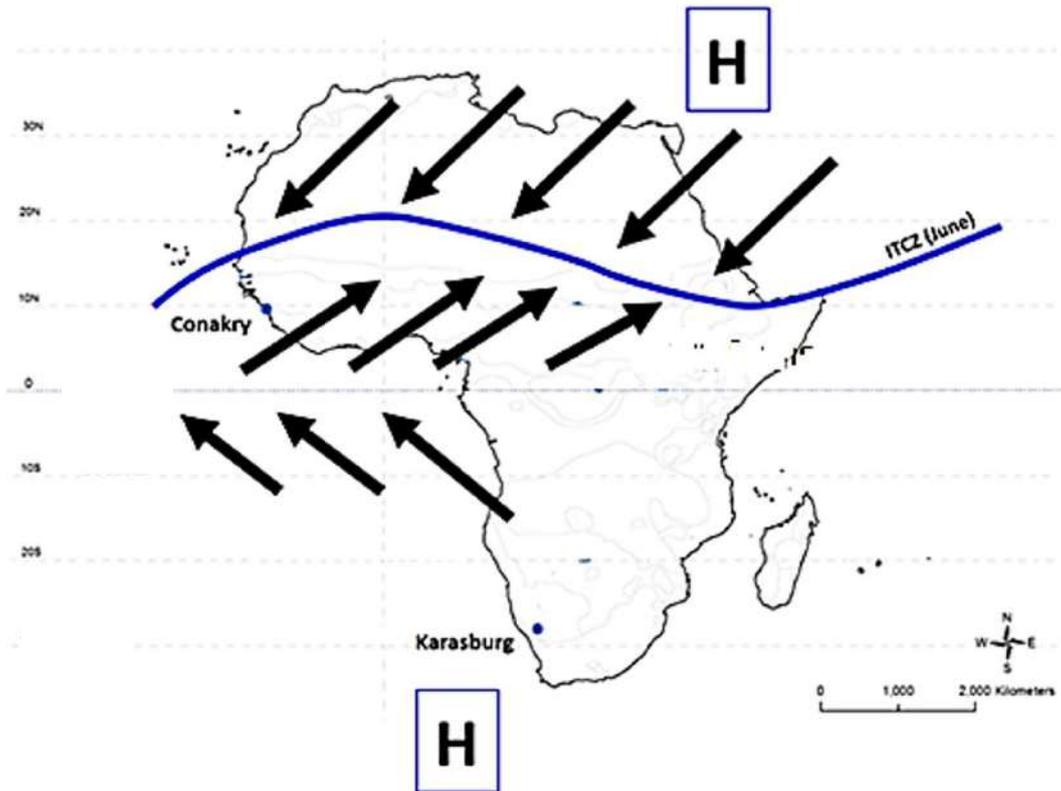


## Climate graph of Karasburg, Namibia



## Resource 5 for Question 2

## Monsoon Wind System over Africa in June



Legend:

- H Region of High Pressure
- Wind movement

## Resource 6 for Question 2

## Flooding in Conakry, Guinea July 2016



Resource 7 for Question 3

Distribution of dams along the Tigris and Euphrates Rivers

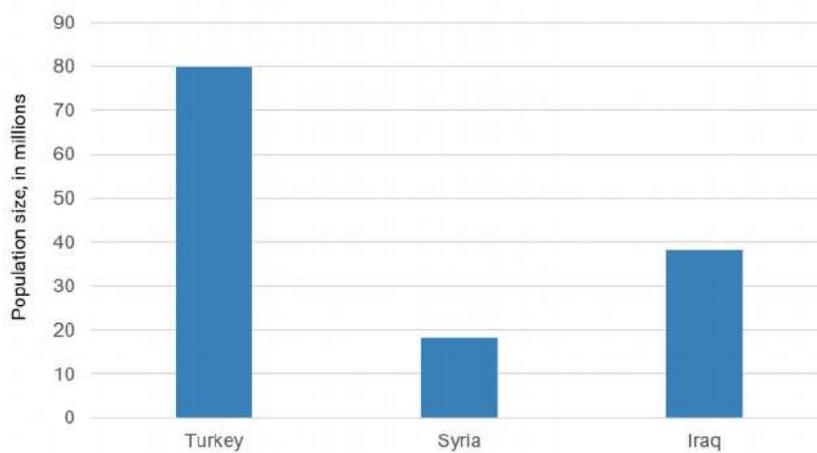


## Resource 8 for Question 3

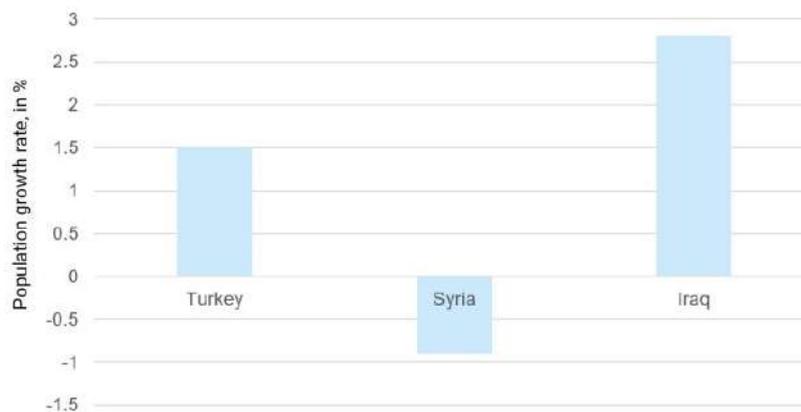
## Water Usage by Sector

	Turkey (2007)	Syria (2003)	Iraq (2000)
Agriculture (%)	<b>72</b>	<b>87</b>	<b>78</b>
Industrial (%)	<b>12</b>	<b>4</b>	<b>15</b>
Domestic (%)	<b>16</b>	<b>9</b>	<b>7</b>

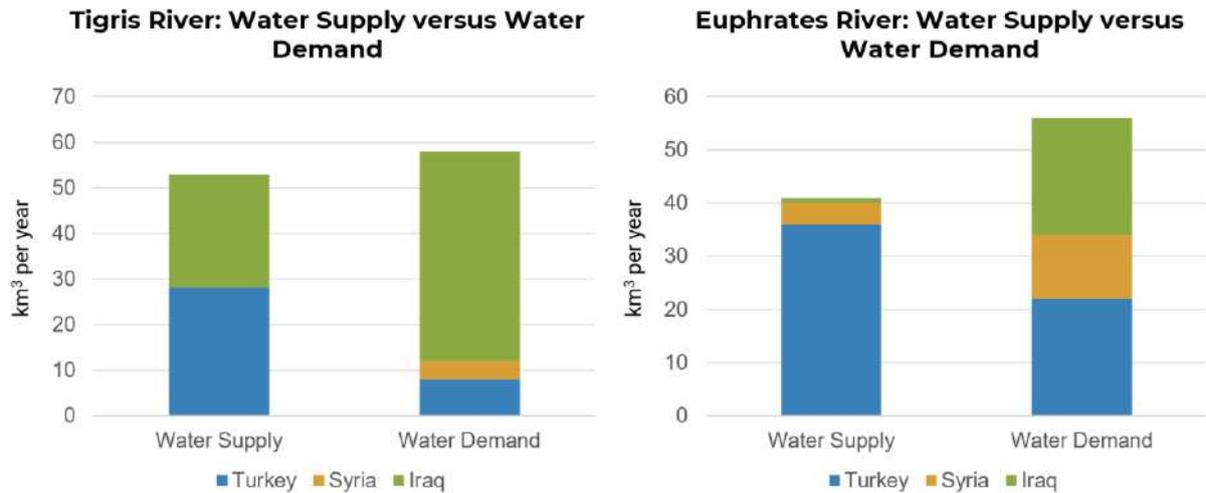
## Population Size (2017)



## Population Growth Rate (2017)

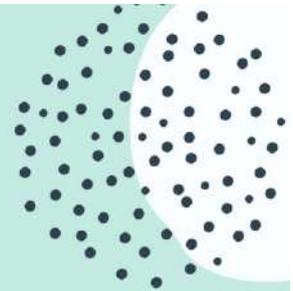


## Resource 9 for Question 3



## Resource 10 for Question 3

## Main Water Agreements for the Tigris-Euphrates River Basin



### TURKEY-SYRIA

- 1987 - The Protocol on Economic Cooperation is a temporary agreement on water quantity which states that 500 m<sup>3</sup>/s is to be released annually at the Syrian-Turkish border.
- 2009 - The Turkish-Syrian Strategic Cooperation Council Agreement addresses joint activities in the field of water such as the improvement of water quality and the construction of joint dams.

### SYRIA-IRAQ

- 1990 - The Syrian-Iraqi Water Accord allocates the water of the Euphrates River according to a fixed ratio of 42% to Syria and 58% to Iraq.

### TURKEY-IRAQ

- 2009 - The Protocol on Water is signed. Both sides agreed to share hydrological and meteorological information and exchange expertise in these areas.

## Resource 11 for Question 4

## Some ways Medellin has changed

# MEDELLIN

## URBAN CHANGE

With urban planning, Medellin, once a city labelled by Time Magazine as "the world's most dangerous city" in 1988, has turned into a city of growth.

### Medellin, Colombia, S America



#### FDI

Increase in foreign direct investments totalling US\$1.63 billion over the last 15 years



#### Tourism

Sharp increase in tourism: Today, Medellin sees about 550,000 international visitors in a year.



#### Crime

Homicide, or murder, rate saw a 90% drop in one decade, from 1990s to 2000s. In 1991, Medellin had the world's highest homicide rate of 380 deaths per 100,000.



**Resource 12 for Question 4****Excerpt on the strategies meant to help the urban poor in Medellin**

Medellin is located in a valley surrounded by mountains. Many of its poorest communities live on inaccessible mountain slopes and are cut off from the amenities and opportunities in the city centre. To address this, Medellin developed the world's first cable car system dedicated to mass transit, the Metrocable. The construction of outdoor escalators on steep slopes also helps to lessen commute times. 'Library parks' were introduced to promote education and social cohesion in these communities.

Thousands of families have also been relocated to a segregated area of the city called Nuevo Occidente, which has little access to social services. It takes an hour to reach this complex from the city centre via the Metrocable.

**Resource 13 for Question 4****Plaza Botero in Medellin**

Plaza Botero is a popular outdoor museum in Medellin, which is home to 23 giant bronze sculptures donated by native artist Fernando Botero in 2004.

## Resource 14 for Question 4

## Results of Medellin in two different rankings on urban liveability

Liveability Indicator	Criteria used	Ranking of Medellin
Colombian national 'Como Vamos' ('How Are We Doing?') quality of life survey of citizen perceptions	<ol style="list-style-type: none"> <li>1. Optimism</li> <li>2. Civic pride</li> <li>3. Household economic improvement</li> <li>4. General well-being</li> <li>5. Education</li> <li>6. Health</li> <li>7. Safety</li> <li>8. Public services</li> <li>9. Mobility</li> <li>10. Civic behaviour</li> <li>11. Public-sector management</li> </ol>	1/12 cities in Colombia
Numbeo Quality of Life Index (2019 mid-year); Numbeo is the world's largest database of user contributed data about cities worldwide.	<ol style="list-style-type: none"> <li>1. Purchasing power</li> <li>2. Pollution</li> <li>3. House price to income ratio</li> <li>4. Cost of living</li> <li>5. Safety</li> <li>6. Healthcare</li> <li>7. Traffic commute time</li> <li>8. Climate</li> </ol>	146/206 cities worldwide



**ST ANDREW'S JUNIOR COLLEGE**  
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**Higher 2**

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**GEOGRAPHY**

**9751/01**

Paper 1 Structured Essay Questions

**17 September 2019**

**3 hours**

Additional Materials: Answer Booklet  
World outline map

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**READ THESE INSTRUCTIONS FIRST**

Write your name and class on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **2** printed pages.

**[Turn over**

### Section A – Tropical Environments

Answer **one** question from this section.

- 1 (a) Explain how the rock cycle determines rock characteristics. [12]  
 (b) To what extent is slope stability affected by human activities in the tropics? [20]
- 2 (a) Explain the impacts of deforestation in the tropics. [12]  
 (b) Assess the effectiveness of strategies to manage tropical deforestation. [20]

### Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a) Explain the factors leading to the emergence of the New International Division of Labour (NIDL). [12]  
 (b) ‘Transnational corporations are more important than the state in promoting development in countries at low levels of development.’  
 How far do you agree with this statement? [20]
- 4 (a) Explain the characteristics of extractive industries in resource-rich countries. [12]  
 (b) To what extent is the ‘resource curse’ inevitable in resource-rich countries? [20]

### Section C – Sustainable Development

Answer **one** question from this section.

- 5 (a) With the aid of an annotated diagram, explain the causes of the enhanced greenhouse effect. [12]  
 (b) ‘The focus of low-income countries should be on adaptation to climate change, instead of mitigation.’  
 Discuss this statement. [20]
- 6 (a) Explain the challenges in measuring sustainable urban development. [12]  
 (b) Assess the success of the strategies used to manage non-hazardous solid waste in cities at different levels of development. [20]



**ST ANDREW'S JUNIOR COLLEGE**  
**Preliminary Examinations**  
**Higher 2**

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**Geography**

**9751/02**

Paper 2 Data Response Questions

**16 September 2019**

**3 hours**

Additional Materials: Answer Booklet  
1 Insert  
World outline map

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**READ THESE INSTRUCTIONS FIRST**

Write your name and class on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Candidates answer **all** questions.

The Insert contains all the Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **5** printed pages and 1 Insert.

**[Turn over**

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### Theme 4: Geographical Investigation

- 1 A group of eight 18-year-old students were tasked to investigate how the flood risk may vary along the segment of the Kallang River which flows through Bishan-Ang Mo Kio Park. Kallang River starts from the Lower Pierce Reservoir (see Resource 1).

The students were given the location map and photographs of the two sites, X and Y, and decided to test the following hypothesis:

‘Site X has a higher flood risk than Site Y.’

The students formed two teams of four to visit Site X and Site Y simultaneously on a Sunday in June to measure the discharge at these sites. They chose the timings of 8 am, 9 am, 4 pm and 5 pm. The day was hot and windy from 8 am to 9 am.

Each team had a metre ruler, a measuring tape, a stop watch and an orange to serve as a float to aid their investigation.

In the course of the day, both teams noticed that the water level in the channel has increased. The team at Site X decided to proceed with the measurement but the team at Site Y decided not to out of safety concerns, and so was unable to collect the required data. (See Resource 3) The students learnt later that water was released from the Lower Peirce Reservoir between 1 pm and 1.30 pm on that day.

Resource 1 shows the location map of Sites X and Y. Resource 2 shows photographs of Sites X and Y. Resource 3 shows the discharge data collected at Sites X and Y.

- (a) With reference to Resources 1 and 2, suggest why Sites X and Y are suitable sampling sites for the investigation. [2]
- (b) With reference to Resource 2, suggest and explain **two** ways the students planned to minimise the potential risks they could encounter at Site X. [ 6 ]
- (c) With the help of Resource 2, describe and explain how the river discharge at Site X can be measured. [7]
- (d) Sketch the discharge data shown in Resource 3 using a suitable method of data representation. [4]
- (e) The students concluded that they do not have accurate and/or reliable discharge data at both Sites X and Y to achieve the aim of the investigation.

Explain how the process of data collection could be improved. [6]

## Theme 1: Tropical Environments

### Climates in Africa

- 2 Resource 4 shows the climate graphs for Conakry, Guinea and Karasburg, Namibia in Africa. Resource 5 shows the monsoon wind system over Africa in June. Resource 6 shows a photograph of flooding in Conakry, Guinea in July 2016.
- (a) Using Resource 4, identify the climatic zones of Conakry, Guinea and Karasburg, Namibia. Describe the differences between their climatic characteristics. [6]
  - (b) With reference to Resource 5, suggest reasons for the variations in rainfall pattern in June between Conakry, Guinea and Karasburg, Namibia. [6]
  - (c) With the aid of Resource 6, explain **one** economic and **one** social effect of flooding in Conakry, Guinea. [4]
  - (d) With reference to all Resources and your own knowledge, evaluate the extent to which volume of rainfall is the main factor for flood occurrences in Conakry, Guinea. [9]

## Theme 2: Development, Economy and Environment

### Transboundary Water Issues in the Tigris-Euphrates River Basin

- 3 The Tigris and Euphrates Rivers are transboundary rivers that flow through Turkey, Syria and Iraq. Approximately 90% of the water flow in the Euphrates and 50% in the Tigris originate in Turkey.

Resource 7 shows the distribution of dams along the Tigris and Euphrates Rivers. Resource 8 shows water usage by sector and population in Turkey, Syria and Iraq. Resource 9 shows water demand and supply along the Tigris and Euphrates Rivers. Resource 10 shows the main water agreements for the Tigris-Euphrates Basin.

- (a) With reference to Resource 7, describe the distribution of dams along the Tigris and Euphrates Rivers. [5]
- (b) With reference to Resources 7 and 8, explain **two** reasons why Iraq may face water scarcity. [4]
- (c) Using Resources 7, 8 and 9, explain why conflict over water supply may arise amongst Turkey, Syria and Iraq in the Tigris-Euphrates River Basin. [7]
- (d) Using the resources and your own knowledge, evaluate the effectiveness of international water agreements such as those shown in Resource 10 in managing transboundary water supply and associated conflicts within the Tigris-Euphrates River Basin. [9]

### Theme 3: Sustainable Development

#### Urban Reimaging and Liveability in Medellin

- 4 Medellin is a city in Colombia, South America. Over 20 years ago, Medellin was known for crime, corruption and poverty. Medellin has since engaged in urban reimaging to promote its image as a city of innovation, culture and social cohesion.

Resource 11 shows some ways Medellin has changed. Resource 12 is an excerpt on the strategies meant to help the urban poor in Medellin. Resource 13 shows Plaza Botero, an outdoor museum in Medellin. Resource 14 shows the results of Medellin in two different rankings on urban liveability.

- (a) Using Resource 11, explain **two** reasons for urban reimaging in Medellin. [4]
- (b) Suggest **two** benefits of the Metrocable, a cable car system dedicated to mass transit for Medellin's urban poor, as stated in Resource 12. [4]
- (c) With reference to Resources 12 and 13, explain **two** strategies used by Medellin to improve its image. [4]
- (d) With the help of Resource 14, explain the difference in the liveability rankings of Medellin. [6]
- (e) With reference to the resources, explain whether urban reimaging has increased the liveability of Medellin for local residents. [7]



**ST ANDREW'S JUNIOR COLLEGE**  
**H2 Geography Preliminary Examinations**  
**Answer Scheme**

**Paper 1: Structured Essay Questions**  
**Section A – Tropical Environments**

1a	<p>Explain how the rock cycle determines rock characteristics. [12]</p> <p><u>Indicative Content</u></p> <p>The rock cycle involves repeated formation and destruction of different types of rocks and explains how one type of rock can be formed from any type of rocks. The rock cycle describes the three principal <u>rock forming processes</u>:</p> <ul style="list-style-type: none"><li>• cooling and crystallisation of molten magma/lava to form igneous rocks,</li><li>• lithification of sediments to form sedimentary rocks, and</li><li>• metamorphism due to high temperature and high pressure to form metamorphic rocks.</li></ul> <p>The rock cycle is also useful to explain certain characteristics associated with rock types:</p> <ul style="list-style-type: none"><li>• Rock forming process like cooling and crystallisation of magma results in certain characteristics in igneous rock which are unique to igneous rocks. For example, cooling and crystallisation of magma above the surface results in fine textured extrusive igneous rocks like basalt; when magma cools and crystallises very slowly below the earth's surface, it forms large crystals and thus intrusive igneous rocks such as granite are coarse textured.</li><li>• Rock forming process like lithification results in zone of weakness or bedding planes in between the layers of sediments in sedimentary rocks thus determining the structure of sedimentary rock.</li><li>• Rock forming process like differential pressure results in banding of similar minerals or foliations in metamorphic rocks. This determines the texture and structure of the metamorphic rock, such as foliation bands. Similarly, uniform stress and high heat result in non-foliated metamorphic rocks.</li></ul> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)</i></p>
1b	<p>To what extent is slope stability affected by human activities in the tropics? [20]</p> <p><u>Indicative Content</u></p> <p>Slope stability is a function of shear stress and shear strength. Geology has a role to play in terms of the steepness of slopes and rock structure. Climate is an important factor in the provision of moisture and extent of weathering of slope materials. Tectonic activity can provide a vital trigger to mass movement on slopes. Human activities can affect slope stability through overloading the slope (construction on slopes), undercutting the slope (roads, quarrying and mining) and vegetation removal (deforestation). Generally, however, <b>human activities serve to accentuate slope instability rather than being the only cause.</b> Human</p>

	<p>activities can <b>also make slopes more stable</b>.</p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b)</i></p>
2a	<p>Explain the impacts of deforestation in the tropics. [12]</p> <p><u>Indicative Content</u></p> <p>Impacts of deforestation for this question would include global warming and its consequence in the tropics, soil erosion, flooding, disruption of ecosystem, loss of biodiversity, mass movement, disruption of the life of indigenous people, etc. <b>Impacts could be social, economic and environmental and can be further categorised into long term and short term for deeper analysis.</b> Impacts are mainly negative.</p> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)</i></p>
2b	<p>Assess the effectiveness of strategies to manage tropical deforestation. [20]</p> <p><u>Indicative Content</u></p> <p>Strategies to manage tropical deforestation include reforestation, legally protecting forests, strengthening of governance, use of standards (sustainability certificates), managing population growth and demand, and commitments such as REDD+. <b>The criteria for effectiveness would include considerations such as whether there was a reduction in deforestation, and whether it manages to resolve the root of the problem</b> (e.g. reliance on and demand for timber both commercially and domestically) or merely minimising the extent of deforestation. <b>The likely challenges each strategy encounter may also be included to assess its overall effectiveness.</b></p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b)</i></p>

### Section B – Development, Economy and Environment

3a	<p>Explain the factors leading to the emergence of the New International Division of Labour (NIDL). [12]</p> <p><u>Indicative Content</u></p> <p>In explaining the factors leading to the emergence of the NIDL, students should show clear understanding of how the NIDL is 'new' compared to the OIDL, as well as the <i>division of labour</i> at the international scale.</p> <p>At the basis of the NIDL is the ability of TNCs to take advantage of the cheapest costs of production and of skills specialisation worldwide, resulting in the global nature of production networks. Factors leading to the emergence of the NIDL include:</p> <ul style="list-style-type: none"> <li>• <b>Push Factors from DCs</b> – why do firms want to move out from DCs? Consider rising factor costs (especially for labour) and rising levels of competitions in home countries.</li> </ul>
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	<ul style="list-style-type: none"> <li>• <b>Pull Factors in LDCs/NIEs</b> – what is so attractive about LDCs and NIEs? Include the comparative advantages that these locations offer, such as low labour cost, low labour militancy and attractive state policies. <i>Remember, you are using this term from the perspective of TNCs, not countries (as you would in Economics).</i> LDCs/NIEs also offer new markets of investments (remember, TNCs are both asset-seeking and market-seeking).</li> <li>• <b>Technology</b> – what helped the firms to decide to move? Consider the role of communications, transportation and production (deskilling) technologies.</li> </ul> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)</i></p>
3b	<p>'Transnational corporations are more important than the state in promoting development in countries at low levels of development.'</p> <p>How far do you agree with this statement? [20]</p> <p><u>Indicative Content</u></p> <p>Transnational corporations (TNCs) are firms with the power to coordinate and control operations in more than one country, even if they do not own the operations. Development refers to the rise in the well-being of society as a whole. Candidates should consider and weigh the roles of TNCs and states in promoting development in the <b>context of countries at low levels of development.</b></p> <p>TNCs are important in promoting development in countries at low levels of development as they provide employment and the benefits of cumulative causation. TNCs may also directly promote social development and environmental protection as part of their corporate social responsibility programmes. In some instances, the role of TNCs could indeed be more important than the state. For example, <b>due to their large scale of operation, especially in labour-intensive manufacturing, TNCs could provide greater employment opportunities and linkages to local firms</b> as compared to state-owned enterprises and government-linked corporations. <b>Where there is corruption and poor economic management by the state and/or limited financial capacity of the state (for instance in the extractive industries), the economic opportunities created by TNCs would also be crucial.</b></p> <p>However, the state is also important, and often more important than TNCs, in promoting development in countries at low levels of development.</p> <ul style="list-style-type: none"> <li>• <b>TNCs can in fact bring about impacts that impede, rather than promote, development, and thus the role of the state as a regulator of economic activities is crucial.</b></li> <li>• <b>The state plays the important and unique role of provider of public goods and services.</b> Goods and services that are deemed too risky or unprofitable for individual private firms (including TNCs) and/or fundamental to the population's well-being are often provided for by the state. Instances of such services include transport, education, health and infrastructure, which are essential for meeting basic needs of the population and promoting development.</li> <li>• <b>The state also plays the important role of business owner in promoting development.</b> State-owned enterprises are public enterprises that are directly owned and managed by the state. They are commonly found in countries at low levels of</li> </ul>

	<p>development, where the state has immediate developmental goals that can be achieved through direct state ownership and management of business internationally. Many, if not most, SOEs are active internationally and engaged in transnational operations, creating significant employment and revenues for the country. While TNCs are geographically flexible in their operations and may switch easily between host countries, SOEs ensure that the economic benefits can be used to promote the long-term development of the country.</p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b)</i></p>
4a	<p>Explain the characteristics of extractive industries in resource-rich countries. [12]</p> <p><u>Indicative Content</u></p> <p>Candidates should explain the key characteristics of extractive industries in resource-rich countries, which are (a) locational specific, (b) capital and technology intensive and (c) mixture of large private and state-owned firms.</p> <p>A higher level response should explain the unique and interconnected characteristics of extractive industries, backed up with specific evidence. Conversely, weaker responses would show limited understanding of extractive industries and what characterises them.</p> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)</i></p>
4b	<p>To what extent is the 'resource curse' inevitable in resource-rich countries? [20]</p> <p><u>Indicative Content</u></p> <p>The 'resource curse' refers to a phenomenon whereby countries rich in natural resources tend to have lower economic growth and worse development outcomes compared to countries with fewer natural resources. Responses should include a discussion of the extent to which the 'resource curse' is inevitable in resource-rich countries.</p> <p>Candidates should consider why the 'resource curse' may seem to be inevitable in resource-rich countries. Possible reasons include:</p> <ul style="list-style-type: none"> <li>• The <b>characteristics of the extractive industries, which often result in an over-reliance on TNCs in resource-rich countries due to their lack of capital and technology</b></li> <li>• The <b>common phenomenon of the 'Dutch Disease' which often follows after a natural resource boom</b></li> <li>• The <b>common phenomenon of poor governance</b></li> </ul> <p>Candidates should also consider why the 'resource curse' may not be inevitable in resource-rich countries, as there are countries which have escaped the 'resource curse'. Possible reasons include:</p> <ul style="list-style-type: none"> <li>• The implementation of <b>economic policy changes</b></li> <li>• The <b>presence of strong governance</b> in regulating TNCs and making sound economic decisions</li> </ul>

	<i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b)</i>
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### Section C – Sustainable Development

5a	<p>With the aid of an annotated diagram, explain the causes of the enhanced greenhouse effect. [12]</p> <p><u>Indicative Content</u></p> <p>Responses should <b>distinguish between the natural and enhanced greenhouse effect</b>. The differences between the natural and enhanced greenhouse effect should be shown using a clear, annotated diagram.</p> <p>The <b>causes of the enhanced greenhouse effect are human activities which disrupt the carbon cycle, reducing carbon sinks and adding more carbon in the atmosphere</b>. Human activities also <b>release other greenhouse gases such as nitrous oxide</b>. These activities include the burning of fossil fuels, deforestation and agriculture.</p> <p><b>Natural feedback loops (positive feedback loops) reinforce the enhanced greenhouse effect caused by human activities</b>. The melting of sea and continental ice sheets reduces albedo and increases the absorption of incoming shortwave radiation, which in turn results in more outgoing longwave radiation emitted by the surface that could be trapped by greenhouse gases. The melting of permafrost also releases deposits of methane and carbon dioxide beneath the permafrost into the atmosphere, further contributing to the enhanced greenhouse effect.</p> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)</i></p>
5b	<p>'The focus of low-income countries should be on adaptation to climate change, instead of mitigation.'</p> <p>Discuss this statement. [20]</p> <p><u>Indicative Content</u></p> <p>Responses to the impacts and risks of climate change may be categorised as mitigation or adaptation. This question requires candidates to discuss whether low-income countries should focus on adaptation rather than mitigation. <b>The focus of this question is therefore the weighing of mitigation vis-à-vis adaptation.</b></p> <p>Possible ideas to raise include:</p> <ul style="list-style-type: none"> <li>• The focus of low-income countries should be on mitigation, instead of adaptation, if we take a long-term view on managing climate change.</li> <li>• The focus of low-income countries should be on adaptation, instead of mitigation, because it is about the 'here and now'.</li> <li>• The focus of low-income countries should be on adaptation, instead of mitigation, because it is relatively easier to implement.</li> </ul>

	<p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b)</i></p>
6a	<p>Explain the challenges in measuring sustainable urban development. [12]</p> <p><u>Indicative Content</u></p> <p>Sustainable urban development is about sustainable development in the context of cities. SUD can be understood to have at least three dimensions (i) economic sustainability, (ii) social sustainability, and (iii) environmental sustainability. Clarifying these dimensions are important as they determine the use of relevant indicators to monitor SUD.</p> <p>However, not everyone agrees on how SUD should be measured. Measurement of SUD is in reality very difficult, and unsurprisingly so because sustainability is a complex and contested notion with various interpretations and differentiated interests. Challenges would include deciding what to include to represent the various dimensions (the ‘depth’ and ‘breadth’), and indeed various stakeholders and representing their varied interests; whether what ought to be measured can indeed be measured (e.g. justice and equity); difficulties of accurate / comprehensive data collection, difficulties in obtaining timely data, etc.</p> <p><i>Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)</i></p>
6b	<p>Assess the success of the strategies used to manage non-hazardous solid waste in cities at different levels of development. [20]</p> <p><u>Indicative Content</u></p> <p>Strategies to be considered include <b>landfills</b>, <b>incineration (WtE) plants</b>, and <b>3Rs</b>. When evaluating them, it is important to consider these in relation to <b>urban metabolism</b>. Whether these can move a city towards closer to circular metabolism helps to determine its success as a waste management strategy. This could be set out in the beginning as an important parameter of assessment.</p> <p>A full assessment would include <b>(i)</b> an outline of the strategy (i.e. how it works) <b>(ii)</b> why is it used or not (i.e. is this a commonly used strategy? Where? Why? <b>(iii)</b> problems it generates and the extent to which it brings a city closer to circular metabolism <b>(iv)</b> examples of actual use of these waste management strategies to deepen evaluation, such as UK, Sweden, Denmark, Singapore, Jakarta, Manila, etc.</p> <p><i>Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b)</i></p>

**Paper 2: Data Response Questions**  
**Theme 4: Geographical Investigation**

1(a)	<p><b>With reference to Resources 1 and 2, suggest why Sites X and Y are suitable sampling sites for the investigation. [2]</b></p> <p>1 mark for each valid suggestion.</p> <p>Possible responses include:</p> <ul style="list-style-type: none"> <li>• There is difference in the nature of the channel, flood management strategies and land use between Sites X (natural, vegetated) and Y (concrete, channelized, built up area) along the segment in Kallang River which have different discharge needed to assess and compare flood risk.</li> <li>• Given the number of students (man power), each team of 4 students should be able to investigate each site easily within the given time.</li> <li>• Both the sites are easily accessible by roads.</li> </ul> <p><i>Point marked</i></p>
1(b)	<p><b>With reference to Resource 2, suggest and explain two ways the students planned to minimise the potential risks they could encounter at Site X. [6]</b></p> <p>3 marks for each suggestion and explanation (1 for suggestion, 2 for explanation)</p> <p>Students could emphasise on the ways to minimize risk and then link it to the risk or vice versa.</p> <p>Possible risks and solutions could include:</p> <ul style="list-style-type: none"> <li>• To combat the potential risk of high velocity of channel, students planned to carry sticks or ropes to support themselves against strong current. They also planned to wear antiskid shoes to have a better grip on the channel bed.</li> <li>• Slippery or uneven channel bed e.g. boulders, pebbles, might be a potential risk as students might injure themselves if they slip and fall. So they planned to wear covered antiskid shoes and also carry sticks for additional support. For any injury they also planned to carry a First Aid kit with bandages and antiseptics.</li> <li>• For inclement weather like rainfall and lightning, students planned to carry raincoat or poncho and know the nearest shelter (nearby residential area) from the site so that they can take shelter. Check the weather forecast from time to time because rainfall in upstream might increase volume of water in the channel suddenly which might be dangerous for the students to carry on the investigation. So they can stop the investigation for the day and do another day.</li> <li>• There might be risk of trespassing into the property of the park authorities. So students should plan to take prior permission of the park authorities so that the authorities are well aware and can alert the students if there is any unknown risk. They should have the permission letter with them throughout the investigation process.</li> </ul>

	<i>Point marked</i>															
1(c)	<p><b>With the help of Resource 2, describe and explain how the river discharge at Site X can be measured. [7]</b></p> <p><u>Indicative Content</u></p> <p><b>Discharge (Q) = Cross Sectional Area (A) x Velocity (V).</b>  <b><u>Measuring the cross sectional area of the channel:</u></b>  <b>Cross Sectional Area (A) = Width (W) x Depth (D) of the channel at Site X</b></p> <p><b>1) Measuring the width (W) of the channel:</b></p> <p><b>2) Measuring the depth (D) of the channel:</b></p> <p><b>(3) Then measure the velocity of the channel at Site X using the ‘float method’:</b>  <b>Velocity = Distance/Time</b></p> <p><i>Levels marked</i></p> <table border="1"> <thead> <tr> <th>Level</th> <th>Marks</th> <th>Descriptors</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>6-7</td> <td>Response demonstrates accurate knowledge on the steps needed to measure velocity. Provides a thorough explanation on why certain steps are needed to measure velocity.</td> </tr> <tr> <td>2</td> <td>3-5</td> <td>Response demonstrates good knowledge on the steps needed to measure velocity. Provides a clear explanation on why certain steps are needed to measure velocity.</td> </tr> <tr> <td>1</td> <td>1-2</td> <td>Response shows some knowledge of relevant steps needed to measure velocity. Steps mentioned can be generic and explanation if present is very limited.</td> </tr> <tr> <td>0</td> <td>0</td> <td>No creditworthy response.</td> </tr> </tbody> </table>	Level	Marks	Descriptors	3	6-7	Response demonstrates accurate knowledge on the steps needed to measure velocity. Provides a thorough explanation on why certain steps are needed to measure velocity.	2	3-5	Response demonstrates good knowledge on the steps needed to measure velocity. Provides a clear explanation on why certain steps are needed to measure velocity.	1	1-2	Response shows some knowledge of relevant steps needed to measure velocity. Steps mentioned can be generic and explanation if present is very limited.	0	0	No creditworthy response.
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0	0	No creditworthy response.														
1(d)	<p><b>Sketch the discharge data shown in Resource 3 using a suitable method of data representation. [4]</b></p> <p><u>Indicative Content</u></p> <p>For sketching two bar or line graphs to represent discharge data over time:</p> <ul style="list-style-type: none"> <li>• Title – e.g. Discharge of Kallang River in Sites X and Y (1 mark)</li> <li>• Appropriate labels for both axes – X-axis (Time of the day) and Y-axis (Discharge in cumecs) (1 mark)</li> <li>• Relative accuracy for each bar or line graph drawn (1 mark each)</li> </ul> <p><i>Point marked</i></p>															

1(e) **The students concluded that they do not have accurate and/or reliable discharge data at both Sites X and Y to achieve the aim of the investigation.**

**Explain how the process of data collection could be improved. [6]**

<b>Reasons for inaccuracy</b>	<b>Reasons for low reliability</b>
Strong wind influence movement of float or velocity of the river	Discharge measured only on a Sunday which do not represent well
Release and receive time of float and stop clock use coordination	Students investigated two sections of the channel.
Defective instruments or malfunctioning instruments	Students just measure discharge (quantitative) to assess the flood risk.
Improper or incorrect ways of using measuring instruments	For Site Y students could not the collect the data at 4 and 5pm.
Incorrect way of measuring and recording width, depth and/or velocity of the river	Students are only collecting primary data.
Disturbance created by the students by making excess movement on the river water	
Nature of float chosen by the students	
Obstructions by stepping stones	

*Levels marked*

<b>Level</b>	<b>Marks</b>	<b>Descriptors</b>
3	5-6	Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the given context in the question.
2	3-4	Response demonstrates good knowledge and understanding of geographical investigation skills and methods relevant to the given context in the question.
1	1-2	Response shows inadequate knowledge and understanding of geographical investigation skills and methods relevant to the given context in the question.
0	0	No creditworthy response.

**Theme 1: Tropical Environments**  
**Climate and Flooding in Conakry and Karasburg**

2(a)	<p><b>Using Resource 4, identify the climatic zones of Conakry, Guinea and Karasburg, Namibia. Describe the differences between their climatic characteristics. [6]</b></p> <p>Identify:</p> <ul style="list-style-type: none"> <li>• Conakry – Am (1 mark) ***** High rainfall and seasonal rainfall</li> <li>• Karasburg – BWh (1 mark) ***** Remember total rainfall is below 250mm in BWh</li> </ul> <p>Describe <b>differences</b>:</p> <ul style="list-style-type: none"> <li>• Temperature: (2 marks) <ul style="list-style-type: none"> <li>○ ATR, temperature pattern (uniform, fluctuates), average annual tempt.</li> <li>○ For e.g., ATR in Conakry is low at about 2°C whereas ATR in Karasburg is higher at 13°C.</li> <li>○ In Conakry, temperature is uniformly high with lowest temperature being 28°C in the month of January and highest being 30°C in the month of April whereas in Karasburg, temperature fluctuates with lowest temperature being 11°C in the month of July and highest being 24°C in the month of January.</li> <li>○ Average annual temperature in Conakry is 28°C which is higher than Karasburg, which is 18.6°C.</li> </ul> </li> <li>• Rainfall: (2 marks) <ul style="list-style-type: none"> <li>○ Total annual rf, rainfall pattern (seasonal vs uniformly low), highest and lowest rf.</li> <li>○ For e.g., total annual rainfall in Conakry is high being 3760mm while total annual rainfall for Karasburg is low being 124mm.</li> <li>○ Conakry experiences seasonal rainfall with wet summers from June to October and dry winters from November to May whereas Karasburg experiences very low rainfall throughout the year.</li> <li>○ In Conakry, highest rainfall of 1090mm is recorded in the month of July and lowest rainfall of 5mm in the month of January whereas Karasburg experiences very low rainfall throughout the year with below 20mm from April to January.</li> </ul> </li> </ul> <p><i>Point marked</i></p>
2(b)	<p><b>With reference to Resource 5, suggest reasons for the variations in rainfall pattern in June between Conakry, Guinea and Karasburg, Namibia. [6]</b></p> <p><u>Indicative Content</u></p> <p>Students to provide at least 2 reasons.</p> <p>Heavy rainfall in June in Conakry:</p> <ul style="list-style-type: none"> <li>• <b>Overhead sun over Tropic of Cancer in June</b>, insolation heating, terrestrial radiation heating, instability, LP, rising warm and moist air due to convection, then cools, condenses, forms cloud and brings heavy rainfall in Conakry which is in the NH.</li> <li>• <b>In June, ITCZ north of Conakry</b>, LP over NH land and HP over SH land, PGF, SE monsoon wind from the SH blows towards the NH. SE monsoon wind after crossing</li> </ul>

the equator deflects to the right in the NH and moves as SW monsoon wind towards Conakry. As the monsoon wind picks up moisture from the Atlantic Ocean, the monsoon winds converge and uplift at ITCZ forming clouds and brings rain to Conakry.

- **Coastal location of Conakry** received onshore winds first, which have the maximum moisture.

Low rainfall in June in Karasburg:

- **In June, Karasburg is under the influence of HP or STH**, zone of sinking cold and dry air, stability, no uplift mechanism, and no cloud formation so rainfall is very low.
- **SE monsoon wind blows from the land to the sea and are thus offshore winds.** Thus SE monsoon winds do not bring rain to Karasburg in June.
- **Cold ocean current** along the western coast of south Africa where Karasburg is located, thus cold and dry wind from the ocean, do not cause rainfall.

*Levels marked*

Level	Marks	Descriptors
3	5-6	Response demonstrates accurate knowledge and understanding of the how different factors (that are shown on the resource) can explain for the variations in rainfall pattern in Conakry and Karasburg. Explanation is detailed, thorough and relevant Reference made to resource-to substantiate response.
2	3-4	Response demonstrates some knowledge and understanding of the how different factors (that are shown on the resource) can explain for the variations in rainfall pattern in Conakry and Karasburg. Explanation is clear and mostly relevant Limited use made of resource to substantiate response.
1	1-2	Response shows limited or no knowledge and understanding of the how different factors (that are shown on the resource) can explain for the variations in rainfall pattern in Conakry and Karasburg. Explanation is weak and at times irrelevant. Little or no reference to resources in response.
0	0	No creditworthy response.

2(c) **With the aid of Resource 6, explain one economic and one social effect of flooding in Conakry, Guinea. [4]**

**Economic effects – (2 marks)**

- damage to infrastructure (roads/pavements/lighting/lamp post)
- loss of property – houses/automobiles (damaged infrastructure)
- high cost involved to rebuild, repair etc. (damaged infrastructure)
- late to work, reduce productivity and efficiency due to traffic disruptions caused by flooding (traffic congestion)

**Social effects – (2 marks)**

- deterioration of health conditions owing to waterborne diseases like diarrhea, cholera etc. (stagnant, dirty water)
- loss of human lives or death (stagnant, polluted water)
- trauma of flood victims (loss of life, property etc.)
- late to work and school, reduced family time etc. increases mental stress (traffic

	<p>congestion)</p> <p><i>Point marked</i></p>									
2(d)	<p><b>With reference to all Resources and your own knowledge, evaluate the extent to which volume of rainfall is the main factor for flood occurrences in Conakry, Guinea. [9]</b></p> <p><u>Indicative Content</u></p> <p>Students should argue that though volume of rainfall is the main factor for flood occurrence in Conakry as June to September it received the prolonged and high intensity rainfall, but there are other physical and human factors which might also be responsible for the occurrence of flood in Conakry.</p> <table border="1"> <tr> <td><b>Factors affecting flood occurrences</b></td> </tr> <tr> <td>Actual Volume of rf (Resource 4)</td> </tr> <tr> <td>Duration of rainfall (SOF)</td> </tr> <tr> <td>Intensity of rainfall (HOF)</td> </tr> <tr> <td>Factors contributing to high rainfall that leads to flood – <ul style="list-style-type: none"> <li>• Wind Patterns (Resource 5)</li> </ul> </td> </tr> <tr> <td>Urbanisation (Resource 5)</td> </tr> <tr> <td>Coastal location (Resource 6)</td> </tr> <tr> <td>Topography (Resource 1)</td> </tr> <tr> <td>Absence of storm water drains or insufficient or inefficient storm water drains</td> </tr> </table> <p><i>Levels marked using H2 generic level descriptors for open-ended 9m DRQ on Themes 1, 2 and 3</i></p>	<b>Factors affecting flood occurrences</b>	Actual Volume of rf (Resource 4)	Duration of rainfall (SOF)	Intensity of rainfall (HOF)	Factors contributing to high rainfall that leads to flood – <ul style="list-style-type: none"> <li>• Wind Patterns (Resource 5)</li> </ul>	Urbanisation (Resource 5)	Coastal location (Resource 6)	Topography (Resource 1)	Absence of storm water drains or insufficient or inefficient storm water drains
<b>Factors affecting flood occurrences</b>										
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Urbanisation (Resource 5)										
Coastal location (Resource 6)										
Topography (Resource 1)										
Absence of storm water drains or insufficient or inefficient storm water drains										

**Theme 2: Development, Economy and Environment**  
**Transboundary Water Issues in the Tigris-Euphrates River Basin**

3(a)	<p><b>With reference to Resource 7, describe the distribution of dams along the Tigris and Euphrates Rivers. [5]</b></p> <p>1 mark for each description with supporting evidence to a maximum of 5 marks.</p> <p>Possible responses include:</p> <ul style="list-style-type: none"> <li>• For the Euphrates River, dams are concentrated in the upstream states of Turkey and Syria, where 13 out of 16 dams are found. [1]</li> <li>• For the Euphrates River, all 3 proposed dam and dams under construction are found in Syria. [1]</li> <li>• For the Tigris River, dams are concentrated in the downstream states of Iraq and Iran, where 11 of 17 dams are found. [1]</li> <li>• While there are currently only 4 operational dams along the Tigris River in the upstream state of Turkey, there are 1 proposed dam and 1 dam under construction in Turkey as well. [1]</li> </ul>
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	<ul style="list-style-type: none"> <li>• There are dams constructed along most of the tributaries of the Tigris and Euphrates Rivers, such as Deralok and Bekhme in Syria and Karkheh and Dez in Iran. [1]</li> </ul> <p><i>Point marked</i></p>
3(b)	<p><b>With reference to Resources 7 and 8, explain two reasons why Iraq may face water scarcity. [4]</b></p> <p>1 mark for each reason without supporting evidence to a maximum of 2 marks. 2 marks for each well-explained reason with supporting evidence to a maximum of 4 marks.</p> <p>Possible responses include:</p> <ul style="list-style-type: none"> <li>• Iraq, being located downstream, is dependent on the upstream states Turkey and Syria for water supply. Resource 7 shows that Turkey and Syria have 13 dams along the Euphrates River and Turkey has 6 dams along the Tigris River, including proposed dams and dams under construction. This allows Turkey and Syria to control the flow of water into Iraq. If these dams do not release water or release polluted water, Iraq will not be able to receive sufficient usable water supply to meet the demands of water usage, leading to water scarcity. [2]</li> <li>• Another reason why Iraq may face water scarcity is population pressures. Resource 8 shows that Iraq has a large population of 38 million, while facing a high population growth rate of 2.8%. Population pressures drive up demand for water across the agricultural, industrial and domestic sectors, leading to water scarcity when existing supply is unable to meet demand. [2] OR Iraq may face water scarcity due to its strong reliance on agriculture, as seen in Resource 8 where agriculture uses up 78% of water. Inefficient and water-inefficient agricultural practices such as excessive irrigation can drive up demand for water beyond existing supply. Fertilisers and pesticides, as well as waste from farm animals, may be washed into and pollute water bodies, reducing the supply of usable water. [2]</li> </ul> <p>Note: the explanation provided should be clearly linked back to the situation of water scarcity, which is the lack of sufficient available water resources to meet the demands of water usage within a region.</p> <p><i>Point marked</i></p>

3(c) **Using Resources 7, 8 and 9, explain why conflict over water supply may arise amongst Turkey, Syria and Iraq in the Tigris-Euphrates River Basin. [7]**

Indicative Content

- Conflict over water supply amongst Turkey, Syria and Iraq may arise over the **quantity of water**. Approximately 90% of the water flow in the Euphrates and 50% in the Tigris originate in Turkey, giving Turkey significant control over the rivers.
- Conflict may also arise over the **quality of water**, where pollution in Turkey and Syria has severe implications on the state(s) downstream. Given the strong reliance on agriculture across all 3 states (Resource 8), agricultural pollution could be significant, where fertilisers and pesticides, as well as waste from farm animals, are washed into the rivers.

*Levels marked*

Level	Marks	Descriptors
3	6-7	Response demonstrates accurate knowledge of factors contributing to conflict over water supply in the context of the Tigris-Euphrates Basin. Response uses all resources accurately to explain why conflict between two parties or more may arise. Response is clear, detailed and shows focus on the question.
2	3-5	Response demonstrates adequate knowledge of factors contributing to conflict over water supply in the context of the Tigris-Euphrates Basin. Response uses resource(s) to explain why conflict between two parties or more may arise, but may be vague at times in addressing 'conflict'. Response is mostly clear and shows some supporting detail and focus on the question.
1	1-2	Response demonstrates limited knowledge of factors contributing to conflict over water supply in the context of the Tigris-Euphrates Basin. Little or no use of the resource(s) to explain why conflict between two parties or more may arise. Response lacks detail, clarity and focus on the question, with a neglect of 'conflict' between two or more parties.
0	0	No creditworthy response.

3(d)	<p><b>Using the resources and your own knowledge, evaluate the effectiveness of international water agreements such as those shown in Resource 10 in managing transboundary water supply and associated conflicts within the Tigris-Euphrates River Basin. [9]</b></p> <p><u>Indicative Content</u></p> <p>Candidates should consider how international water agreements, such as those shown in Resource 4, may be effective in managing transboundary water supply, weighed against the limitations of such agreements. There should be some conclusion on whether international water agreement are on the whole effective in managing transboundary water supply and associated conflicts within the Tigris-Euphrates River Basin.</p> <p>International water agreements could be effective in managing transboundary supply and associated conflicts within the Tigris-Euphrates River Basin, as they are legal and political arrangements that establish clear guidelines for cooperation and sharing of water. Water agreements establish a common consensus based on what each party deems to be a fair share of the gains.</p> <p>However, international water agreements also have their limitations in managing transboundary water supply and associated conflicts within the Tigris-Euphrates River Basin. Students should consider 1-2 limitation(s).</p> <ul style="list-style-type: none"> <li>• One key limitation of the water agreements within the Tigris-Euphrates River Basin is the lack of agreements among all three riparian states in joint water management and conflict resolution.</li> <li>• The effectiveness of water agreements in managing water supply and conflicts is limited by the existing political situation within the Tigris-Euphrates Basin.</li> <li>• The sustainability of the water agreements in managing water supply and conflicts within the Tigris-Euphrates Basin is also limited. The 1987 agreement between Turkey and Syria remains a “temporary” agreement. Additionally, the allocation of water by a fixed ratio of 42% to Syria and 58% to Iraq in the 1990 agreement may be insufficient to meet the water needs of both countries if Turkey continues with dam construction.</li> </ul> <p>A higher level response demonstrates sound evaluation of the overall effectiveness of international water agreements in managing transboundary water supply and associated conflicts within the Tigris-Euphrates River Basin.</p> <p><i>Levels marked using H2 generic level descriptors for open-ended 9m DRQ on Themes 1, 2 and 3</i></p>
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**Theme 3: Sustainable Development**  
**Urban Reimagining and Liveability in Medellin**

4(a)	<p><b>Using Resource 11, explain two reasons for urban reimagining in Medellin. [4]</b></p> <p>1 mark for each reason without supporting evidence to a maximum of 2 marks. 2 marks for each well-explained reason with supporting evidence to a maximum of 4 marks.</p> <p>Possible responses include:</p> <ul style="list-style-type: none"><li>• One reason for urban reimagining in Medellin is the promotion of economic growth. Medellin used to be perceived as the world's most dangerous city, which would certainly deter investments and tourism.</li><li>• Another reason for urban reimagining in Medellin is to increase the liveability of the city. By changing the negative image of Medellin as a city of danger and crime and promoting innovation and culture, there would be an improvement in the quality of life of residents, such as in terms of safety, freedom of expression and economic and recreational opportunities available.</li></ul> <p>Note: answers provided should take into account the <i>change</i> in the urban image of Medellin.</p> <p><i>Point marked</i></p>
4(b)	<p><b>Suggest two benefits of the Metrocable, a cable car system dedicated to mass transit for Medellin's urban poor, as stated in Resource 12. [4]</b></p> <p>1 mark for each benefit without supporting evidence to a maximum of 2 marks. 2 marks for each benefit with supporting evidence to a maximum of 4 marks.</p> <p>Possible responses include:</p> <ul style="list-style-type: none"><li>• One benefit of the Metrocable is the ability to effectively link poor communities to the city centre. As stated in Resource 12, many of the poorest communities in Medellin live on inaccessible mountain slopes and the Metrocable will be able to link them to the amenities and opportunities in the city centre. This would help to increase the social and economic wellbeing of the poor. [2]</li><li>• Another benefit of the Metrocable is the ability to avoid the costs and risks which come with construction of roads. The alternative to the Metrocable is to construct roads from the mountains to the city centre. However, this is costly due to the steep and "inaccessible mountain slopes" as stated in Resource 12 and could increase the risk of mass movement and worsen traffic congestion in the city centre. [2]</li></ul> <p><i>Point marked</i></p>
4(c)	<p><b>With reference to Resources 12 and 13, explain two strategies used by Medellin to improve its image. [4]</b></p> <p>Award 1 mark for each strategy without supporting evidence to a maximum of 2 marks. Award 2 marks for each well-explained strategy with supporting evidence to a maximum of</p>

	<p>4 marks.</p> <p>Possible responses include:</p> <ul style="list-style-type: none"> <li>• One strategy used by Medellin is to alleviate poverty in the city. Resource 12 shows that Medellin has improved transport from the poorest communities on mountain slopes to the city centre via the Metrocable and outdoor escalators, as well as introduced 'library parks' to promote education and social cohesion. Improving the access of the poor to amenities, opportunities, education and social support would alleviate poverty and reduce the need to turn to crime. This would allow Medellin to improve its image from a city of crime and poverty to one of growth and social cohesion. [2]</li> <li>• Medellin adopted a strategy of innovative urban design to improve its image. To connect the poorest communities on mountain slopes to the amenities and opportunities in the city centre, Medellin devised the innovative solutions of outdoor escalators and the Metrocable, which is the world's first cable car system dedicated to mass transit (Resource 12). The introduction of 'library parks' is another innovative measure to promote education and social interaction in these communities. These innovative measures could then become icons for the improvement in Medellin's image from a city of danger and poverty to a city of innovation and social cohesion. [2]</li> <li>• Another strategy used by Medellin is culture-led reimagining. Resource 13 shows Plaza Botero, a popular outdoor museum home to 23 giant sculptures donated by native artist Botero. Iconic public art projects like this can help to enhance cultural vibrancy, attract crowds and improve the sense of safety in outdoor spaces in the city. The showcase of native art would also increase civic pride and identity amongst residents. This would help to improve Medellin's image from a city of danger to a city of innovation and culture, which is conducive for live, work and play. [2]</li> </ul> <p>Note: answers provided should clearly take into account the <i>change/improvement</i> in the urban <i>image</i> of Medellin.</p> <p><i>Point marked</i></p>
4(d)	<p><b>With the help of Resource 14, explain the difference in the liveability rankings of Medellin. [6]</b></p> <p><u>Indicative Content</u></p> <ul style="list-style-type: none"> <li>• While Medellin was ranked the top city out of 12 in Colombia in the Colombian national 'Como Vamos' quality of life survey, it was given a low ranking of 146/206 cities in the Numbeo Quality of Life Index.</li> <li>• The difference in the liveability rankings of Medellin could be attributed to the different pool and scale of cities ranked.</li> <li>• The difference in the liveability rankings of Medellin could also be due to the different criteria used for each indicator. The Numbeo uses eight criteria, looking into economic and environmental aspects of liveability such as cost of living, climate and pollution which are not considered in the Colombian national survey. The Colombian national survey uses 11 criteria, including more qualitative criteria not considered in Numbeo such as civic pride and behaviour and optimism.</li> <li>• Ultimately, what constitutes 'liveability' is highly relative. Its precise meaning depends on the place, time and purpose of the assessment and on the value system of the</li> </ul>

assessor. For the Colombia national survey, the purpose of the assessment would be to rank the liveability of national cities in terms of the quality of life perceived by citizens. On the other hand, the Numbeo is a database of user contributed data about cities worldwide. The Index is catered to a specific global audience, most likely corporate executives with high mobility and interest in the expat experience across cities worldwide. Users contributing the data may not be residents, but rather well-travelled visitors to Medellin.

Level	Marks	Descriptors
3	5-6	Response demonstrates accurate knowledge of the measurement of urban liveability in the context of Medellin. Response uses resource accurately to explain the difference in the liveability rankings of Medellin, with clear understanding of the relative nature of liveability. Response is clear, detailed and shows focus on the question.
2	3-4	Response demonstrates adequate knowledge of the measurement of urban liveability in the context of Medellin. Response uses resource to explain the difference in the liveability rankings of Medellin, but may be vague or inaccurate at times. Response is mostly clear and shows some supporting detail and focus on the question.
1	1-2	Response demonstrates limited knowledge of the measurement of urban liveability in the context of Medellin. Little or no use of resource to explain the difference in the liveability rankings of Medellin. Response lacks detail, clarity and focus on the question.
0	0	No creditworthy response.

4(e) **With reference to the resources, explain whether urban reimagining has increased the liveability of Medellin for local residents. [7]**

Indicative Content

Candidates should explain how urban reimagining has increased the liveability of Medellin for local residents, as well as the limitation(s) of reimagining in improving liveability.

Urban reimagining has increased the liveability of Medellin for local residents.

- Reimagining has boosted economic growth in Medellin (Resource 11). The increase in foreign investment and tourism in the city would bring about greater economic opportunities such as jobs and partnerships with foreign firms for local residents in Medellin, improving liveability.
- One key contribution to the increase in liveability is the change in Medellin's image as a city of crime and danger. This would increase actual and perceived safety and reduce fear of local residents in the city (Resource 11).
- The innovative use of cable cars and outdoor escalators to connect the poorest communities living on inaccessible mountain slopes to the city centre and construction of 'library parks' in these neighbourhoods would increase liveability for the urban poor (Resource 12). The poor would now gain greater mobility and access to the amenities and opportunities in the city centre as well as education and social support.
- The use of culture-led reimagining, such as public art seen in Resource 13, could increase recreational opportunities and freedom of creative expression for local residents in the urban environment. The display of local art could also provide a focal point for community pride and identity of local residents in Medellin.

- All in all, the increase in liveability for local residents is evident in the national 'Como Vamos' quality of life survey based on citizen perceptions (Resource 14). While Medellin used to be a city of crime and poverty, it is now ranked the top city in Colombia for quality of life, in aspects such as household economic improvement, education, safety, mobility and civic pride.

However, urban reimagining has not necessarily increased the liveability of Medellin for all local residents.

- Resource 12 states that thousands of poor families have been relocated to a segregated area of the city called Nuevo Occidente, which has little access to social services. It also takes a lengthy one hour to reach the city centre via the Metrocable. For the poor households living in Nuevo Occidente, there may not be significant improvement in quality of life in their new neighbourhood due to the limited access to social services and long travel time to the city centre.
- According to Resource 14, Medellin was given a low rank of 146/206 cities worldwide in the Numbeo Quality of Life Index. This could be due to its low rating in terms of pollution, climate and traffic commute time, which are not included in the national quality of life survey but would affect liveability for local residents as well.

*Levels marked*

Level	Marks	Descriptors
3	6-7	Response demonstrates accurate knowledge of urban liveability in the context of Medellin. Response uses all resources accurately to explain whether urban reimagining has increased the liveability of Medellin for local residents, with consideration of both the positive impact of reimagining on liveability and the limitation(s) in increasing liveability. Response is clear, detailed and shows focus on the question.
2	3-5	Response demonstrates adequate knowledge of urban liveability in the context of Medellin. Response uses resource(s) to explain whether urban reimagining has increased the liveability of Medellin for local residents, but may be one-sided and vague or inaccurate at times. Response is mostly clear and shows some supporting detail and focus on the question.
1	1-2	Response demonstrates limited knowledge of urban liveability in the context of Medellin. Little or no use of resource to explain whether urban reimagining has increased the liveability of Medellin for local residents. Response lacks detail, clarity and focus on the question.
0	0	No creditworthy response.



TEMASEK JUNIOR COLLEGE  
JC2 PRELIMINARY EXAMINATION 2019  
Higher 2

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**GEOGRAPHY**

**9751/02**

Paper 2 Data Response Questions

**17 September 2019**

INSERT

**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

This Insert contains all the Resources referred to in the questions.

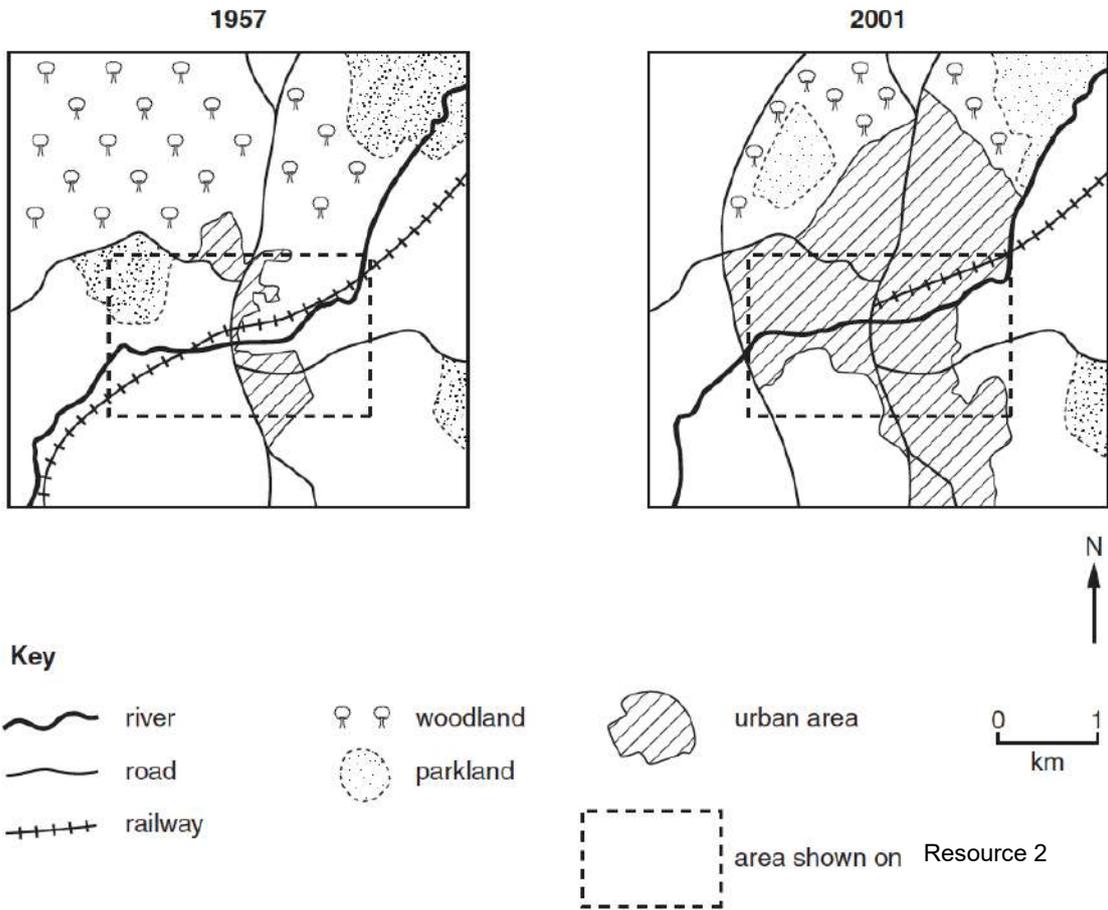
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This document consists of **14** printed pages and **2** blank pages.



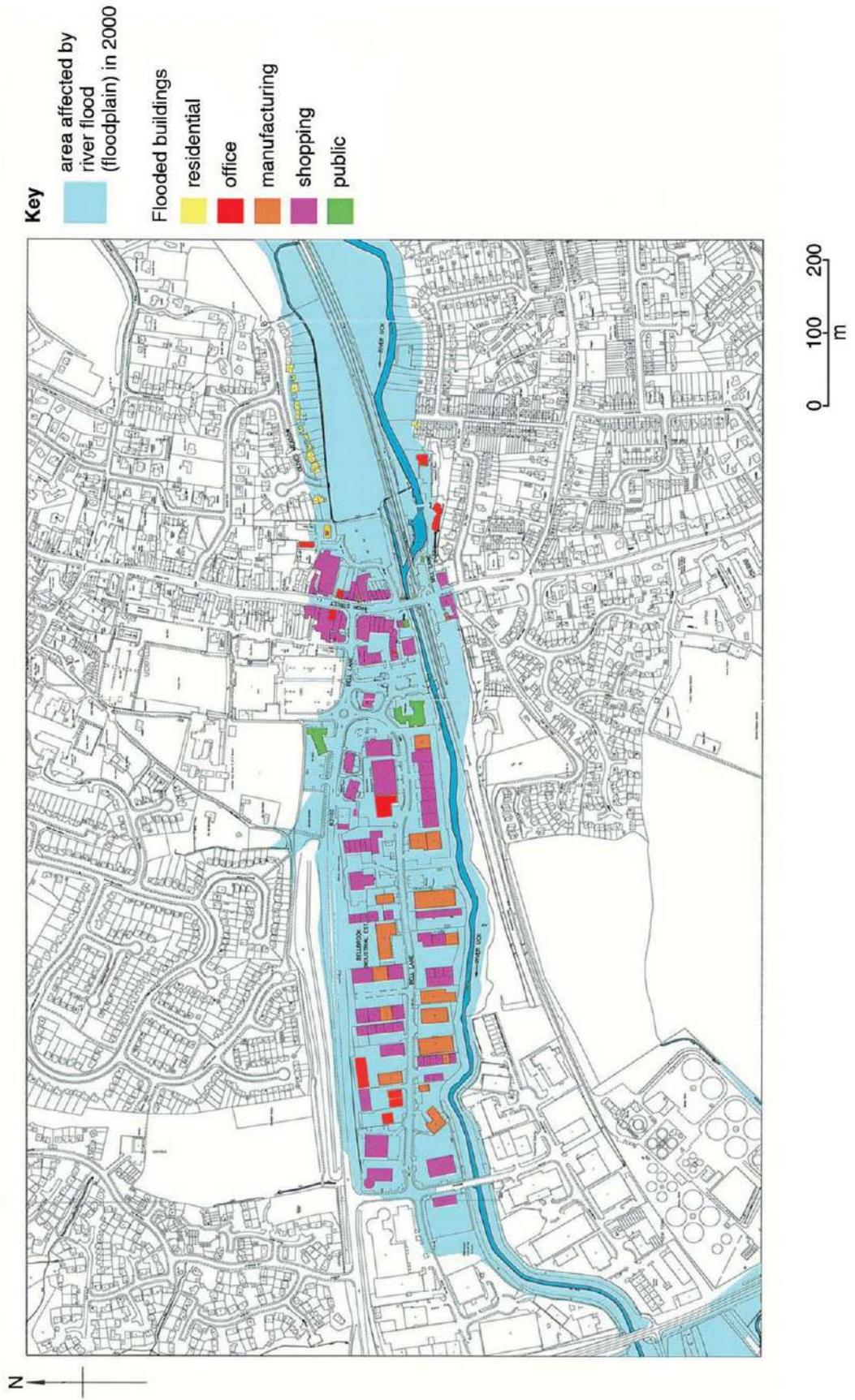
### Resource 1 for Question 1

### Changes in the area



### Resource 2 for Question 1

### Flood Map of River Uck



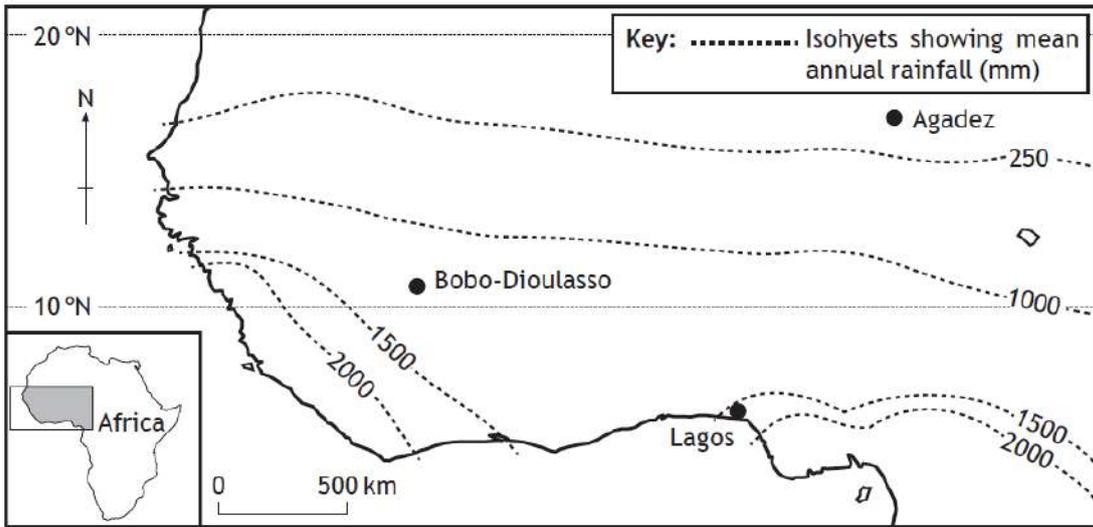
### Resource 3 for Question 1

#### Recording sheet of bi-polar survey used at a site

Location:				Date / Time: 29 Aug 2019				
The flood risk is ...								
Low risk	-3	-2	-1	0	+1	+2	+3	High Risk
Furthest from the river channel or drainage					✓			Near to the river channel or drainage
Higher extent of vegetation cover, and hence higher interception storages			✓					Lower extent of vegetation cover, and hence lower interception storages
Lower % of built up area						✓		Higher % of built up area
Greater height above drainage channel level						✓		Lower height above drainage channel level
Surfaces with higher infiltration capacity					✓			Surfaces with lower infiltration capacity
No visible debris in drainage system			✓					Presence of debris in drainage system
Higher channel capacity of drainage system			✓					Lower channel capacity of drainage system
Evidence of low soil disturbance				✓				Evidence of high soil disturbance
Effective flood mitigation measures					✓			Ineffective flood mitigation measures
Effective flood prevention measures (e.g. flood barriers)						✓		Ineffective flood prevention measures
Total Score:								

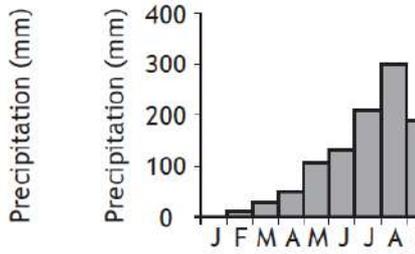
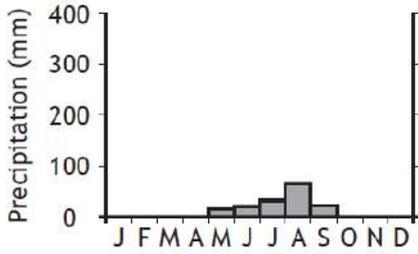
Resource 4 for Question 2

Rainfall variations across West Africa

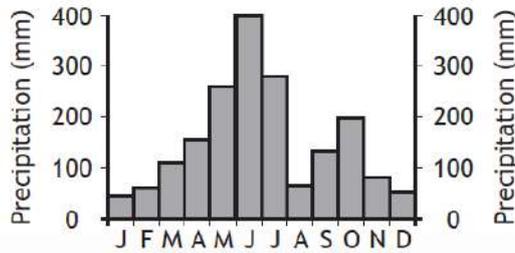


Agadez

Bobo-Dioulasso



Lagos

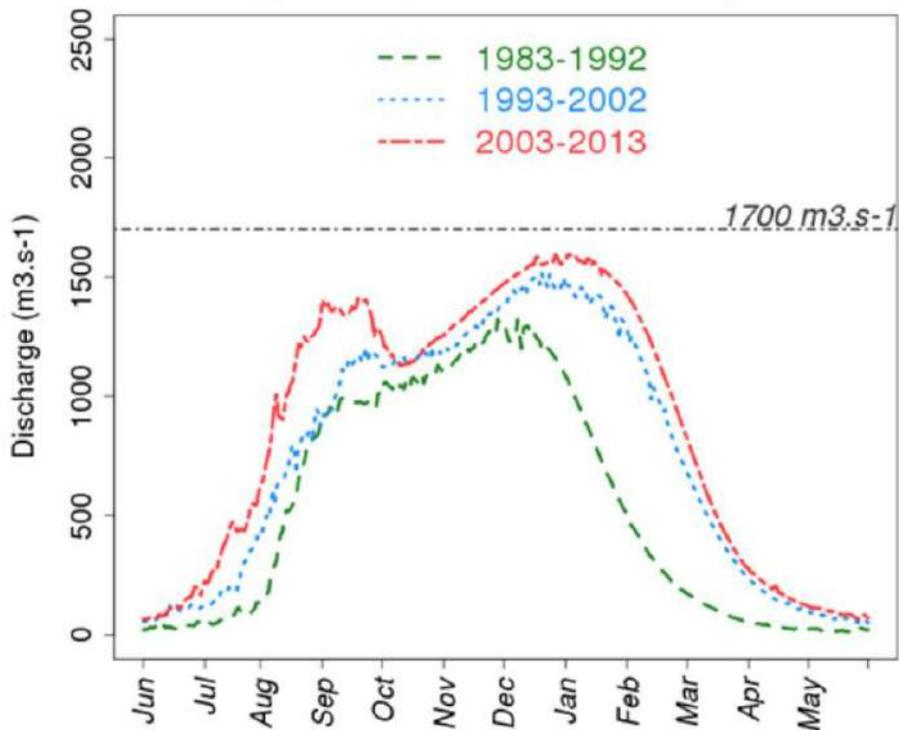


## Resource 5 for Question 2

## Location of Niger River

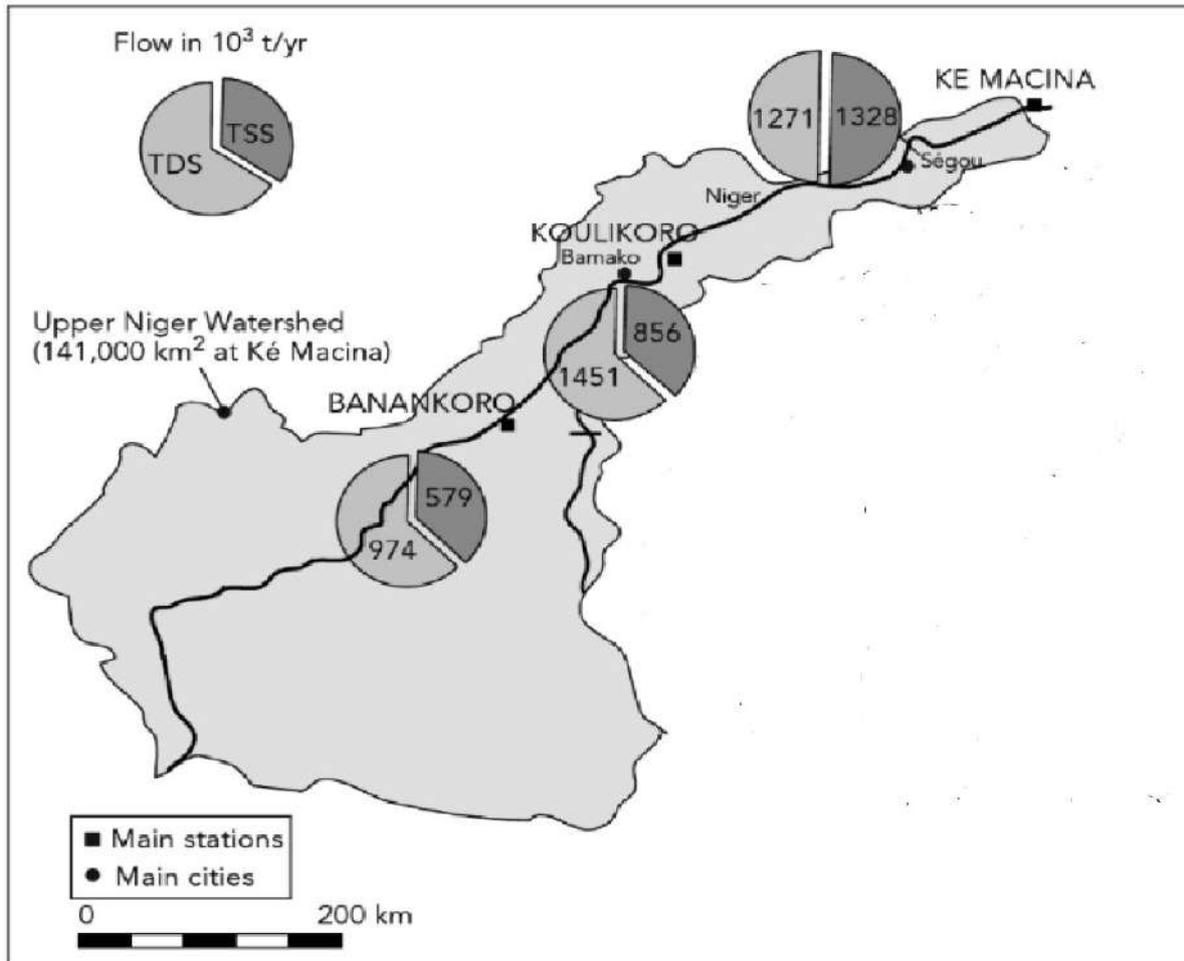


## Niamey Discharge Station at the Niger River



## Resource 6 for Question 2

**Annual Average Discharge for  
Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) from the  
Upper Niger Watershed in the Guinea Highlands to the Niger Inland Delta**



Resource 7 for Question 2

A section of Niger River before Niamey discharge station



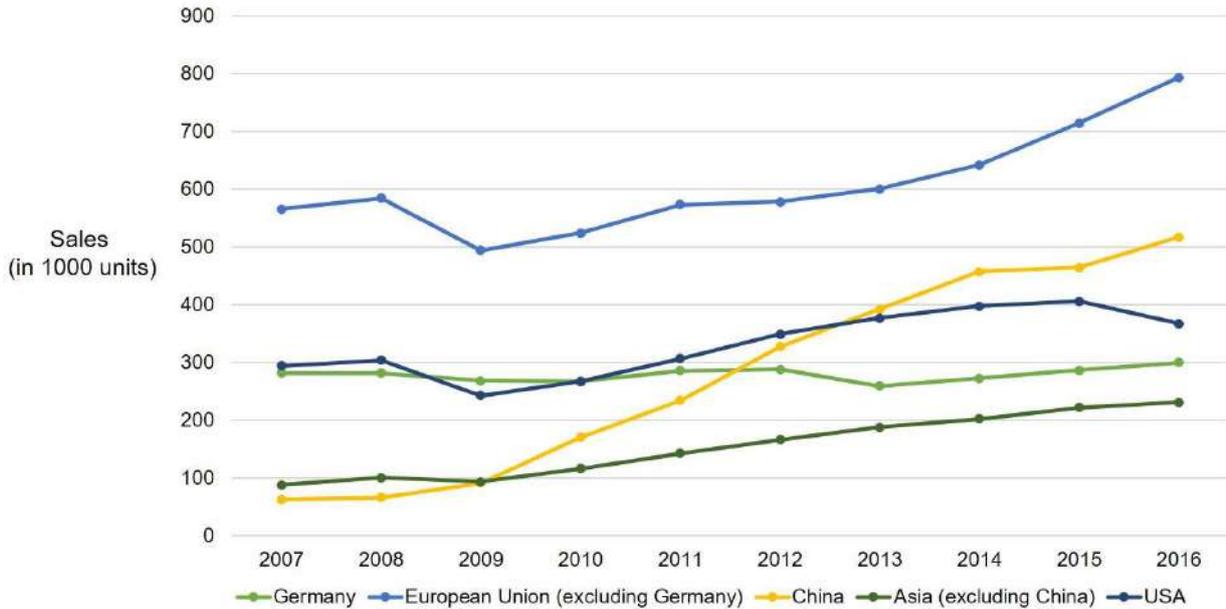
Resource 8 for Question 3

Production network of BMW in 2018



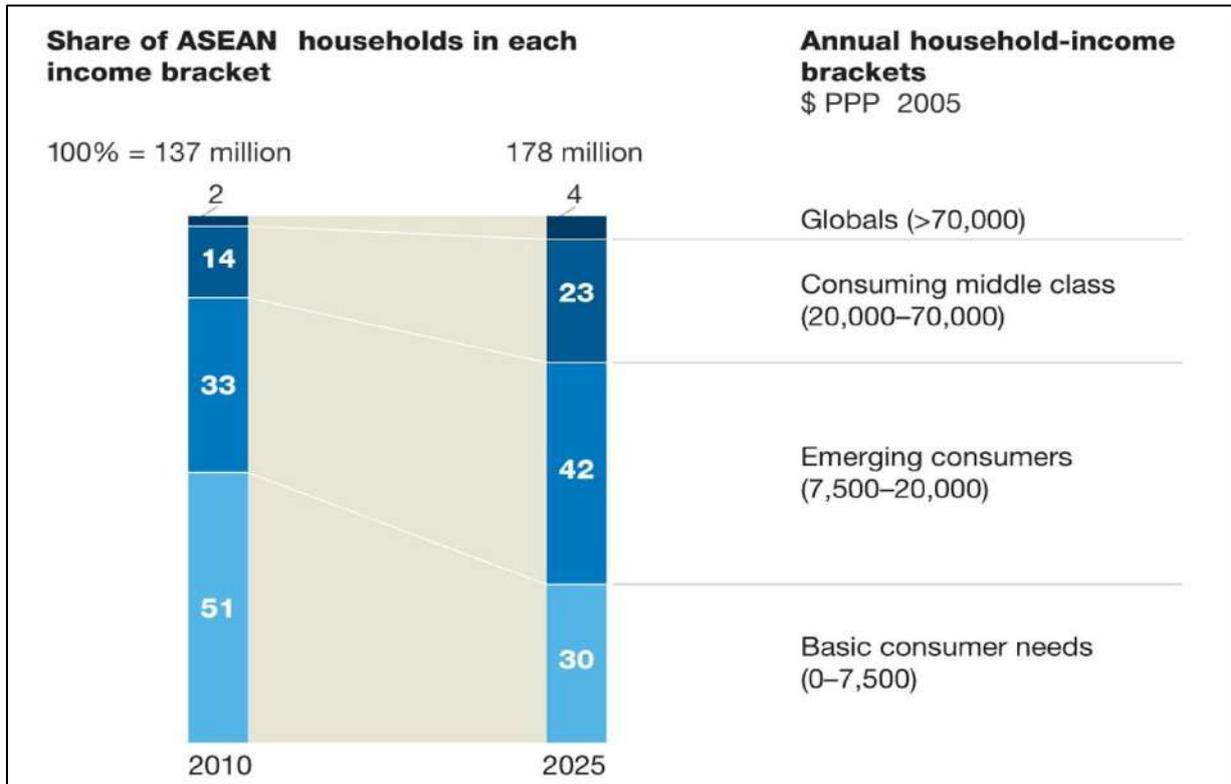
Resource 9 for Question 3

BMW's automobile sales volume across countries and regions, 2007-2016



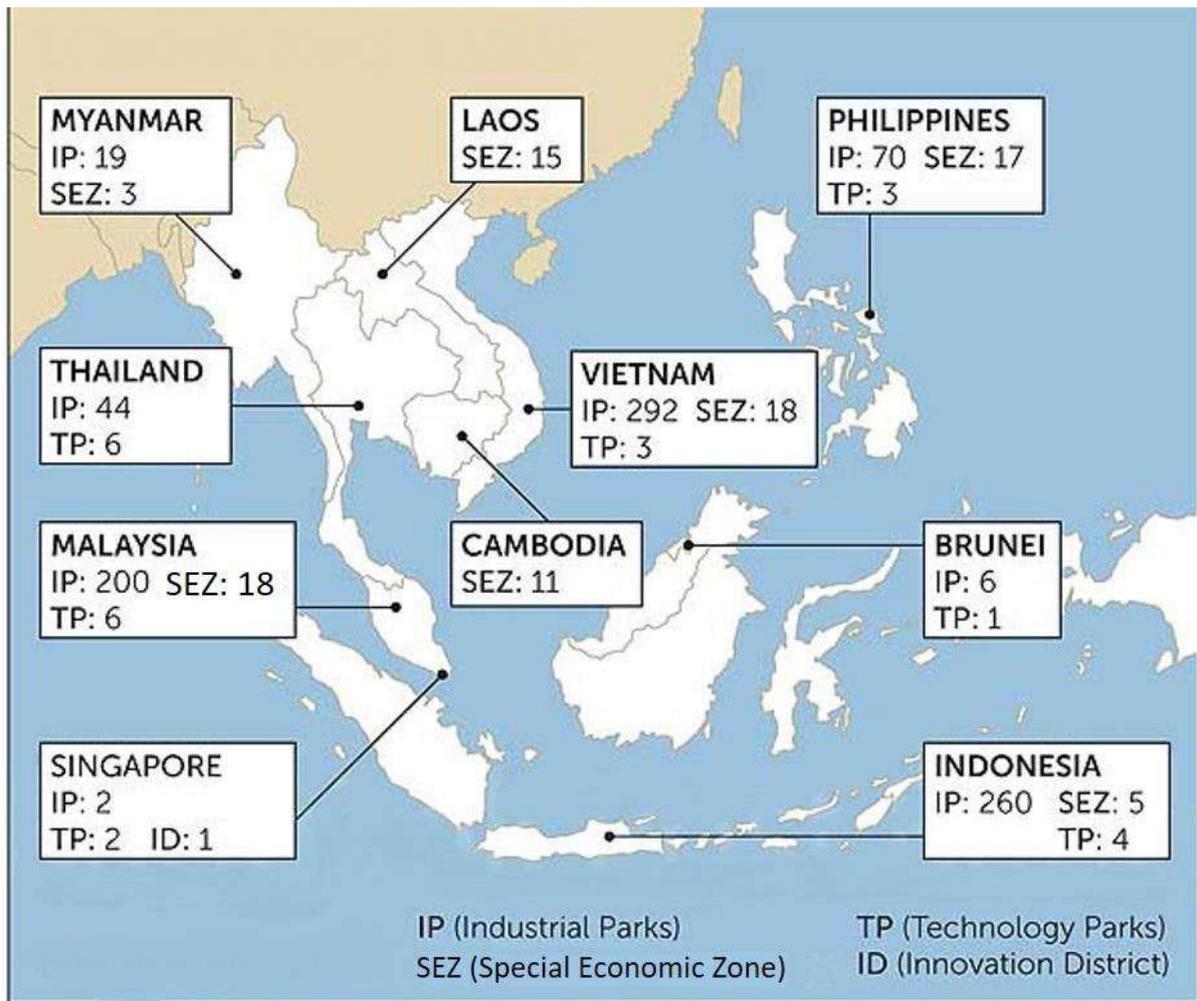
Resource 10 for Question 3

Projected changes in share of ASEAN households in different income brackets, 2010-2025



Resource 11 for Question 3

Economic zones in ASEAN in 2015

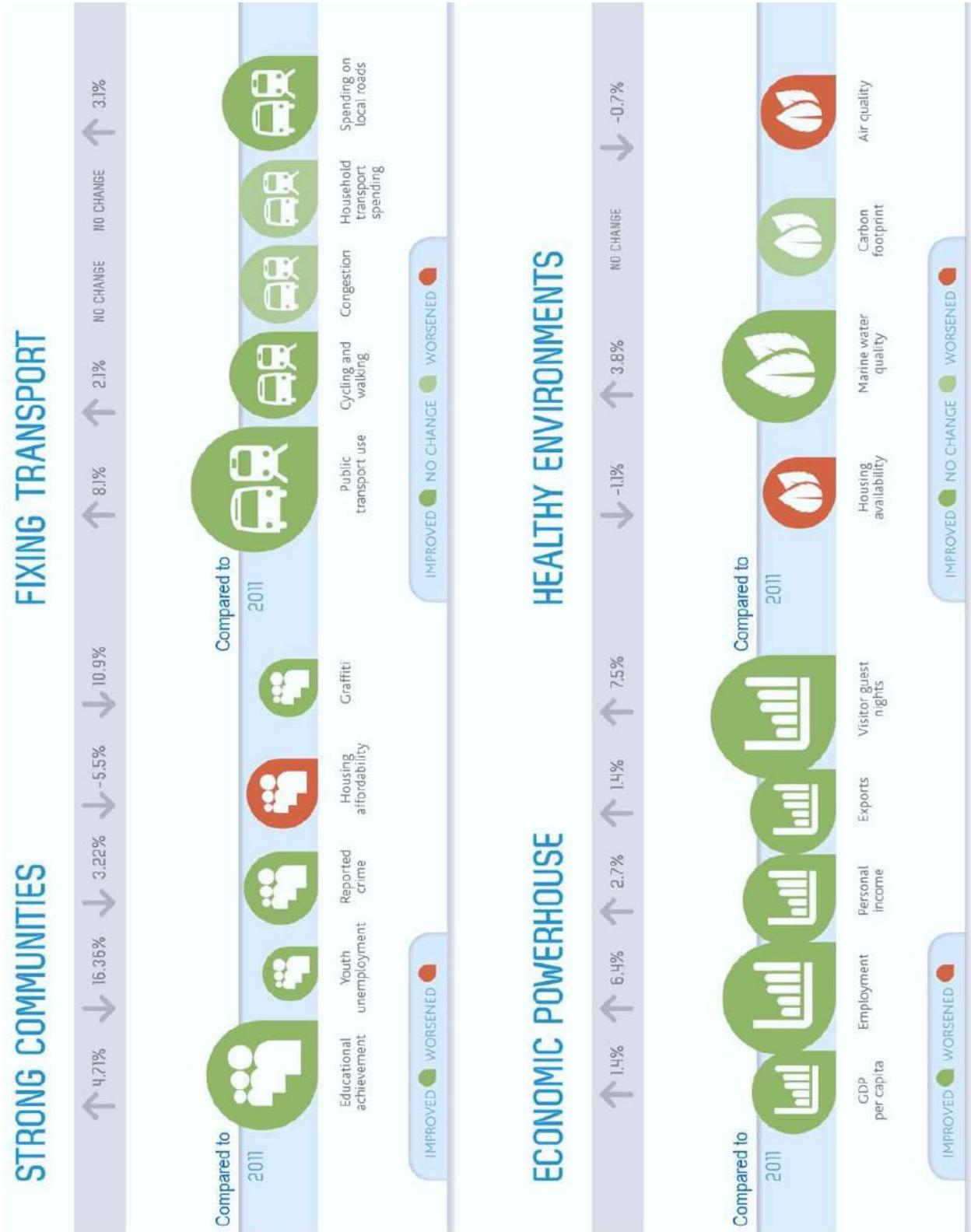


Source: UN Industrial Development Organization

POSTgraphics

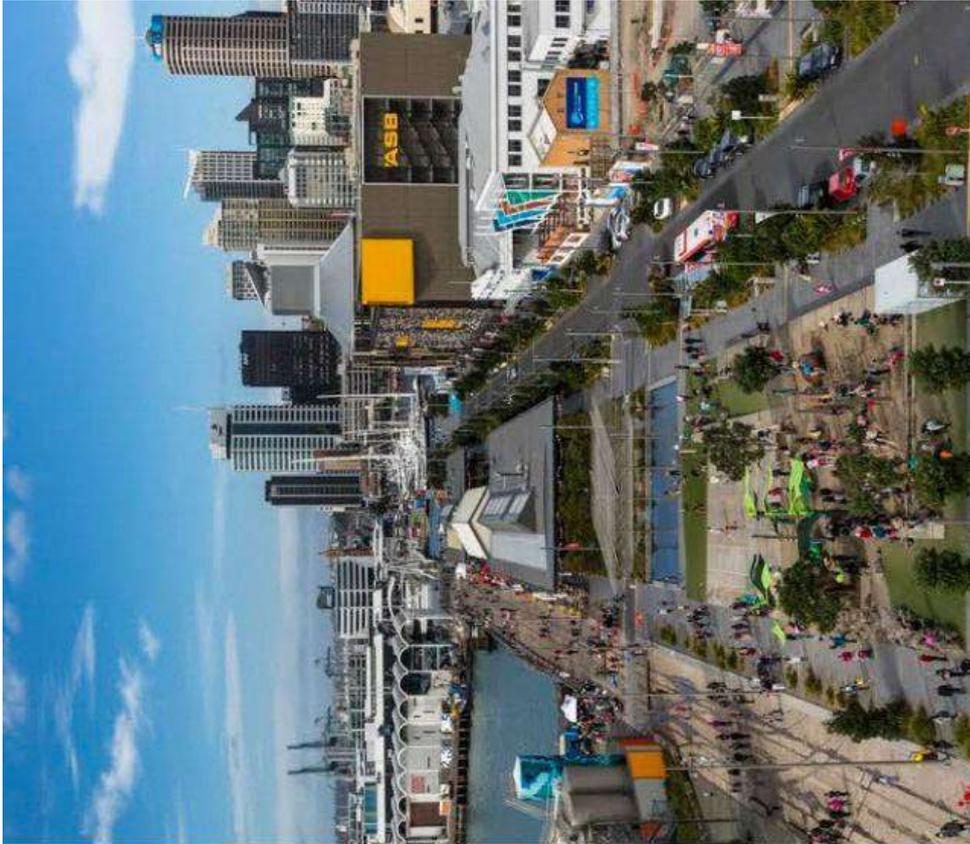
Resource 12 for Question 4

Auckland's liveability scores from 2011 to 2012

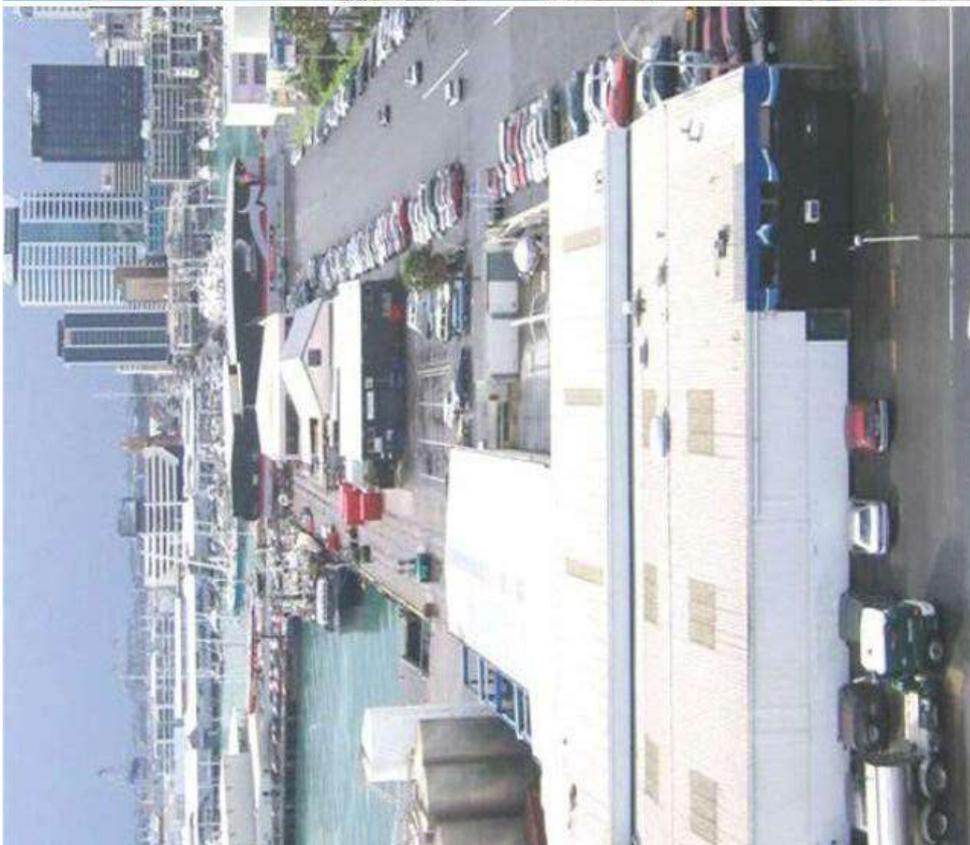


Resource 13 for Question 4

Reimagined urban area of Wynyard Quarter in Auckland



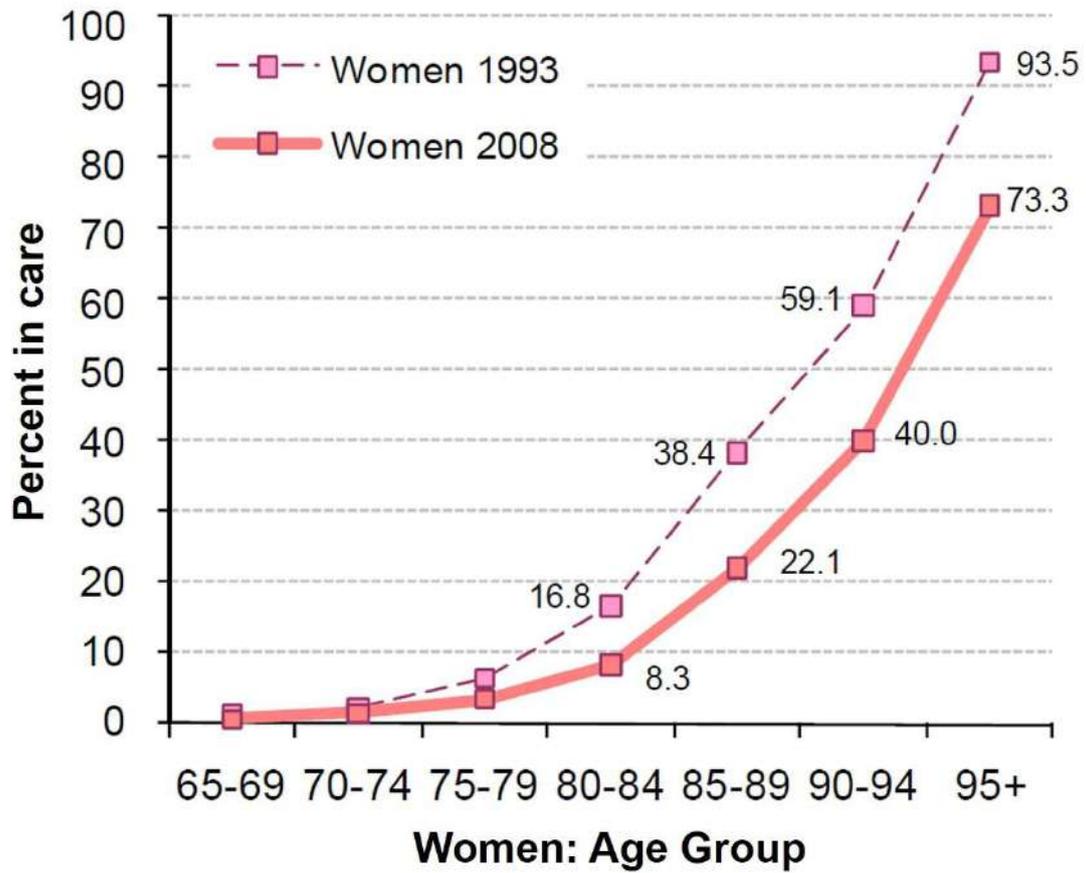
After



Before

## Resource 14 for Question 4

Proportion of elderly female Aucklanders in government-provided residential care facilities between 1993 and 2008



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TEMASEK JUNIOR COLLEGE  
JC2 PRELIMINARY EXAMINATION 2019  
Higher 2

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**GEOGRAPHY**

Paper 2 Data Response Questions

**9751/02**

**17 September 2019**

**3 hours**

Additional Materials:      Answer Booklet  
   1 Insert  
   Paper for draft work

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**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, index number and name on all the work you hand in.  
Write in dark blue or black pen on all pages of the answer booklet.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Candidates answers **all** questions.

The Insert contains all the Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or the classroom,  
even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
You are reminded of the need for good English and clear presentation in your answers.

The number of marks is given in brackets [ ] at the end of each question or part question.

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This document consists of **6** printed pages, **2** blank pages and **1** Insert.



## Section A

### Theme 4: Geographical Investigation

- 1 A group of twenty 17-year students in East Sussex, United Kingdom were tasked with undertaking a fieldwork exercise on a river in their town Uckfield to investigate how land use changes have affected the risk of flooding along the river.

Before conducting their investigation, they did some secondary research and found information on the land use changes that had taken place. They also studied a map of the 2000 flood event to broadly identify a medium to high probability flood zone for investigation.

Using the flood zone map shown in Resource 2, they proceeded to sub-divide the study area into zones and carried out a bi-polar survey at these zones to identify sources of flood risk, as well as to determine the vulnerability of the area from any flood occurrence. They walked along the river on a Wednesday over six hours in summer to conduct this bi-polar survey.

Some of the equipment they brought along included:

- base map of the area
- recording sheets for the bi-polar survey
- writing instruments
- camera
- measuring tape

When they returned to the classroom in the following week, the students analysed the data they had collected and produced a report.

Study Resources 1, 2 and 3. Resource 1 shows the land use changes in the river basin. Resource 2 shows the flood map for investigation. Resource 3 shows a recording sheet of the bi-polar survey used at one site.

- (a) Suggest a suitable hypothesis for the students' investigation with reference to Resources 1 and 2. [1]
- (b) Using Resources 2 and 3, describe an appropriate sampling method to conduct the bi-polar environmental survey. Justify your method. [7]
- (c) Describe a suitable method to represent the information from the bi-polar survey shown in Resource 3 onto a base map similar to Resource 2. Justify your choice of method. [5]
- (d) Explain how the reliability of the flood risk investigation findings may be affected by the data which was collected using the recording sheet shown in Resource 3. [5]
- (e) The local council has asked the group to gather river channel information that will help in mitigating flood risk in the town. Explain how the group would go about gathering the information. [7]

## Section B

### Theme 1: Tropical Environments

#### Climate and Fluvial Systems in West Africa

- 2** Resource 4 shows the rainfall variations across West Africa. Resource 5 shows the location and discharge patterns of the Niger River, a major river in West Africa, over three decades. Resource 6 shows the sediment regime of the upper Niger River basin in terms of Total Dissolved Solids (TDS) and Total Suspended Solids (TSS). Resource 7 shows a section of the Niger River before the Niamey discharge station.
- (a)** Using Resource 4, account for the variations in rainfall across the three locations in West Africa. [5]
- (b)** With the help of Resource 4 and your own knowledge, suggest reasons for the main changes in discharge for the Niger River over time shown in Resource 5. [5]
- (c)** Describe the downstream changes in sediment load carried by the Niger River in its upper basin shown in Resource 6. [2]
- (d)** With the aid of a cross-sectional sketch at X-Y shown in Resource 7, describe the main fluvial characteristics of the Niger River. [4]
- (e)** Using all the resources, assess the factors influencing the channel morphology of the Niger River shown in Resource 7. [9]

## Theme 2: Development, Economy and Environment

### Global Production Network of BMW

- 3** BMW is a transnational corporation headquartered in Germany and is the one of the world's leading producer of automobiles.

Resource 8 shows BMW's production network in 2018. Resource 9 shows BMW's automobile sales volume across different countries and regions from 2007 to 2016. Resource 10 shows projected changes in the share of ASEAN households in different income brackets from 2010 to 2025. Resource 11 shows the distribution of economic zones in ASEAN in 2015.

- (a)** Describe the spatial organisation of BMW's intra-firm network shown in Resource 8. [4]
- (b)** Compare the changes in automobile sales volume between 2007 and 2016 for the European Union and USA shown in Resource 9. [4]
- (c)** With the aid of Resource 9 and your own knowledge, suggest reasons for the location of BMW's joint ventures shown in Resource 8. [5]
- (d)** Outline the relative projected changes in share of ASEAN households in different income brackets from 2010 to 2025 shown in Resource 10. [3]
- (e)** With reference to the resources and your own knowledge, recommend whether BMW should expand its production network in ASEAN. [9]

### Theme 3: Sustainable Development

#### Liveability of Auckland, New Zealand

- 4** Auckland in New Zealand has risen over the years to become one of the most liveable cities in the world. It ranked 3<sup>rd</sup> in the 2019 Mercer Quality of Living Survey, only behind Vienna, Austria and Zurich, Switzerland. There have been constant efforts by the local government to improve Auckland's liveability.

Resource 12 shows the changes in Auckland's liveability scores monitored by the local government from 2011-2012. Resource 13 shows images of Wynyard Quarter, an inner city area of Auckland, before and after reimagining. Resource 14 shows the proportion of elderly females in Auckland residing in government-provided residential care facilities between 1993 and 2008.

- (a)** Describe the changes in Auckland's liveability scores between 2011 and 2012 as shown in Resource 12. [5]
- (b)** Outline how the measurements of Auckland's liveability shown in Resource 12 may be limited in its usefulness. [4]
- (c)** Contrast the liveability of Wynyard Quarter before and after reimagining as shown in Resource 13. [6]
- (d)** With reference to Resource 14, describe and account for the percent of elderly females in government-provided residential care facilities in 1993 across different age groups. [5]
- (e)** Suggest reasons for the percent change in female Aucklanders aged 80-84 years old between 1993 and 2008 in government-provided residential care facilities as seen in Resource 14. [5]

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**Temasek Junior College 2019 Preliminary Exams  
H2 Geography Paper 2 Marking Guide**

**SECTION A**

**Theme 4: Geographical Investigation**

- 1** A group of twenty 17-year students in East Sussex, United Kingdom were tasked with undertaking a fieldwork exercise on a river in their town Uckfield to investigate how land use changes have affected the risk of flooding along the river.

Before conducting their investigation, they did some secondary research and found information on the land use changes that had taken place. They also studied a map of the 2000 flood event to broadly identify a medium to high probability flood zone for investigation.

Using the flood zone map shown in Resource 2, they proceeded to sub-divide the study area into zones and carried out a bi-polar survey at these zones to identify sources of flood risk, as well as to determine the vulnerability of the area from any flood occurrence. They walked along the river on a Wednesday over six hours in summer to conduct this bi-polar survey.

Some of the equipment they brought along included:

- base map of the area
- recording sheets for the bi-polar survey
- writing instruments
- camera
- measuring tape

When they returned to the classroom in the following week, the students analysed the data they had collected and produced a report.

Study Resources 1, 2 and 3. Resource 1 shows the land use changes in the river basin. Resource 2 shows the flood zone map for investigation. Resource 3 shows a recording sheet of the bi-polar survey used at one site.

- (a) Suggest a suitable hypothesis for the students' investigation with reference to Resources 1 and 2. [1]

Urbanisation has increased the flood risk on the northern bank more than the southern bank of River Uck.

- (b) Using Resources 2 and 3, describe an appropriate sampling method to conduct the bi-polar survey. Justify your method. [7]

Two-step approach to area sampling.

- Firstly, the flood map could be sub-divided into zones
- Secondly, the students could adopt a various approaches of sampling to conduct the bi-polar survey.

The reasons for choosing the sampling method should be stated clearly, and there should be attempts to use the equipment outlined in the preamble in the collection of data.

- (c) Describe a suitable method to represent the information from the bi-polar environmental survey shown in Resource 3 onto a base map similar to Resource 2. Justify your choice of method. [5]

There are two possible methods.

- Use of a radar chart
- Construct a choropleth map

Justification for methods chosen:

- Allows for easy comparisons
- Effective representation of data collected due to the inherent nature of these presentations

- (d) Explain how the reliability of the flood risk investigation findings may be affected by the data which was collected using the recording sheet shown in Resource 3. [5]

- Present flood risk: Overall score of 6 but findings may be unreliable
- Subjectivity may be introduced in the recording processes
- Possible operator errors
- Data collected for only one day and in summer where discharge is presumably lower
- Unable to assess the effectiveness of flood mitigation measures during low discharge conditions

- (e) The local council has asked the group to gather river channel information that will help in mitigating flood risk in the town. Explain how the group

would go about gathering the information.

[7]

Stage 1, 2 and 3 of the geographical investigation process should be detailed and explained. Channel variables could be collected. There could be a systematic sampling of channel variables along the river in the study. For instance, the upstream, mid-stream and downstream sampling could be conducted. Students would need to collect information on the normal flow as well as the bankfull discharge based on visual markers. Students need to propose the equipment used and how they would go about conducting the investigation to ensure data accuracy and reliability.

## SECTION B

### Theme 1: Tropical Environments

#### Climate and Fluvial Systems in West Africa

**2** Resource 4 shows the rainfall variations across West Africa. Resource 5 shows the location and discharge patterns of the Niger River, a major river in West Africa, over three decades. Resource 6 shows the sediment regime of the upper Niger River basin in terms of Total Dissolved Solids (TDS) and Total Suspended Solids (TSS). Resource 7 shows a section of the Niger River before the Niamey discharge station.

**(a)** Using Resource 4, account for the variations in rainfall across the three locations in West Africa. [5]

Patterns:

Rainfall generally decreases further inland from the coast.  
Strong seasonally in rainfall patterns through the year.

Possible explanations include:

- Influence of ITCZ and STHP
- Effect of the African Monsoon
- Continentality

**(b)** With the help of Resource 4 and your own knowledge, suggest reasons for the main changes in discharge for the Niger River over time shown in Resource 5. [5]

The discharge pattern is that of a simple river regime.

Possible reasons include:

- Rainfall patterns
- Inherent characteristics of channel

Possible reasons for the higher inter-year discharge and higher flood peaks include:

- Climate change
- ITCZ variability
- Human activities

**(c)** Describe the downstream changes in sediment load carried by the Niger River in its upper basin shown in Resource 6. [2]

- Increases in absolute amount of TDS and TSS downstream
- Increasing proportion of TSS downstream

**(d)** With the aid of a cross-sectional sketch at X-Y shown in Resource 7,

describe the main fluvial characteristics of the Niger River.

[4]

Sketch should include these features:

- flanking channels
- erosional features
- mid-channel bars

(e) Using all the resources, assess the factors influencing the channel morphology of the Niger River shown in Resource 7.

[9]

For a 9m qn, a clear argument and evaluation is required.

Students will need to use the resources to assess the relative influence of various factors in influencing the channel morphology of the Niger River. Some factors that they will need to analyse include:

- discharge and sediment regime
- climate
- relief

*Answers are levels marked as per the level descriptors in the syllabus document for Open Ended 9m DRQ.*

C H2 Generic Level Descriptors for Open-Ended 9m DRQ on Themes 1, 2 and 3

Level	Marks	Descriptors
3	7–9	<p>Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.</p> <ul style="list-style-type: none"> <li>• Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Makes a decision which clearly addresses different elements of the issue and/or interest of different stakeholders</li> </ul>
2	4–6	<p>A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.</p> <ul style="list-style-type: none"> <li>• Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Shows some attempt to address different elements of the issue and/or views of different stakeholders when making a decision but is not well-developed</li> </ul>
1	1–3	<p>Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response.</p> <ul style="list-style-type: none"> <li>• Provides little or no evaluation</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Evidence of decision-making, if present, is simple and may be flawed</li> </ul>
0	0	No creditworthy response.

**Note:**

1. The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.
2. The descriptors in each level may be worded differently in actual assessment to link them more to the questions set. However, regardless of the wordings used, the quality of responses expected of candidates in each level would not deviate from that stated in the generic level descriptors.

## Theme 2: Development, Economy and Environment

### Global Production Network of BMW

- 3** BMW is a transnational corporation headquartered in Germany and is the one of the world's leading producer of automobiles.

Resource 8 shows BMW's production network in 2018. Resource 9 shows BMW's automobile sales volume across different countries and regions from 2007 to 2016. Resource 10 shows projected changes in the share of ASEAN households in different income brackets from 2010 to 2025. Resource 11 shows the distribution of economic zones in ASEAN in 2015.

- (a)** Describe the spatial organisation of BMW's intra-firm network shown in Resource 8. [4]

Suggested points include:

- Dominance in Europe, with all functions seen
- Each continent has facilities
- Some of the functions are only specific to certain continents

- (b)** Compare the changes in automobile sales volume between 2007 and 2016 for the European Union and USA shown in Resource 9. [4]

Suggested points include:

- Similar sales volume trend
- Different total sales volume
- Rate of increase

- (c)** Using Resource 9 and your own knowledge, suggest reasons for the location of BMW's joint ventures shown in Resource 8. [5]

The locations are USA and China.

Possible reasons include:

- USA: market size, labour profile, existing facilities to tap on
- China: growing market, state restrictions to be overcome

- (d)** Outline the projected changes in percentage of ASEAN households in different income brackets from 2010 to 2025 shown in Resource 10. [3]

Suggested points include:

- Increasing proportion of households in all brackets other than basic consumers

- Shift in what is the higher proportion
- Smallest proportion remains the same

(e) With reference to the resources and your own knowledge, recommend whether BMW should expand its production network in ASEAN. [9]

For a 9m qn, a clear argument and evaluation is required.

Drawing on the resources and their own knowledge, students will mark an argument for BMW to expand its production in ASEAN. They will then raise some concerns about doing so as a counterargument, before coming to an overall evaluation.

*Answers are levels marked as per the level descriptors in the syllabus document for Open Ended 9m DRQ.*

C H2 Generic Level Descriptors for Open-Ended 9m DRQ on Themes 1, 2 and 3

Level	Marks	Descriptors
3	7–9	<p>Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.</p> <ul style="list-style-type: none"> <li>• Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Makes a decision which clearly addresses different elements of the issue and/or interest of different stakeholders</li> </ul>
2	4–6	<p>A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.</p> <ul style="list-style-type: none"> <li>• Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Shows some attempt to address different elements of the issue and/or views of different stakeholders when making a decision but is not well-developed</li> </ul>
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0	0	No creditworthy response.

**Note:**

1. The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.
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### Theme 3: Sustainable Development

#### Liveability of Auckland, New Zealand

- 4** Auckland in New Zealand has risen over the years to become one of the most liveable cities in the world. It ranked 3<sup>rd</sup> in the 2019 Mercer Quality of Living Survey, only behind Vienna, Austria and Zurich, Switzerland. There has been constant efforts by the local government to improve Auckland's liveability.

Resource 12 shows the changes in Auckland's liveability scores monitored by the local government from 2011-2012. Resource 13 is an image of Wynyard Quarter, an inner city area of Auckland, before and after reimagining. Resource 14 shows the proportion of elderly females in Auckland residing in government-provided residential care facilities between 1993 and 2008.

- (a)** Describe the changes in Auckland's liveability scores between 2011 and 2012 as shown in Resource 12. [5]

Suggested points include:

- Mostly positive score across categories
- Variations in how much improvement is made
- A few categories worsened between 2011 and 2012

- (b)** Outline how the measurements of Auckland's liveability shown in Resource 12 may be limited in its usefulness. [4]

Suggested points include:

- Data only gives percent changes but not actual values.
- Number of years of comparison is too few to show improvement
- Broader scope of liveability not considered by indicators
- Question of liveability for whom not tackled in data

- (c)** Contrast the liveability of Wynyard Quarter before and after reimagining as shown in Resource 13. [6]

Students could be guided by these principles:

- Looking at liveability by its various dimensions (social, economic, environmental)
- Looking at aspects in the photo to differentiate the before and after reimagining scenario. These include land use, infrastructure, architecture.

- (d)** With reference to Resource 14, describe and account for the percent of elderly females in government-provided residential care facilities in 1993 across different age groups. [5]

Description: increasing proportion as age groups progresses

Explanation could include:

- Physical factors associated with different age groups
- Economic situation of elderly
- Support networks

- (e) Suggest reasons for the percent change in female Aucklanders aged 80-84 years old between 1993 and 2008 in government-provided residential care facilities as seen in Resource 14. [5]

Possible reasons include:

- Role of technology
- Role of the economy
- Role of government
- Perceptions of elderly

TEMASEK JUNIOR COLLEGE  
JC2 PRELIMINARY EXAMINATION 2019  
Higher 2

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**GEOGRAPHY**

Paper 1 Structured Essay Questions

**9751/01**

**28 August 2019**

**3 hours**

Additional Materials:      Answer Booklet  
   Paper for draft work

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**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, index number and name on all the work you hand in.  
Write in dark blue or black pen on all pages of the answer booklet.  
You may use a soft pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
You are reminded of the need for good English and clear presentation in your answers.

The number of marks is given in brackets [ ] at the end of each question or part question.

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This document consists of **3** printed pages and **1** blank page



### Section A – Tropical Environments

Answer **one** question from this section.

- 1 (a)** Explain how the Hadley Cell redistributes the surplus solar radiation received at the tropics. [12]
- 1 (b)** To what extent do the seasonal variations in wind direction help explain temperature and rainfall patterns in the tropics? [20]
- 2 (a)** Compare and contrast the characteristics of cockpit karst, tower karst and isolated karst in the humid tropics. [12]
- 2 (b)** ‘Landforms in the humid tropics develop due to weathering processes while landforms in the arid tropics develop due to erosional processes.’  
To what extent do you agree with this statement? [20]

### Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a)** With reference to countries at low levels of development, explain the reciprocal relationship between economic growth and human development. [12]
- 3 (b)** To what extent is the Human Development Index an effective tool to measure and monitor development? [20]
- 4 (a)** Explain how the views of Thomas Malthus and David Harvey differ in their perspectives on the relationship between population and resources for countries at low levels of development. [12]
- 4 (b)** ‘It is challenging to manage extractive industries in resource-rich countries.’  
Discuss the validity of this statement. [20]

**Section C – Sustainable Development**

Answer **one** question from this section.

- 5 (a)** Explain how international conferences such as Rio Earth Summit and Rio +20 highlight the political and economic challenges in attaining sustainable development over space and time. [12]
- 5 (b)** ‘There is sufficient science to argue that anthropogenic activities are the main processes underlying climate change.’  
To what extent do you agree? [20]
- 6 (a)** Explain how indicators are used to monitor sustainable urban development in cities in countries at high levels of development. [12]
- 6 (b)** To what extent is it difficult to resolve the issues that confront cities in achieving sustainable development? [20]

**END OF PAPER**

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**Temasek Junior College 2019 Preliminary Exams  
H2 Geography Paper 1 Marking Guide**

All essays to be marked according to these generic level descriptors:

**A H2 Generic Level Descriptors for 12m SEQ sub-part (a)**

Level	Marks	Descriptors
4	10–12	Response is consistently analytical and comprises purposeful explanations. Response addresses the question fully using accurate and detailed knowledge. Depth of relevant knowledge and understanding is evident throughout. Response is coherent and use of terminology is accurate throughout.
3	7–9	Response is analytical and explanatory rather than descriptive. There is a clear focus on the question. Response demonstrates relevant knowledge and understanding. The response is coherent and the use of terminology is mostly accurate.
2	4–6	Response includes analysis and explanation but is generally dominated by description. Response reflects understanding of the question and is generally relevant. Some parts of the response may be unclear. Use of terminology is limited.
1	1–3	Response lacks focus on the question. Response is generally fragmentary and lacks a clear structure and organisation. There may be many unsupported, brief or incomplete assertions and/or arguments with some inaccurate use of terminology.
0	0	No creditworthy response.

**Note:** The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.

**B H2 Generic Level Descriptors for 20m SEQ sub-part (b)**

Level	Marks	Descriptors
5	17–20	Response is perceptive, logical and has strong evaluative elements. Evaluation is relevant and comprehensive. Strong evidence of synoptic thinking where knowledge from different topics is synthesised purposefully. Response fully addresses the demands of the question and features detailed and accurate knowledge reflecting depth of understanding of the subject content. The argument or discussion is coherent and well supported by relevant material. Use of terminology is accurate.
4	13–16	Response displays a sound evaluative element. There is some evidence of synoptic thinking through synthesising knowledge from different topics. Response is generally focussed on the demands of the question and features accurate knowledge, reflecting depth of understanding of the subject content. The argument or discussion is coherent and supported by relevant material. Use of terminology is accurate and appropriate.
3	9–12	Response is broadly evaluative rather than descriptive. Response addresses the question and features accurate knowledge, reflecting some understanding of the subject content. Argument or discussion is mainly coherent and supported by material which is largely relevant. Use of terminology is relevant and mostly accurate.
2	5–8	Response is largely descriptive. Response attempts to provide an argument to address the question. The weakest responses in this level may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Some lapses in use of terminology though generally accurate.
1	1–4	Response lacks focus on the question and may be largely irrelevant to it. Response is fragmentary and lacks clarity. There may also be unsupported assertions and/or arguments with limited or no use of relevant terminology.
0	0	No creditworthy response.

**Note:** The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.

## SECTION A – Tropical Environments

Answer **one** question from this section.

All questions carry 32 marks.

- 1 (a)** Explain how the Hadley Cell redistributes the surplus solar radiation received at the tropics. [12]

Candidates should outline the radiation surplus in the tropics, and a radiation deficit in the higher latitudes are a result of regional differences in the energy budget. They should then explain the formation of the Hadley Cell, which forms the basis of tropical air circulation. Candidates should explain the processes involved in creating the low pressure zone near the equator and the high pressure zone at the mid-latitudes.

- 1 (b)** To what extent does the seasonal variations in wind directions help explain temperature and rainfall patterns in the tropics? [20]

Seasonal variations in wind directions are the result of the differential heating and differences in specific heat capacities of land and sea, exerting a critical effect on the extent to which the ITCZ migrates. It is less mobile over the sea, as compared to larger variations of the ITCZ over large land masses.

In addition, there are a number of climatic controls that influence the types of climate in the tropics:

- The role of the ITCZ and its influence on rainfall
- Cold / warm ocean currents
- Continentality
- El Nino

Possible synoptic links include:

- Role of human activities in influencing temperature and rainfall patterns: deforestation (Theme 1.2); extractive industries (Theme 2.2); urbanisation and the resultant urban heat island effect (Theme 3.2)

- 2 (a)** Compare and contrast the characteristics of cockpit karst, tower karst and isolated karst in the humid tropics. [12]

Candidates should compare and contrast the features of the landforms. The criteria of comparison should be established clearly. No one approach is correct, but there should be some attempts to explain how the landforms differs from one another.

- 2 (b)** 'Landforms in the humid tropics develop due to weathering processes

while landforms in the arid tropics develop due to erosional processes.’

To what extent do you agree with this statement?

[20]

Both parts of the assertion should be handled, with a set of evidences presented to substantiate candidates’ arguments.

Karst landscapes in the humid tropics develop as a result of chemical weathering processes, particularly Carbonation-Solution. However, there needs to be a consideration of other processes. All these processes can also be used to show that landforms in the humid tropics are a result of complex interplay of factors. Similarly, for landforms in the arid tropics, erosion by running water and wind are one amongst other processes in the creation of yardangs, sand dunes, rills and gullies. There should be a set of criteria to evaluate the relative importance of processes over time and space.

Possible synoptic links include:

- Role of human activities in aiding processes that affect the formation of landforms: deforestation (Theme 1.2); extractive industries (Theme 2.2); urbanisation (Theme 3.2)

## **SECTION B – Development, Economy and Environment**

Answer **one** question from this section.

All questions carry 32 marks.

- 3 (a)** With reference to countries at low levels of development, explain the reciprocal relationship between economic growth and human development. [12]

Candidates have to explain how economic growth leads to human development, in which both variables exist in a virtuous relationship. Revenue comprises local and foreign capital, foreign direct investments and innovation. Government revenue could be used to develop developmental projects in economic, social and even political arenas. Treatment of the term ‘reciprocal relationship’ should be equally addressed.

- 3 (b)** To what extent is the Human Development Index an effective tool to measure and monitor development? [20]

Development refers to change, progress and growth over time and can occur at different scales. Various indicators have been created in order to

measure and gauge development on a global scale and these indicators provide us with a clearer idea on what development entails, the level of development globally, as well as inform policy makers on improvements to be made. Candidates will have to evaluate how the HDI is effective as a tool to measure and monitor development by weighing its relative strengths and weaknesses.

Possible synoptic links include:

- Considerations of sustainable development (Theme 3.1)
- Measuring and monitoring sustainable development at the urban scale (Theme 3.2)

- 4 (a)** Explain how the views of Thomas Malthus and David Harvey differ in their perspectives on the relationship between population and resources for countries at low levels of development. [12]

Candidates are to compare the perspectives of David Harvey and Thomas Malthus on population and resources. While Malthus believed that population increased geometrically whereas food supply could only grow arithmetically, David Harvey was fundamentally concerned with how unequal systems of consumption in the capitalist world contributed to scenarios of resource scarcity in some countries, while other countries experience abundance of resources. A set of criteria to make a consistent comparison may include the:

- o Premise of argument and perspective
- o Relevance in contemporary times
- o Limitations

- 4 (b)** “It is challenging to manage extractive industries in resource-rich countries.”

How far do you agree with this statement? [20]

Candidates are to engage in debates that examine to what extent challenges of the extractive industries are able to be managed. Challenges may be insurmountable and difficult to manage, especially if they demonstrate symptoms of the infamous ‘resource curse thesis’ faced by resource-rich countries. These countries’ challenges include the reliance on expat labour, enclave tendencies and the lack of local production linkages. The challenges may also be difficult to manage due to the severity of the negative impacts. The challenges, however, have been successfully handled in certain countries that could be considered as exceptions to the resource curse, through sound policies and good governance.

Synoptic links include:

- how extractive industries are embedded within the wider production circuit and global production network (Theme 2.1)
- actors that could aid in the governance of the global economy and,

- by association, extractive industries (Theme 2.1)
- Considerations of sustainable development (Theme 3.1)

### SECTION C – Sustainable Development

Answer **one** question from this section.

All questions carry 32 marks.

- 5 (a)** Explain how international conferences such as Rio Earth Summit and Rio +20 highlight the political and economic challenges in attaining sustainable development over space and time. [12]

Candidates will be required to demonstrate their understanding of the two conferences mentioned in the question (Rio Earth Summit and Rio +20) and how they are linked to the concept of sustainable development. The focus of this question is the political and economic challenges that they face in attaining sustainable development over space and time.

There are several approaches to the question – students could either be focused on each of the conferences and the challenges that emerged from them, or see both conferences more broadly and the challenges that remain over space and time in their efforts to help the world achieve sustainable development.

- 5 (b)** ‘There is sufficient science to argue that anthropogenic activities are the main processes underlying climate change.’

How far do you agree with the statement? [20]

Candidates are expected to consider both sides of the argument for this question, although the statement in itself is relatively hard to refute.

The thesis argument can be well supported by looking at reports from the Intergovernmental Panel on Climate Change (IPCC).

The counterargument can come in two forms:

1. That there is insufficient scientific evidence to link climate change to anthropogenic activities.
2. That there is sufficient evidence to prove that climate change is driven by natural cycles.

Synoptic links include:

- Consideration of past climates (Theme 1.1)
- Increased occurrences of extreme weather events

- Urbanisation and urban unsustainability (Theme 3.2)

**6 (a)** Explain how indicators are used to monitor sustainable urban development in cities in countries at high levels of development. [12]

The focus of this question is on the measurement of sustainable development at the urban scale, and how these indicators aid in the monitoring of sustainable development of cities. Answers provided by candidates need to engage consistently with the context of the question being cities in countries at high levels of development. A stronger answer will be one that engages with a range of indicators, which can highlight unique features to broaden the scope of the answer.

**6 (b)** To what extent is it difficult to resolve the issues that confront cities in achieving sustainable development? [20]

To answer the question, students will need to acknowledge what are the broad issues that confront cities in achieving sustainable development, which include housing, waste and transport issues. The difficulty of resolving the issues can be contingent on:

- The extent of the issue faced by cities
- The effectiveness of solutions that have been implemented in cities
- The difficulty for cities to address the causes of the issues

Synoptic links include:

- Broader considerations of sustainable development and the link to the conferences (Theme 3.1) and the goals (Theme 2.1)
- Energy mix, production and alternative energies (Theme 3.1)
- cities embedded in the global economy (Theme 2.1)



**VICTORIA JUNIOR COLLEGE**  
**JC 2 PRELIMINARY EXAMINATION 2019**  
**HIGHER 2**

**H2 GEOGRAPHY**

**9751/01**

**Paper 1**

**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

Write your name and index number on the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Answer **three** questions. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question. Diagrams and sketch map should be drawn whenever they serve to illustrate and answer.

You are reminded of the need for good English and clear presentation of your answers.

At the end of the examination fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

**Section A – Tropical Environments**

Answer **one** question from this section.

- 1 (a) Explain how channel processes may vary in the tropics. [12]
- (b) 'Fluvial erosion has the greatest influence on channel morphology'.  
Discuss this statement. [20]
- 2 (a) Explain why the El Nino may impact areas both within, and beyond the tropical Pacific. [12]
- (b) To what extent does the El Nino have the most significant impact on geomorphic processes in the tropics? [20]

**Section B – Development, Economy and Environment**

Answer **one** question from this section.

- 3 (a) Explain how the negative impacts of privatisation of water resources may vary in countries at different levels of development. [12]
- (b) To what extent is there water scarcity in the world today? [20]
- 4 (a) Explain how the arguments by Harvey can help us understand why transnational corporations (TNCs) may decide to set up operations in countries at low levels of development. [12]
- (b) To what extent can uneven development be addressed? [20]

**Section C – Sustainable Development**

Answer **one** question from this section.

- 5 (a) Explain the effects of the use of fossil fuels on the global carbon cycle. [12]
- (b) To what extent can the political and economic challenges in attaining sustainable development be overcome? [20]
- 6 (a) Explain how urbanisation trends and urban population change vary between countries at different levels of development. [12]
- (b) Discuss the role of different stakeholders in meeting the needs of migrants in urban areas. [20]

## Section A – Tropical Environments

### 1 (a) Explain how channel processes may vary in the tropics.

[12]

#### Indicative content

Students should discuss both temporal and spatial variations of how channel processes in the tropics. They should compare various climatic zones in the tropics to illustrate both forms of variations.

Some possible points include:

There is generally greater erosion and transportation in the humid tropics than in the arid tropics, mainly due to the variations in the higher discharge and hence river energy. In the humid tropics, there are temporal variations in the fluvial processes that take place in the basin. E.g. Within the Tropical Monsoon/Savanna climate, the distinct wet and dry season has an impact on river energy... Also, during high magnitude floods during the wet season, the river has even more energy to carry out transportation and erosion due to increases in discharge and velocity. To illustrate spatial variations, channel processes in different climatic zones may be compared- for instance, in an AF climate vs a BWH climate.

It is particularly important for the students to explain river energy and hence its associated impact on various channel processes of erosion, deposition and transportation. Students may explain upstream vs downstream variations in channel processes however, this should not be the bulk of the essay since these variations are for all channels and not only those in the tropics.

### (b) 'Fluvial erosion has the greatest influence on channel morphology'.

**Discuss this statement.**

[20]

#### Indicative content

Yes, because it accounts for the formation of erosional channel features, as well as influencing the cross-sectional shape of a channel.

- Important for the formation of erosional channel features:
  - Pot holes in riverbeds that comprise of solid rock.
    - Fast flowing rivers with strong eddy motions can result in localised vertical fluvial erosion (particularly abrasion) that creates shallow bowls on the channel bed. The shallow bowls may then become occupied by a large stone, which is continually swirled rapidly around the bowl, deepening it into a pot hole by the process referred to as pot hole drilling.
  - Waterfall due to uneven vertical erosion between weak and resistant rocks (see Fig. 1 below).

- Plunge pools at the base of waterfalls due to hydraulic action (see Fig. 1 below).
- Gorge formed by the retreat of waterfalls due to headward erosion (see Fig. 1 below).

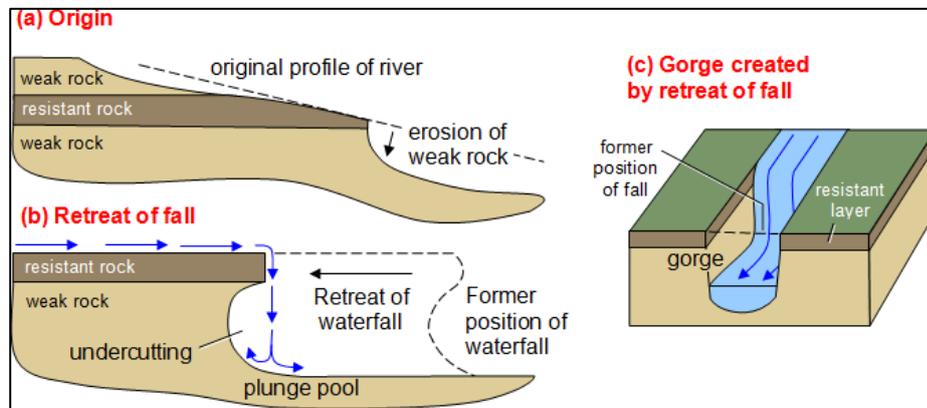


Fig. 1: Formation of different channel features caused by fluvial erosion

- Affects the cross-sectional shape of a channel by influencing the form ratio, which tends to increase in a downstream direction as width increases more rapidly than depth due to more lateral than vertical erosion downstream.

No, because other fluvial processes such as deposition is more important for the formation of depositional channel features such as point bars and mid-channel bars.

Moreover, the three fluvial processes of erosion, transportation, and deposition can be argued to be equally important as they are all necessary in affecting channel patterns—particularly meandering and braided rivers.

- Meanders
  - Lateral erosion at the outer banks (forming a steep river cliff) provides the sediments that are transported downstream and deposited at the inner banks (forming a gentle slip off slope) of the meander. The continued alternate erosion and deposition at the outer and inner banks respectively through the helicoidal flow over time will result in an increase in meander amplitude and hence, sinuosity.
- Braided
  - Braided channels are common in rivers that have a high proportion of bed load where during periods of high discharge, large amounts of sediment are eroded and transported. As discharge falls, coarse debris is deposited where there are any fluctuations of the channel floor or obstacles in the way. This debris acts as a nucleus for the growth of a mid-channel bar. As discharge continues to decrease, more sediment is deposited where over time, the channel is forced to diverge to either side of the bar dividing the flowing water into a number of anabranches. However, the mid-channel bars can rarely survive for long, since they themselves are composed of loose sediments and can suffer bank erosion by flowing water in the anabranches on either side. The continued action of fluvial erosion,

transportation, and deposition at different time periods that affects discharge levels thus cause the formation of a braided channel that consists of a mass of diverging and intertwining threads of anabranches separated by ever-changing islands of sediment

Nevertheless, it can be argued that fluvial erosion has the greatest influence on channel morphology, as without it, there would not be any eroded sediments for transportation and deposition to occur in the first place.

Yet in certain instances, the influence of fluvial erosion on channel morphology can be minimal despite the river having sufficient energy for it to take place.

- For rivers that run on resistant rock, the effect of fluvial erosion on the channel bed and banks would be minimal.
- Many river channels in the world today have been highly modified by human activities, thus the scale of influence of fluvial erosion can be rendered minimal. Channel modification such as concretising the channel bed and banks to reduce friction can greatly reduce the influence of fluvial erosion. Also, the cross-section of a river can be artificially enlarged through dredging and channel widening rather than naturally undergoing fluvial erosion that takes a longer period of time too.

\*Synoptic linkages could be made by linking human activities to flood protection.

**2 (a) Explain why the El Nino may impact areas both within, and beyond the tropical Pacific.**

**[12]**

Indicative content

Responses should explain how the weakening and reversal of the Walker circulation (surface westerly, equatorial undercurrent, easterly counter flow) might result in impacts on the eastern and western Pacific.

Responses should also discuss the influence of the descending limbs of the Walker Circulation on the Indian and Atlantic Ocean and its impacts on areas beyond the Pacific (teleconnections).

Possible impacts include:

- Reduced rain events, increase in droughts, reduced cyclone incidence and magnitude in areas located in the Western Pacific.
- Reduced rain events may also affect areas beyond the tropical Pacific as well e.g India and North-East Brazil.
- Increased rain events, floods, mass movement, increased cyclone incidence and magnitude in areas located in the Eastern Pacific.

Higher-level responses may include other impacts with regards to specific stakeholders e.g. crop failure and loss of livelihoods for farmers in drought stricken areas of the western Pacific.

**(b) To what extent does the El Nino have the most significant impact on geomorphic processes in the tropics?**

**[20]**

Indicative content

Responses should evaluate the influence of the El Nino on geomorphic processes in the tropics such as weathering, wind & water erosion, soil & rock formation, mass movement.

Responses should also compare the El Nino to other factors (e.g. climate, geology, human activities) that may influence geomorphic processes. Higher-level responses may compare El Nino to other factors based on criteria e.g. spatial & temporal extent.

Possible points:

- El Nino has a significant impact on short term processes e.g massmovement , small scale weathering resulting in variations in landform features ( in contrast to long term weathering that leads to landscape formation e.g karst)
- El Nino has less of an impact on long-term processes e.g soil & rock formation, which are more influenced by climate.
- El Nino has less of an impact on areas further inland e.g mass movement in cities found inland are possibly more influenced by human activities e.g. road building.

[Possible synoptic links to Topic 1.2 (Human activities -Tropical deforestation, Karst Landscapes), Topic 3.2 (Urbanisation)]

Below is an example of how a candidate approached this question:

Introduction

Geomorphic processes in the tropics refer to the alteration of the earth's crust and the formation of its resultant landforms. Due to the short-term nature of the El Nino, it does not impact the geomorphic processes to a large extent as compared to other factors such as climate, geology and human activities. Nonetheless, in the case of processes like mass movement, El Nino can be an important factor in such processes.

Body paragraph 1

The El Nino does not play a significant role in impacting geomorphic processes in the tropics due to the time taken for these processes to occur. Typically, geomorphic processes such as rock formation or the formation of karst landscapes happen over millions of years and is seldom a result of short-term climatic variability. In the case of the lithification of sedimentary rock, the process is more dependent on the availability of sediments, which is a product of weathering of other rocks or the decay of organic matter.

Body paragraph 2

Similarly, the formation of karst landscapes is less dependent on the El Nino but rather requires suitable geology like rocks composed of calcium carbonate e.g limestone. While El Nino might provide a short-term change in climate resulting in increased temperatures and rainfall, which favours chemical weathering, such events only occur every 7-11 years. Furthermore, even with higher rainfall and

temperatures, the formation of karst landscapes cannot begin without the presence of rocks composed of calcium carbonate. Hence El Nino, does not have a significant impact on these processes.

#### Body paragraph 3

Geomorphic processes are more dependent on longterm variations in the climate. These changes will result in a prolonged change to an area's temperature, precipitation patterns and vegetation, thus influencing geomorphic processes. In the case of Ha Long Bay in Vietnam, its distinctive tower and isolated karst features were formed over 8000 years ago when the area was flooded by water. These conditions resulted in the eventual transformation of cone karst (formed in drier conditions) into tower karst due to lateral erosion, which steepened the existing cone karst into tower karts over time. Thus, it is evident that climates has had a more significant role in the formation of karst landscapes.

#### Body paragraph 4

Apart from climate, humans may have a more significant impact on geomorphic processes. This is especially so for areas in the tropical Pacific, which are further inland, as well as tropical areas located away from the Pacific Ocean. The growing population of humans and our increasing demand for food and other resources has led to deforestation and the eventual formation of desert landscapes. Over the long-term, clearance of forested land for agriculture has resulted in accelerated erosion (lack of roots to hold the surrounding soil intact) and the soil being deprived of inputs of nutrients and organic matter from decomposing leaf litter. This can lead to the degradation of soil structure and fertility. In tropical drylands, the loss of nutrients can result in desertification, where land degradation results in the loss of an area's resource potential, turning productive land into deserts. For example, the increasing desertification in Nigeria (driven partly due to deforestation) is leading to the near absence of trees in the extreme northern Nigeria.

#### Body paragraph 5

While El Nino may not have a significant impact on most geomorphic processes, it still may have an impact on processes that occur on a smaller time scale. Increased precipitation during an ENSO event can be the triggering mechanism for slope instability that results in various mass movement hazards including landslides and debris flows. Depending on the type of mass movement and the nature of human activities carried out near slopes experiencing mass movement, impacts might vary from damage to property and infrastructure, clogged rivers and drainages to injuries and fatalities. In 2015, Peru's government declared a state of emergency in three regions affected by heavy rains, landslides and floods. Landslides mainly in rural towns in the Andes and Amazon killed 28 people and destroyed 1,245 houses.

#### Conclusion

The El Nino therefore has a more significant role in short term geomorphic processes while other factors such as climate and human activities play a larger role in other context with regards to geomorphic processes in the tropics.

## Section B – Development, Economy and Environment

- 3 (a) Explain how the negative impacts of privatisation of water resources may vary in countries at different levels of development.

[12]

Indicative content

**On society**

- Privatisation could lead to rate increases, reducing the ability of people (especially the poor) to pay.
- Privatisation could undermine water quality, affecting the health of consumers.
- Privatisation could lead to job losses.
- Privatisation could reduce local control and public rights

**On environment**

- Private firms could deplete local freshwater resources.
- Presence of privatized water firms may not address environmental issues such as the
- over abstraction of groundwater.
- The burgeoning bottled water industry is contributing to environmental degradation.

**Loss of sovereignty**

- Debt relief and privatization – lack of choice for impoverished countries.

Any 2 different impacts with contrasting examples. Examples may include variations between countries at different levels of development and within a single country as well. Some students only covered countries at lower levels of development, which makes for a narrowly scoped essay.

- (b) To what extent is there water scarcity in the world today?

[20]

Indicative content

Water scarcity is the lack of sufficient water resources available to meet the demands of a region, and it varies greatly across space and time. A) The trends in domestic, industrial and agricultural water use seem to suggest that it is not the absolute physical scarcity of water that matters as much as the marginalization of poorer communities. B) Water scarcity is the result of a combination of hydrological variability, high human use and poor management of water sources. C) Scarcity is 'socially produced'. It is not a signal of absolute scarcity but of relative scarcity due to factors such as increasing pollution, population density and water use per capita.

Students may discuss water scarcity on 2 levels: absolute vs relative scarcity and illustrate with examples how these 2 forms of scarcity may occur. They may also cover some strategies that are aimed at reducing absolute scarcity and the various successes on national scale. Some common errors include a misinterpretation of what is classified as absolute scarcity.

- 4 (a) Explain how the arguments by Harvey can help us understand why transnational corporations (TNCs) may decide to set up operations in countries at low levels of development.

[12]

Indicative content

Central to Harvey's arguments is the idea of *the spatial fix*. TNCs' geographical expansion is argued as being part of the "spatial fixes" to problems that they encounter (definition of "fix" (Cambridge Dictionary): a solution to a problem). The spatial fix helps TNCs to overcome two contradictions of capitalism (Marx's ideas):

- (a) the overaccumulation of goods produced with few buyers
  - As demand decreases or stagnates in countries at high levels of development, TNCs look towards the relatively untapped markets in countries at low levels of development.
  - The opening up of these new and untapped markets create opportunities for TNCs to sell their products to "new consumers" who have the potential and ability to consume the goods produced by the TNCs.
  - At the same time, labour shortages are "fixed" by expanding production to countries at low levels of development with labour surpluses and/or weak labour organisation. This allows TNCs to reduce the cost of labour, and maintain the high profits.
- (b) the overexploitation of nature and environment
  - As exploitation and degradation of the environment result in increasing scarcity of resources in one place, TNCs look for new places with resources to exploit.
  - Resource-rich countries at low levels of development are attractive to TNCs because of their large resource base and weak environmental regulations.

Higher level responses will be able to make clear links between Harvey's idea of *the spatial fix* and TNCs' locational decisions. Strong responses will demonstrate an awareness of how TNCs' expansion to countries at low levels of development are a way of resolving (i.e. a fix) asset- and market-related problems.

- (b) To what extent can uneven development be addressed?

[20]

Indicative content

This question can be explored in various ways. For example:

- Responses can discuss the role of different actors in addressing uneven development and their extent of success as well as the challenges they face.
- Responses can also discuss the extent to which uneven development has been reduced (e.g. by citing the example of the Asian Tigers and contrasting it to the persistent gap between the richest and the poorest countries).
- Responses can also discuss the different perspectives on development and relate these to uneven development.

Higher level responses will demonstrate an awareness that uneven development can exist on multiple scales and/or of the complex nature of uneven development (e.g. through a discussion of the causes of uneven development (and whether

these can be addressed); the involvement of many stakeholders with different (and potentially conflicting) agendas).

Possible synoptic links to Topic 3.1 (sustainable development; impacts of climate change on development); Topic 2.2 (resource curse thesis); Topic 3.2 (slums as a manifestation of uneven development within an urban area).

Below shows an example of how a candidate has approached the question:

#### Introduction

Uneven development can be addressed to a small extent. In order to address uneven development globally, states have to be able to enact effective policies to minimise economic leakages from foreign investments. In addition, states have to have the ability to utilise policies and development aid from international organisations such as the World Bank effectively. Lastly, addressing uneven development also depends on the extent to which TNCs transfer technology and knowledge to host countries, especially those at lower levels of development.

#### Body paragraph 1

Firstly, states have to enact policies that are able to capture economic leakages and be able to maximise profits from foreign investments. While, according to the core-periphery model, it is possible for the wealth of the core to diffuse to the periphery via a trickle-down effect, this unfortunately does not occur without the intervention of the states in the periphery to bargain and capture benefits from the core. States in the periphery, however, may lack the political will or ability to enforce policies such as import tariffs and corporate taxes for TNCs, resulting in large amounts of economic leakages that could have otherwise been captured for investment in economic and social projects for long-term growth. An example would be the exploitation of oil reserves in African nations by foreign-owned corporations. Most recently, state-owned Chinese companies that specialise in oil extraction have profited billions of dollars by exploiting oil resources in African nations such as Nigeria and Congo. While these Chinese state-owned companies invest in public infrastructure projects in these African countries in return for the right to extract oil, the aid given is often only a fraction of what the oil is worth in the global economy. This results in significant economic leakages from the peripheral African states, perpetuating uneven development on the global scale.

#### Body paragraph 2

In addition, the extent to which uneven development can be addressed also depends on whether states of countries at low levels of development are able to utilise development aid effectively. In exchange for development aid, international organisations such as the World Bank and the International Monetary Fund (IMF) may mandate structural adjustment programmes (SAPs). These programmes may include the opening up of domestic markets to foreign investments and trade. However, many countries at low levels of development are unable to reap the benefits of such development aid as the SAPs may adversely impact their economy instead of bringing economic progress. In Peru, after accepting from the IMF in the early 1990s, the state ended up cutting its budget for health and housing subsidies despite the large numbers of people living in poverty who were already struggling to afford healthcare and pay rents in the cities. This caused an increase in the number of people living in poverty. In contrast, in the period immediately after the East Asian Financial Crisis, the loan from the IMF helped Indonesia to stabilise its economy, with the country experiencing a modest GDP growth in 1999. In the case of Peru, the development aid did not bring much

positive impact as the country was already facing widespread economic problems even before it took the loan from the IMF and the policies put in place by the government (with the approval of the IMF) did little to encourage long-term economic growth. For Indonesia, the loan was useful in helping the country tide over a short-term economic crisis and stabilising the economy.

### Body paragraph 3

Lastly, the extent to which uneven development can be addressed depends on the degree to which TNCs transfer technology and knowledge to their host countries. While TNCs often set up manufacturing operations in countries at lower levels of development due to a large and cheap labour force, they often do not transfer valuable technology and know-hows to the local economy. Countries at lower levels of development end up engaging in menial, low-wage jobs for TNCs, perpetuating uneven development. For example, car makers such as BMW often offshore parts of their manufacturing operations to countries at lower levels of development such as Thailand. However, they tend to offshore assembly operations to these countries rather than research and development centres. In the long-term, assembly operations do not provide much growth to the local economy compared to R&D operations, which are typically retained in countries at high levels of development.

### Conclusion

In conclusion, uneven development seems to be a persistent problem that is difficult to overcome. While international organisations and TNCs have the potential to help countries at lower levels of development achieve economic progress, and therefore bridge the development gap, the reality is that these actors often make things worse rather than better. States, as regulators of their national economies, play an important role in helping their countries achieve sustained economic growth. However, their ability to do so is often limited due to both internal and external factors. Hence, the extent to which uneven development can be addressed is limited.

## Section C – Sustainable Development

- 5 (a) Explain the effects of the use of fossil fuels on the global carbon cycle. [12]

Indicative content

The carbon cycle is the biogeochemical cycle by which carbon is exchanged among the main carbon pools of the earth. The burning of fossil fuels results in the emission of carbon.

A discussion of how the increased burning of fossil fuels with industrialisation have increased the concentration of carbon dioxide in the atmosphere should be included.

Higher level responses would compare the global carbon cycle with and without the use of fossil fuels. Candidates could also highlight which fossil fuel is the largest contributor to carbon emissions or which fossil fuel is the most carbon-intensive.

- (b) To what extent can the political and economic challenges in attaining sustainable development be overcome? [20]

Indicative content

Responses need to cover both political and economic challenges.

Examples of political challenges:

- Different levels of importance placed on environmental conservation by countries at high and low levels of development
- Differences in opinions of how best to achieve sustainable development between countries at different levels of development

Examples of economic challenges

- Huge foreign debt of many countries at low levels of development
- Negative social and environmental impacts of structural adjustment programmes (SAPs) in countries at low levels of development
- Significant number of small-scale, subsistence farmers in countries at low levels of development

Higher level responses may demonstrate an awareness that the political and economic challenges can exist (and also be addressed) at multiple scales. Strong responses may also discuss the role of different actors in addressing these challenges.

Possible synoptic links to Topic 2.1 (SAPs by World Bank and IMF); Topic 2.2 (resource curse thesis); Topic 1.2 (deforestation)

- 6 (a) Explain how urbanisation trends and urban population change vary between countries at different levels of development. [12]

Indicative content

**[Urbanisation Trends- PROPORTION OF URBAN POPULATION]**

**Global: The world is becoming increasingly urbanised and level of urbanisation is expected to continue increasing.**

**DCs: Countries at higher levels of development are already highly urbanised and are experiencing low rates of urbanization.**

- Most of the population were already living in urban areas, there was not much potential for large numbers of people to move from rural areas into cities.
- Counter-urbanisation also took place
- Suburbanisation is key trend in DCs

**LDCs: Levels of urbanisation are relatively lower though rates of urbanisation are higher.**

- Urbanisation is lower in general compared to DCs BUT the rate of urbanisation is much faster.
- Many of these countries' economies are still heavily dependent on agriculture, thus there is still a large proportion of their population living in rural areas.
- However, the rate of urbanisation is high as industrialisation is starting to become more rapid in these regions, driven by both local and foreign investment.

**[EXCEPTIONS] However, some Latin American countries have urbanisation trends that are comparable to those of countries at higher levels of development.**

- Many of the countries in this region have a longer history of urban development compared to countries in Asia and Africa.
- The focus on exports in some of these countries have encouraged the rapid growth of major cities. These major cities attract large numbers of people from rural areas who move in search of employment opportunities.

**[Urban Population Change- ABSOLUTE NUMBERS]**

**Most of this projected growth will occur in regions at lower levels of development, especially Asia and Africa.**

- Due to NATURAL INCREASE & RURAL-URBAN MIGRATION

**In contrast, some areas have experience a decline in urban population in recent years esp in low fertility countries of Asia and Europe.**

- Due to LOW FERTILITY & NET OUT MIGRATION

**(b) Discuss the role of different stakeholders in meeting the needs of migrants in urban areas.**

**[20]**

Indicative content

- For adequate scope, at least 2 stakeholders and 2 needs of migrants need to be addressed.
- For adequate evaluation, students need to weigh the significance of the role of all stakeholders i.e. how influential/extent of influence they in addressing the need(s) of migrants and why.
- The significance of their role can be weighed using criteria such as:

- Scale: E.g. states are able to address more needs than NGOs because of the amount of resources they have OR states are able to address needs on a larger scale (i.e. political level) compared to NGOs (i.e. individual level)
  - Time: E.g. a stakeholder is able to address need effectively and efficiently as they have greater number of resources
  - Category of need: E.g. different stakeholders are responsible in addressing different category/type(s) of need(s) – government (political), NGO (social/emotional)
  - Different stakeholders target different profile of migrants: E.g. the role of NGOs are more significant among blue-collar migrant workers who may lack proficiency in the language of the host country in exercising their rights.
  - The need for collaboration: To effectively address all needs, a collaboration between the different stakeholders is needed
- Varied examples are needed to support the points in the discussion.
  - Students can form synoptic links with other topics/themes in the syllabus using the following discussions:
    - Due to the influx of migrants, this result in uneven economic growth at the national scale [Topic 2.1]
    - One of the reasons for international migration is how climate change result in the increase in environmental refugees [Topic 3.1]



**VICTORIA JUNIOR COLLEGE  
JC 2 PRELIMINARY EXAMINATION 2019  
HIGHER 2**

**H2 GEOGRAPHY**

**9751/02**

**Paper 2 INSERT**

**3 hours**

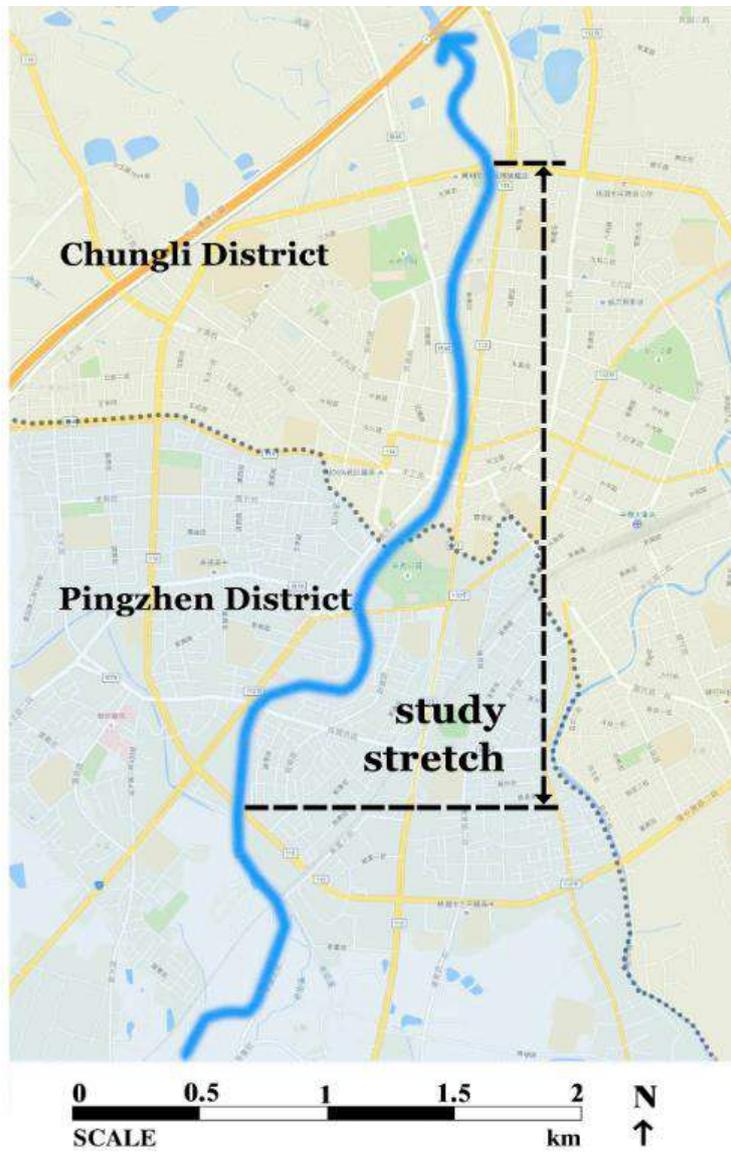
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**READ THESE INSTRUCTIONS FIRST.**

The Insert contains all the Resources referred to in the questions.

Resource 1 for Question 1

Study stretch of Laojie River in Taoyuan City, Taiwan



**Legend**

 Laojie River

**Resource 2 for Question 1****Checklist to assess the project at different sections of the river**Accessibility

1. Does it provide visitors with adequate access to the river?
2. Does it provide enough corridors to connect the city and river?
3. Does it create public open space (e.g. corners and parks) where visitors can sit, look across water or enjoy outdoor activities?
4. Does it give visitors convenient connections with public transport systems?

Activities

5. Does it provide diverse leisure activities (e.g. cycling, jogging or strolling)?
6. Does it provide appropriate riverside economic activities (e.g. shops, cafes)?

Public Facilities and Services

7. Does it provide sufficient street furniture (e.g. benches and signage) to meet the needs of users?
8. Does it install safety and traffic signage and installations to help prevent accidents?
9. Does it have acceptable maintenance services (e.g. repair)?

Flood Prevention

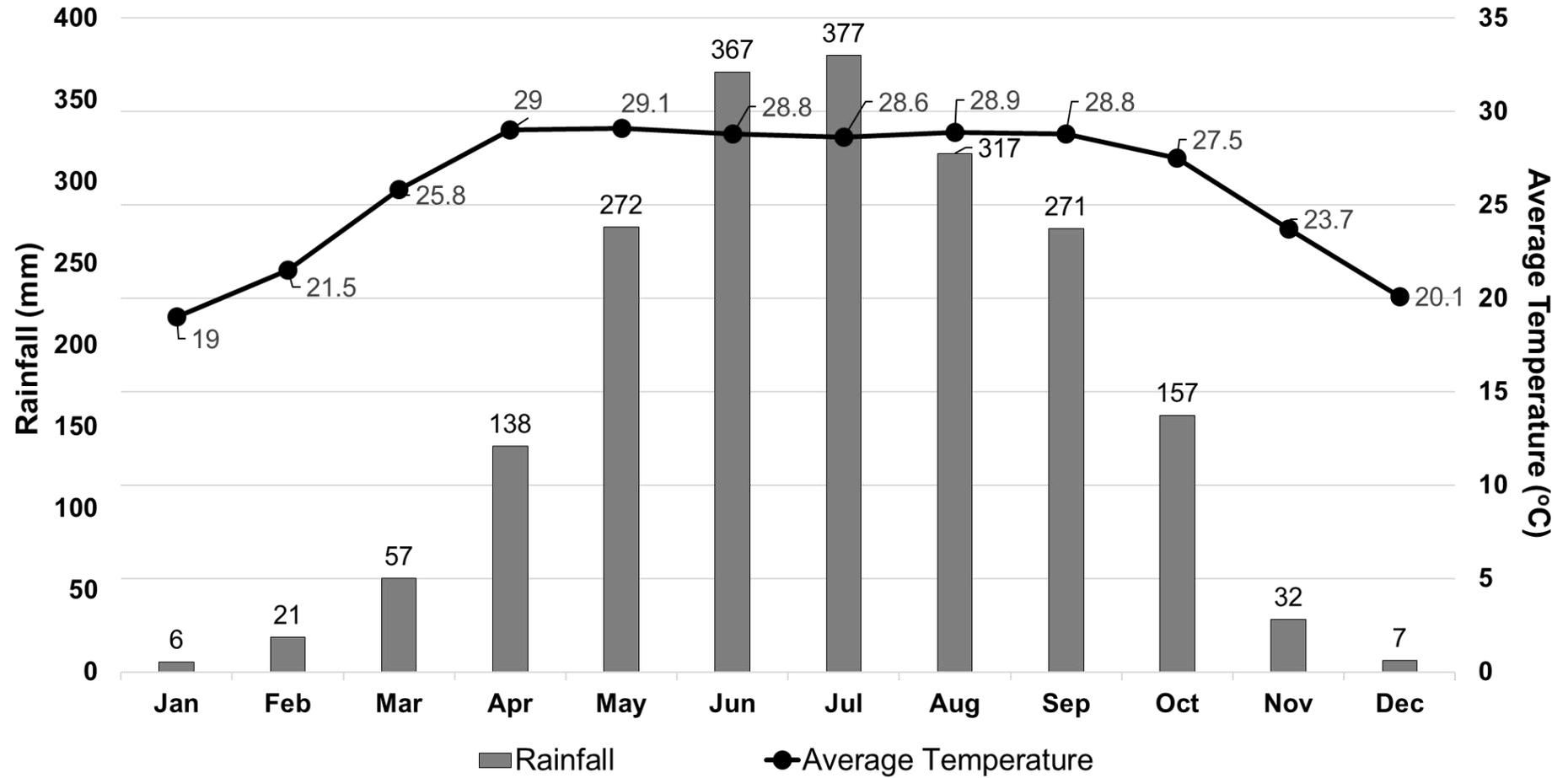
10. Are the flood protection measures (e.g. embankments) built with sheer concrete?
11. Does it employ sustainable drainage methods (e.g. permeable pavements) to enhance rainwater infiltration?
12. Does it provide multi-functional purposes (e.g. a combination of amenity and drainage)?

## Resource 3 for Question 1

## Map of public facilities and services along the river

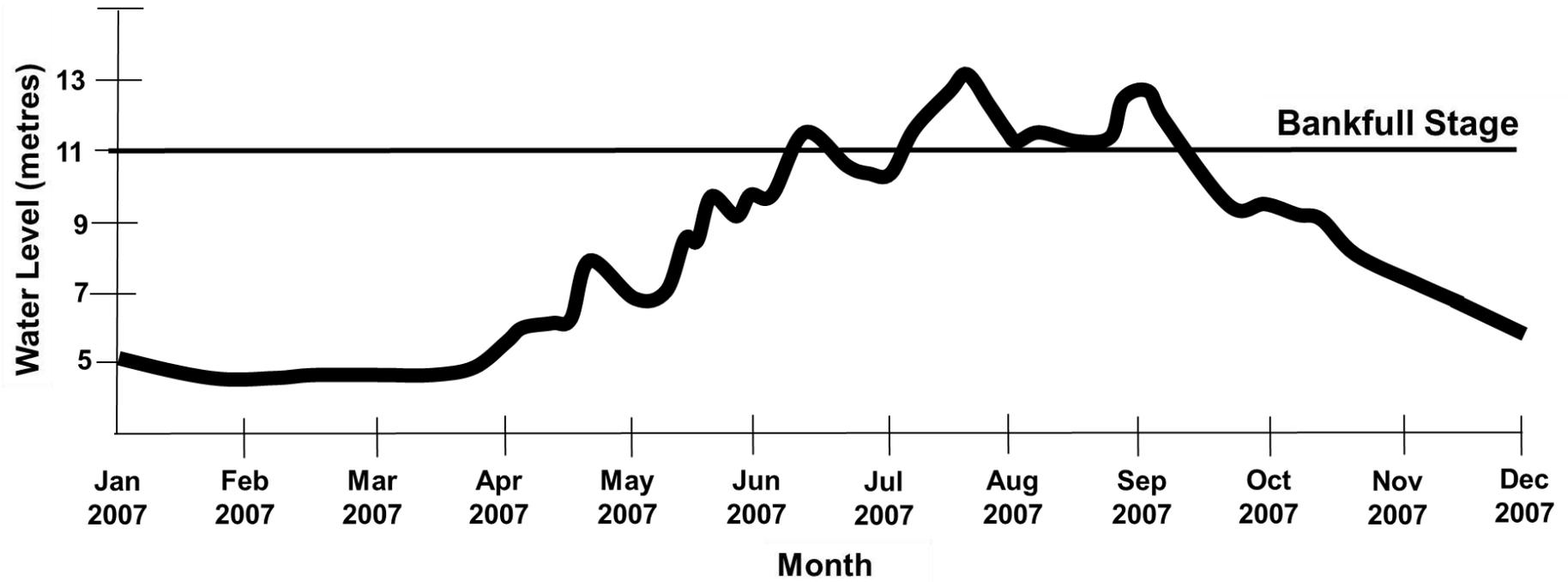


Resource 4 for Question 2  
Climograph of Bangladesh (23.7°N)



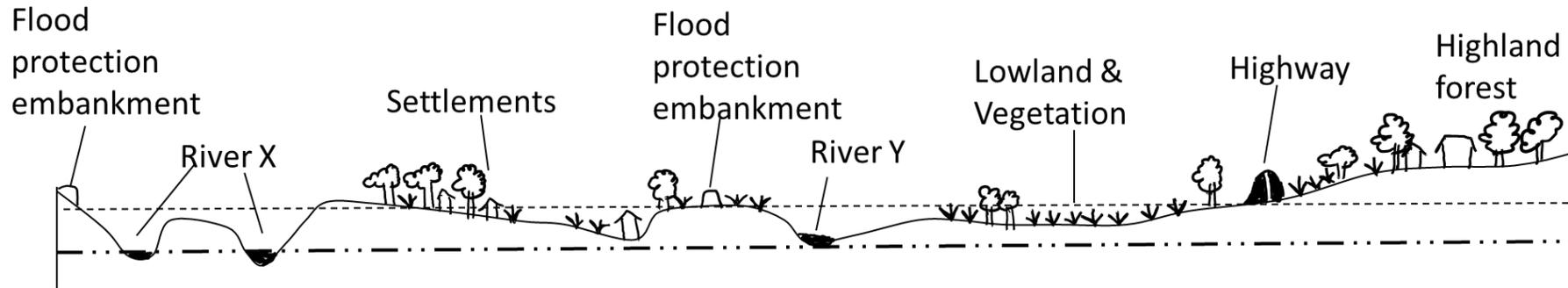
## Resource 5 for Question 2

Flood hydrograph at Serajgonj gauging station along Brahmaputra River in Bangladesh from January 2007 to December 2007



## Resource 6 for Question 2

## Profile of a floodplain in central Bangladesh



Legend:

Trees Settlements Crops 

Dry season water level — · · —

Wet season water level - - - - -

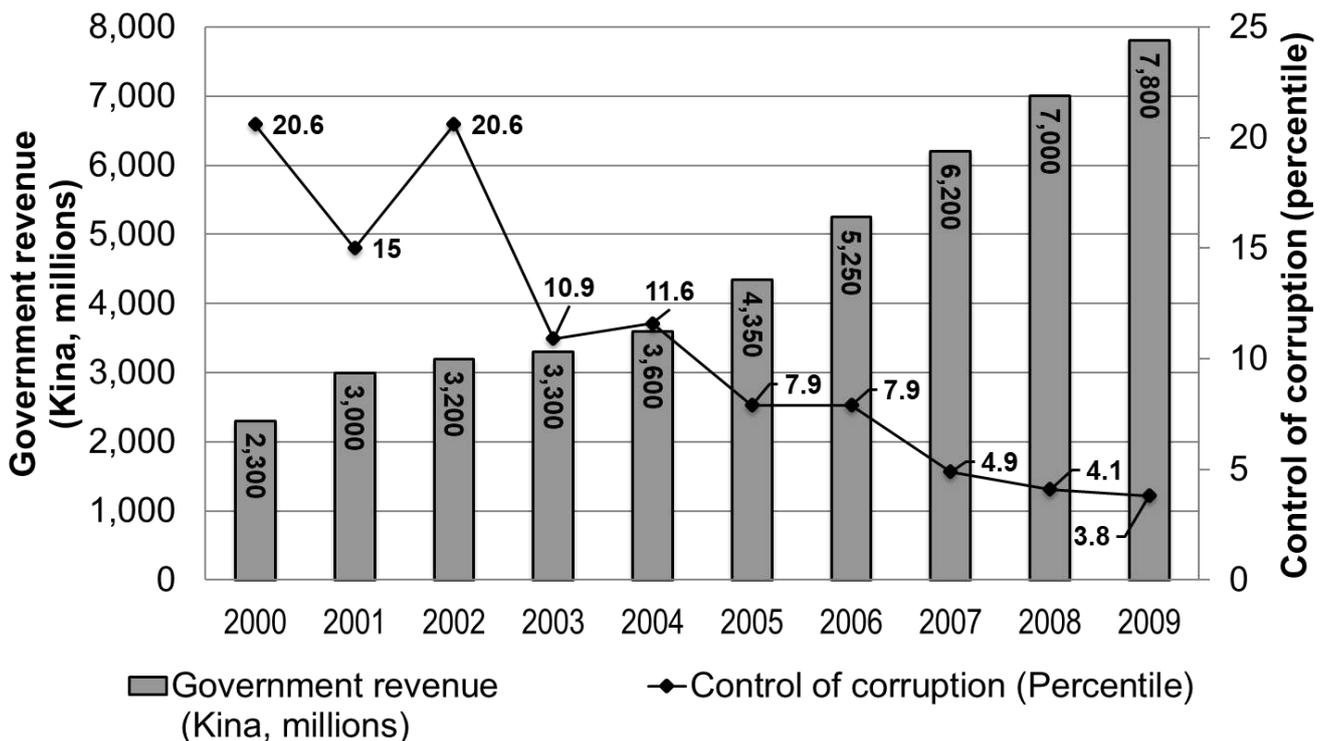
## Resource 7 for Question 3

## Local and foreign ownership in mining and petroleum projects in Papua New Guinea

Project	Local Ownership		Foreign Ownership
	Non-government	Government	
Bougainville Copper Mine	-	22.8%	77.2%
Ok Tedi Mining Limited	2.5%	27.5%	70%
Lihir Gold Limited	0.42%	-	99.58%
Porgera Gold Limited	2.5%	2.5%	95%
Kutubu Petroleum Project	6.75%	-	93.25%

## Resource 8 for Question 3

## Control of corruption and government revenue of Papua New Guinea



\*Control of corruption refers to the perception of control over corruption i.e. the country is perceived to be less corrupted when the percentile for the control of corruption is greater.

**Resource 9 for Question 3**  
**Article on Papua New Guinea**

Overall HDI ranking of Papua New Guinea with other countries fell from 137 in 2005 to 153 in 2017, with 39.9% of the country's population living below the poverty line based on the World Bank's estimates.

Papua New Guinea's population is young and growing with about 40% of the country's population under 15 years of age.

The country's economy remains dominated by two broad sectors:

- The agricultural, forestry, and fishing sectors, which engage more than 80% of PNG's labor force informally;
- The minerals and energy extraction sector which accounts for about 72% of export earnings.

Also, the country is highly dependent on imports for manufactured goods as its industrial sector (excluding mining) accounts for about 9% of Gross Domestic Product (GDP) and contributes little to exports. The small domestic market of about 8 million people and high transport costs constraint industrial development.

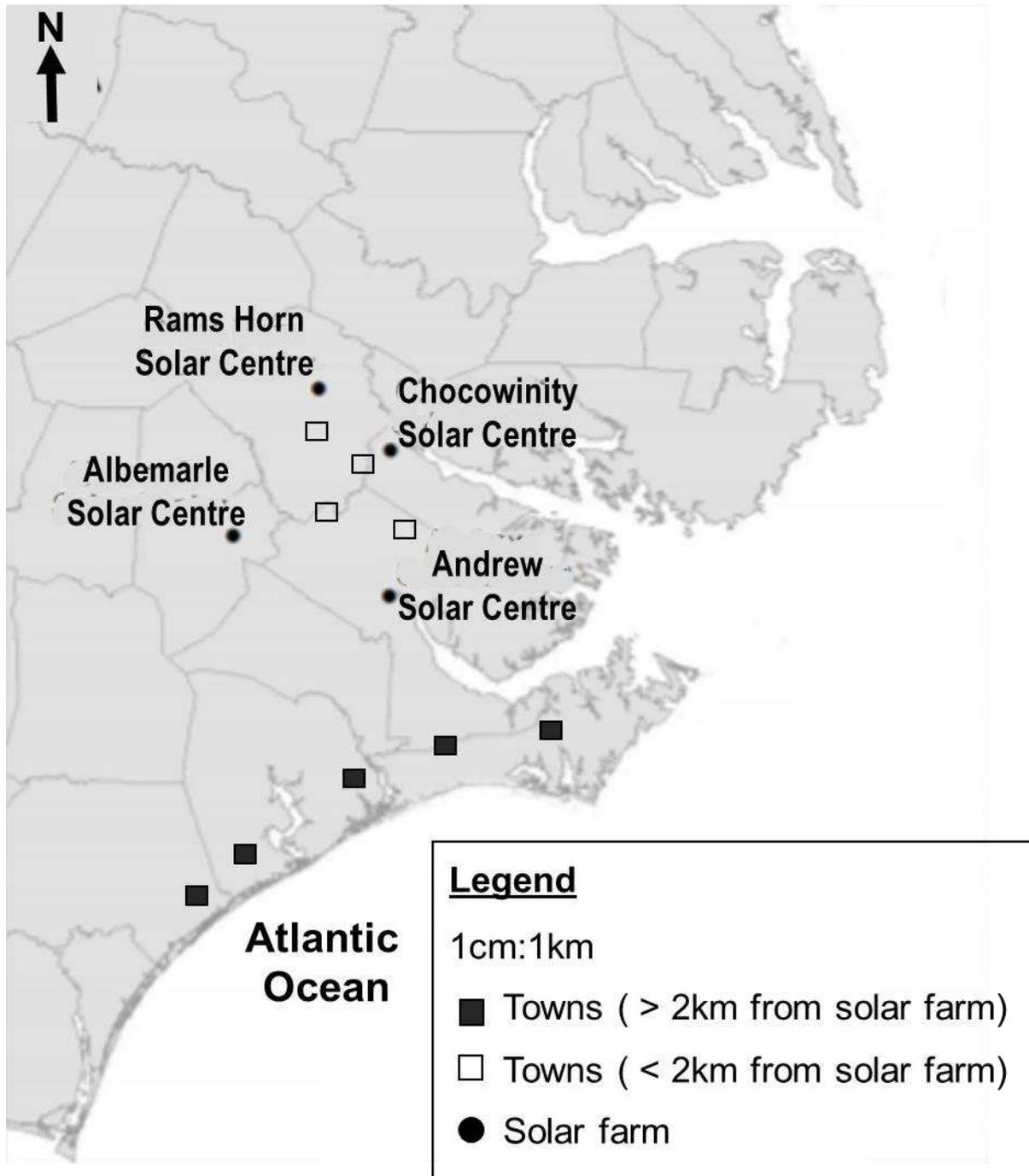
In May 2019, the World Bank and Papua New Guinea government agreed on a new Country Partnership Framework for Papua New Guinea (2019-2022).

The new five-year strategy is aligned with Papua New Guinea's development plans, and lays out three main focus areas for work by the World Bank Group in Papua New Guinea. These three focus areas are:

- To improve the country's financial resilience;
- Ensure more effective and inclusive services, particularly in rural areas; and
- Encourage private sector growth and jobs in the non-resources sector.

## Resource 10 for Question 4

## Distribution of towns and solar farms in North Carolina, USA



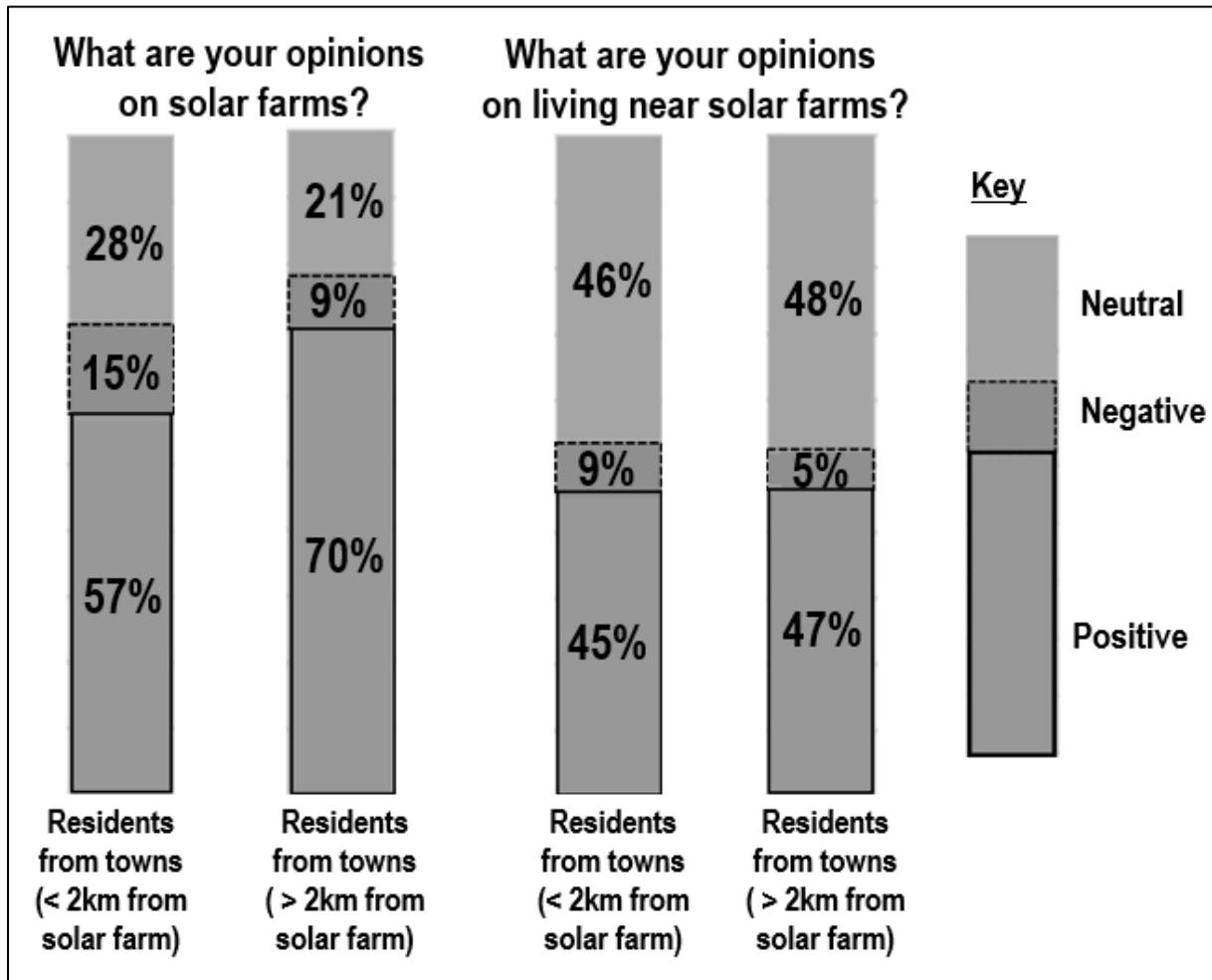
Resource 11 for Question 4

Characteristics of four solar farms found in North Carolina, USA

Name	Size (acre)	Capacity (MW)
Rams Horn Solar Centre	46.21	8.00
Chocowinity Solar Centre	51.95	4.15
Andrew Solar Centre	30.32	5.00
Albemarle Solar Centre	33.34	15.00

Resource 12 for Question 4

Town residents' opinions (positive/negative word choices) when asked about solar farms in general and living near a solar farm







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**Paper 2**

**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

Write your name and index number on the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.

Answer **all** questions.

The Insert contains all the Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagrams and sketch map should be drawn whenever they serve to illustrate and answer.

You are reminded of the need for good English and clear presentation of your answers.

At the end of the examination fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

## Section A

### Theme 4: Geographical Investigation

- 1 Taoyuan City contains 37 km of the Laojie River flowing south–north. The restoration project of the Laojie River in Taoyuan City, Taiwan, transformed the river into a multi-functional urban green space.

A group of researchers from the local university wanted to investigate the positive impacts of the restoration project on urban residents.

The researchers conducted in-depth interviews with a community grassroots leader and three urban planners who were involved in the Laojie River redevelopment project. The names of the interviewees were replaced with identification codes (e.g. Mr X). Each interviewee was asked two central open questions:

- What are the issues affecting the restoration of the Laojie River?
- What are the challenges and opportunities as the Laojie River evolves towards being a multi-functional urban river?

In addition, they also used a checklist (Resource 2) to assess the project at different sections of the river. They decided to focus on four aspects:

- Accessibility
- Activities
- Public facilities and services
- Flood prevention

The 12 questions in the checklist are categorised according to these four aspects.

The data collection process occurred over a period of 12 months.

Resource 1 shows the study stretch of the Laojie River in Taoyuan City, Taiwan. Resource 2 shows the checklist to assess the project at different sections of the river. Resource 3 shows a map of the public facilities and services along the river. The map in Resource 3 is one of the maps produced by the researchers after collecting primary data using the checklist shown in Resource 2.

- (a) Explain one measure that the researchers might have taken to ensure that the research was of a suitable scale. [3]
- (b) Explain why the researchers might have decided to use interviewee identification codes instead of the interviewees' real names. [3]
- (c) Suggest possible improvements to the checklist shown in Resource 2 to increase accuracy. [5]
- (d) Explain the strengths of the data presentation technique shown in Resource 3. [5]
- (e) Evaluate the extent to which the data collected was adequate and suggest additional data that could have been useful. [9]

**Section B****Theme 1: Tropical Environments****Climate and flooding in Bangladesh**

- 2** Resource 4 shows the climograph of Bangladesh. Resource 5 shows a hydrograph measured at Serajgonj gauging station along Brahmaputra River in Bangladesh from January 2007 to December 2007. Resource 6 shows a sketch profile of a floodplain in central Bangladesh.
- (a)** Describe the climatic characteristics of Bangladesh as shown in Resource 4. [5]
- (b)** Account for the mean annual temperature of Bangladesh as shown in Resource 4. [4]
- (c)** With reference to Resource 4, account for the characteristics of the hydrograph shown in Resource 5. [4]
- (d)** With reference to Resource 6, explain how flood risk may vary in central Bangladesh. [6]
- (e)** With reference to Resource 6, explain how the effects of floods can be mitigated in central Bangladesh. [6]

**Theme 2: Development, Economy and Environment****Extractive industries in Papua New Guinea**

- 3** Resource 7 shows the local and foreign ownership in mining and petroleum projects in Papua New Guinea. Resource 8 shows the control of corruption and government revenue of Papua New Guinea. Resource 9 shows an article on Papua New Guinea.
- (a)** With reference to Resource 7, describe local and foreign ownership in the mining and petroleum projects in Papua New Guinea. [5]
- (b)** With reference to Resource 8, describe the government revenue from 2000 to 2009. [4]
- (c)** With reference to all Resources, explain why Papua New Guinea may be experiencing the resource curse. [7]
- (d)** With reference to all Resources, and your own knowledge, discuss the role of governments in helping countries to avoid the resource curse. [9]

**Theme 3: Sustainable Development****Solar energy and liveability in North Carolina, USA**

- 4** Resource 10 shows the distribution of towns and solar farms in North Carolina, USA. Resource 11 shows the characteristics of four solar farms found in North Carolina, USA. Resource 12 shows town residents' opinions (positive/negative word choices) when asked about solar farms in general and living near a solar farm. Resource 13 shows a Word Cloud of residents' responses when asked about solar farms in general and living near a solar farm.
- (a)** Describe the distribution of solar farms and towns in Resource 10. [3]
- (b)** With reference to Resource 11, describe the size and capacity of solar farms in North Carolina, USA. [4]
- (c)** With reference to Resource 12, compare opinions about solar farms and living near solar farms among town residents living less than 2km and more than 2km from solar farms. [5]
- (d)** With reference to Resource 13, suggest possible reasons why residents are supportive of solar farms. [6]
- (e)** With reference to Resources 10, 11 and 13, and your own knowledge, suggest possible reasons why residents might oppose solar farms. [7]

## Section A

### Theme 4: Geographical Investigation

- 1 Taoyuan City contains 37 km of the Laojie River flowing south–north. The restoration project of the Laojie River in Taoyuan City, Taiwan, transformed the river into a multi-functional urban green space.

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- (a) Explain one measure that the researchers might have taken to ensure that the research was of a suitable scale.

[3]

*Point-marked*

Indicative content

- Response should cover only one measure. The 3-marks allocation for one measure means that there is a need for a well-developed explanation.
- As the question asks about the manageability of the research (i.e. suitable scale), there needs to be clear links made to the available resource(s).
- The explanation should be contextualised to this investigation by citing relevant details from the preamble and/or the Resources.
- An example of a well-developed point:
  - **[Identify measure taken]** The researchers only chose to study a section of the river. **[Contextualise by citing relevant details from the preamble and/or Resources]** As shown in Resource 1, the

researchers only studied a 2.7km stretch of the river (straight-line distance) out of the 37km running through Taoyuan City. **[Explain why this ensured that the research was of a suitable scale by linking to available resources + Contextualise by citing relevant details from preamble and/or Resource]** The 2.7km stretch is more manageable for the researchers to study over a period of 12 months compared to the entire 37km length.

- (b) Explain why the researchers might have decided to use interviewee identification codes instead of the interviewees' real names.**

**[3]**

*Point-marked*

Indicative content

- This question is related to research ethics.
- Response need to explain why there is a need for interviewee codes in relation to the context of the investigation.
  - The impact on the interviewees should their real names be used needs to be explained.
  - In this case, there needs to be a consideration of the nature of the restoration project, the focus of the investigation and the profile of the interviewees.
- Response needs to be well-elaborated and contextualised to the investigation.
- An example of a well-elaborated and contextualised point:
  - **[Identify the reason]** The use of the interviewee codes helped to protect the identity of the interviewees. **[Explain why this is important in the context of the investigation by citing relevant details from the preamble and/or Resources]** The project was carried out by the city authorities. As the researchers wanted to investigate the extent of positive impacts of the restoration project, the three urban planners who were interviewed may highlight the issues and challenges related to the project, which may be seen by the city authorities as casting a negative image of the restoration project.

- (c) Suggest possible improvements to the checklist shown in Resource 2 to increase accuracy.**

**[5]**

*Levels-marked*

Indicative content

- [Scope] The question clearly states “improvements” so response needs to cover at least two improvements. However, for effective time management, response should not cover more than three improvements since the question is only allocated a maximum of 5 marks, and there is a need to ensure that points are well-elaborated.
- [Resource] Improvements suggested should be contextualised to the investigation by linking clearly to specific details from the preamble and/or the Resources.
- [Explanation] There needs to be clear and logical links made between the suggested improvements and possible limitations of the checklist by explaining how the suggested improvements will address the limitations of the checklist.

The improvements also need to be clearly explained (ideally through the use of an example to illustrate the improvement).

- Possible improvements:
  - Use of scale rather than yes/no questions
  - Clearer definition of qualitative terms such as 'adequate access'

Level	Marks	Descriptors
3	5	<p><b>Scope:</b> Covers at least two improvements.</p> <p><b>Resource:</b> Cite specific details from preamble and/or Resources to contextualise every point [</p> <p><b>Explanation:</b> Clear and logical links made between possible improvements and limitations of the checklist by explaining how the suggested improvements will address the limitations of the checklist. Improvements are clearly explained.</p>
2	3-4	<p><b>Scope:</b> Covers at least two improvements</p> <p><b>Resource:</b> Cite specific details from preamble and/or Resources to contextualise some points</p> <p><b>Explanation:</b> Clear and logical links made between possible improvements and limitations of the checklist by explaining how the suggested improvements will address the limitations of the checklist for some parts of the response, though there may be some gaps or unclear links. Improvements are explained though there may be some gaps.</p>
1	1-2	<p><b>Scope:</b> Covers only one improvement</p> <p><b>Resource:</b> Limited or no specific details cited from preamble and/or Resources to contextualise points</p> <p><b>Explanation:</b> Limited, no or unclear links made between possible improvements and limitations of the checklist. Improvements are not explained.</p>
0	0	No creditworthy response.

- (d) Explain the strengths of the data presentation technique shown in Resource 3.

[5]

*Levels-marked*

Indicative content

- It is important to note that the question is on data presentation rather than the data itself.
- Response should show a strong understanding of the data presentation technique shown and what the technique can be used to highlight.
  - Resource 3 shows a map.
  - A key strength of a map is to show spatial patterns.
- The strengths highlighted should be relevant to the context of the investigation (in this case, the focus of the investigation), instead of being generic to any map.
- [Scope] Response should cover at least two strengths since the question clearly states “strengths”. However, for effective time management, response should not cover more than three strengths since the question is only allocated a maximum of 5 marks, and there is a need to ensure that points are well-elaborated.
- [Resource] Strengths highlighted should be contextualised to the investigation by citing specific details from Resource 3 (and the preamble, where appropriate)
- [Explanation] There needs to be clear and logical links made between the strengths highlighted and how they aid the investigation
- Possible points include:
  - Allow researchers to see variations along the study stretch for each aspect (e.g. in the provision of public facilities and services)
  - Overlaying maps for different aspects will allow researchers to see variations along the study stretch for all aspects
  - Provides a visual representation of the distribution of public facilities and services along the study stretch

Level	Marks	Descriptors
3	5	<p><b>Scope:</b> Covers at least two strengths.</p> <p><b>Resource:</b> Cite specific details from Resource 3 (and preamble where appropriate) to contextualise every point</p> <p><b>Explanation:</b> Clear and logical links made between specific details from Resource 3 (and preamble where appropriate) and the strengths highlighted i.e. how it results in the strengths.</p>
2	3-4	<p><b>Scope:</b> Covers at least two strengths.</p> <p><b>Resource:</b> Cite specific details from Resource 3 (and preamble where appropriate) to contextualise some points</p> <p><b>Explanation:</b> Clear and logical links made between specific details from Resource 3 (and preamble where appropriate) and the strengths highlighted i.e. how it results in the strengths, for some parts of the response, though there may be some gaps or unclear links.</p>
1	1-2	<p><b>Scope:</b></p>

		Covers only one strength.  <b>Resource:</b> Limited or no specific details cited from Resource 3 (and preamble where appropriate) to contextualise points  <b>Explanation:</b> Limited, no or unclear links made between specific details from Resource 3 (and preamble where appropriate) and the strength highlighted i.e. how it results in the strength.
0	0	No creditworthy response.

- (e) Evaluate the extent to which the data collected was adequate and suggest additional data that could have been useful.

[9]

*Levels-marked using generic level descriptors for 9m GI DRQ*

Indicative content

- [Scope] The question has two parts, so response should cover both parts to score well. Also, for a “well-developed evaluation”, response should cover how the data was adequate **and** in what aspects were there gaps.
- The first part of the question asks whether the data was adequate.
  - “Adequate” means enough or satisfactory/good enough for a particular purpose (Cambridge Dictionary).
  - Thus, to address this question, response can consider whether the data was:
    - Enough (i.e. comprehensive)
    - Satisfactory/good enough (i.e. relevant, accurate, reliable)
- The second part of the question asks about additional data that could be useful.
  - The data suggested needs to be different from what has already been collected since question says “**additional** data”.
  - The additional data can be primary and/or secondary data.
  - “Useful” means able to be used for a practical purpose (Oxford Dictionary).
    - In this case, the purpose is for the researchers to answer the research question.
    - Thus, response needs to clearly explain how the additional data can help the researchers to answer the research question.
      - Out of the AR<sup>2</sup>C framework, response can consider how the additional data is relevant to the research and/or how it can increase the comprehensiveness of the data collected.

Level	Marks	Descriptors
3	7–9	Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides a logical and well-developed evaluation, which may include perceptive insights for the strongest responses. Reflects strong critical thinking skills and a good understanding of the requirements of the question.
2	4–6	Response demonstrates good knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides an evaluation, which may be limited in depth and detail. Response reflects critical thinking skills in general but may not always be relevant to the question.
1	1–3	Response shows inadequate knowledge and understanding of geographical investigation skills and methods. Response has some, though limited, relevance to the given context. Provides little or no evaluation. May include material that is irrelevant to the question.
0	0	No creditworthy response.

## Section B

### Theme 1: Tropical Environments

#### Climate and flooding in Bangladesh

2 Resource 4 shows the climograph of Bangladesh. Resource 5 shows a hydrograph measured at Serajgonj gauging station along Brahmaputra River in Bangladesh from January 2007 to December 2007. Resource 6 shows a sketch profile of a floodplain in central Bangladesh.

(a) Describe the climatic characteristics of Bangladesh as shown in Resource 4.

[5]

*Point-marked*

Indicative content

Any 5 of the following points:

- High average annual temperature of 25.9°C
- Highest average temperature in May (29.1 °C)
- Lowest average temperature in January (19 °C)
- Large annual temperature range (10.1 °C)
- Seasonal distribution of precipitation – wet season from May to Oct or Apr to Oct); dry season from Nov to Apr or Nov to Mar
- High total amount of precipitation of 2022mm
- Highest total precipitation in July (377mm)
- Lowest total precipitation in Jan (6mm)

(b) Account for the mean annual temperature of Bangladesh as shown in Resource 4.

[4]

*Point-marked*

Indicative content

Mean annual temperature is high throughout the year. Hence, reasons to account for this are:

- Bangladesh is located in low latitudes.
- At the low latitudes, the sun's rays hit the Earth's surface at a high angle of incidence.
- This minimises the degree of beam spreading which results in a high intensity of insolation at the surface.
- In addition, the high angle of incidence means that insolation has to pass through lesser atmosphere before reaching the surface, resulting in lesser energy lost through reflection and scattering.

(c) With reference to Resource 4, account for the characteristics of the hydrograph shown in Resource 5.

[4]

*Levels-marked*Indicative content

Relationship between rainfall pattern in Resource 4 and discharge shown in hydrograph in Resource 5:

- The seasonal pattern of discharge as shown in the hydrograph in Resource 5 is the result of the seasonal pattern of rainfall distribution in Bangladesh.
- The wet season corresponds to the months when the discharge is high while the dry season corresponds to the months when the discharge is low.
- The period when the river exceeds bankfull stage from early June to early September corresponds to the 3 highest rainfall months recorded in Bangladesh i.e. June, July and August.
- During wet seasons, there are more steep and rising limbs since the 3 highest rainfall months recorded in Bangladesh i.e. June, July and August.

Accounting for characteristics of hydrograph:

- With high rainfall, there is more inputs into the river channel, hence, the explains the high discharge levels.
- With high rainfall, soils may get easily saturated, which will lead to generation of SOF which will enter into the river channel. Also, when rainfall intensity exceeds infiltration capacity, this will result in HOF or surface runoff which will enter into the river channel. This will increase discharge in the river.
- Although highest rainfall amount is recorded in July, the river reaches peak discharge in mid-July to August because of lag time as it takes time for water to reach the river after a period of rainfall.
- Meanwhile, with low rainfall, there is smaller amount of input direct into the river channel. However, rivers are supplemented with water from baseflow and throughflow.

Levels	Marks	Descriptors
3	4	<p><b>Scope:</b> Covers both wet and dry seasons</p> <p><b>Resource:</b> Cite relevant and accurate data to support every point</p> <p><b>Explanation:</b> Clear and consistent links as to how rainfall patterns help to explain characteristics of hydrograph</p>
2	3	<p><b>Scope:</b> Covers either wet or dry season</p> <p><b>Resource:</b> Use of resource to support most points</p> <p><b>Explanation:</b></p>

		Some links as to how rainfall patterns help to explain characteristics of hydrograph
1	1-2	<p><b>Scope:</b> Covers either wet or dry season</p> <p><b>Resource:</b> Little or no use of resource to support points</p> <p><b>Explanation:</b> Little or no link as to how rainfall patterns help to explain characteristics of hydrograph</p>
0	0	No creditworthy response

(d) **With reference to Resource 6, explain how flood risk may vary in central Bangladesh.**

**[6]**

*Levels-marked*

Indicative content

Students can explain that flood risk may vary temporally and spatially.

i) Temporal variations:

- Flood risk is higher during the wet season than the dry season.

During wet season, the water level in Central Bangladesh is significantly higher – in some settlements, flood levels will inundate these areas. than during the dry season which may result in floods of high magnitude.

ii) Spatial variations:

- Flood risk is higher in areas in close proximity of River Y.

During the wet season, when discharge in Rivers Y increases till it exceeds bankfull capacity, this increases flood risk in the neighbouring settlements near the rivers. Furthermore if there is a particularly, even settlements near River X will be of high risk if there is large magnitude if it exceeds water level.

- Flood risk is higher in lowland areas than highland areas.

During the wet season, lowland areas act as natural storages where there may be accumulation of water, hence, are highly exposed to floods.

Levels	Marks	Descriptors
3	5-6	<p><b>Scope:</b> Covers 2 different variations of flood risk based on the resource (best answer covers both spatial and temporal variations)</p> <p><b>Resource:</b></p>

		Cite relevant and accurate data to support every point  <b>Explanation:</b> Clear and consistent links as to how the characteristics of the area results in variations in flood risk
2	3-4	<b>Scope:</b> Covers either spatial or temporal variations of flood risk based on the resource  <b>Resource:</b> Use of resource to support most points  <b>Explanation:</b> Some links as to how the characteristics of the area results in variations in flood risk
1	1-2	<b>Scope:</b> Covers either spatial or temporal variations of flood risk based on the resource  <b>Resource:</b> Little or no use of resource to support points  <b>Explanation:</b> Little or no link as to how the characteristics of the area results in variations in flood risk
0	0	No creditworthy response

- (e) With reference to Resource 6, explain how the effects of floods can be mitigated in central Bangladesh.

[6]

*Levels-marked*

Indicative content

Possible mitigation measures include:

- Hard engineering strategies - Channel modification, building embankments, flood proofing of settlements
- Soft engineering strategies – Reafforestation, modify cropping practices, floodplain zoning

Strategies chosen to mitigate the effects need to be based on the context of the resource.

For each strategy, need to explain how the strategy helps to mitigate effects i.e. make effects less severe

Levels	Marks	Descriptors
3	5-6	<b>Scope:</b>

		<p>Covers at least 2 strategies or 1 strategy that can address more than 1 effect (latter is not recommended)</p> <p><b>Resource:</b> Cite relevant and accurate data to support every point</p> <p><b>Explanation:</b> Clear and consistent links as to how the identified strategies can help mitigate effects of floods in Central Bangladesh</p>
2	3-4	<p><b>Scope:</b> Covers either hard or soft engineering methods</p> <p><b>Resource:</b> Use of resource to support most points</p> <p><b>Explanation:</b> Some links as to how the identified strategies can help mitigate effects of floods in Central Bangladesh</p>
1	1-2	<p><b>Scope:</b> Covers either hard or soft engineering methods</p> <p><b>Resource:</b> Little or no use of resource to support points</p> <p><b>Explanation:</b> Little or no links as to how the identified strategies can help mitigate effects of floods in Central Bangladesh</p>
0	0	No creditworthy response

## Theme 2: Development, Economy and Environment

### Extractive industries in Papua New Guinea

3 Resource 7 shows the local and foreign ownership in mining and petroleum projects in Papua New Guinea. Resource 8 shows the control of corruption and government revenue of Papua New Guinea. Resource 9 shows an article on Papua New Guinea.

(a) **With reference to Resource 7, describe local and foreign ownership in the mining and petroleum projects in Papua New Guinea.**

[5]

*Point-marked*

#### Indicative content

- All 5 projects are foreign owned where foreign shares for all projects take up more than 51% of ownership each, with the least being Ok Tedi Mining Limited at 70%.
- Most local ownership being Ok Tedi Mining Limited at 30%.
- Most foreign ownership being Lihir Gold Limited at 99.58%.
- Amongst local ownership, greatest government ownership in Ok Tedi Mining Limited at 27.5%, and greatest non-government ownership in Kutubu Petroleum Project at 6.75%.
- Government has a stake in most of the projects (3 out of 5) with no stake at all for Lihir Gold Limited and Kutubu Petroleum Project.
- Amongst local ownership where for projects that the government and non-government have an ownership in, the ownership range is greater for the government at 25% point than non-government at 6.33% point.

(b) **With reference to Resource 8, describe the government revenue from 2000 to 2009.**

[4]

*Point-marked*

#### Indicative content

- Govt revenue overall increase from 2,300m Kina in 2000 to 7,800m Kina in 2009.
- Govt revenue experiences an increase of at least 100m Kina every year from 2000 to 2009.
- Smallest increase in govt revenue of 100m Kina from 2002 to 2003.
- Greatest increase in govt revenue of 950m Kina from 2006 to 2007.
- Rate of increase in government revenue is greater in the first half of the time period of 2000 to 2009, where the overall increase in the first 5 years of 2000

to 2004 was 1,300m Kina, while the overall increase in the following 5 years from 2005 to 2009 was greater at 3,450m Kina.

- (c) **With reference to all Resources, explain why Papua New Guinea may be experiencing the resource curse.**

[7]

*Levels-marked*

Indicative content

- Although PNG's government revenue experienced an overall increase from 2,300m Kina in 2000 to 7,800m Kina in 2009 as seen in Resource 8, PNG's HDI position fell from "137 in 2005 to 153 in 2017" instead as seen in Resource 9. This shows that the **country's increased economic performance did not lead to increased standard of living for its people**, where the opposite seems to be true instead.
- This could be **due to the overreliance on the minerals and energy extraction sector** that accounts for about 72% of PNG's export earnings (Resource 9)—leaving the country's economy vulnerable to the volatile market prices of the extracted resources where if the prices of the resource were to drop, the economy would be severely affected.
- Also, with local shareholders (be it the national government, provincial government, or local landowners) having insignificant share ownership (ranging from 30.0% to 0.42% as seen in Resource 7) in the minerals and petroleum projects in the country, there is likely to be **a lot of economic leakage**, where profits earned from the sector are sent back to the foreign companies' host countries instead of benefitting the local population.
- Moreover, the majority of PNG's population (80% in Resource 9) works informally in the agricultural, forestry, and fishing sectors instead. So not only does the majority of the population are not working in the minerals and energy extraction sector that generates the bulk of the country's revenue, they are likely to not have income security from their informal work—explaining why "39.9% of population live below the poverty line based on the World Bank's estimates" and further reinforcing to why PNG is likely to experience to the resource curse (Resource 9).
- Furthermore, for the little remaining amount of money that the national government receive from the various projects, such monies may not have been used properly to promote development to improve the lives of its people **due to corruption** where money could be was used to fulfill their personal interests rather developing the country. This could be seen where the control of corruption in PNG has decreased from 20.6 percentile in 2000 to 3.8 percentile in 2009 as seen in Resource 8.

Level	Marks	Descriptor
3	6-7	<p><b>Scope:</b></p> <ul style="list-style-type: none"> <li>• At least 2 different reasons to why it is resource cursed (e.g. economic leakage, overreliance on extractive industry, corruption)</li> </ul> <p><b>Resource:</b></p>

		<ul style="list-style-type: none"> <li>• Use all Resources</li> <li>• Cites relevant and accurate data for every point</li> </ul> <p><b>Explanation:</b></p> <ul style="list-style-type: none"> <li>• Response contains clear and logical link between cited evidence and the resource curse thesis to explain why Papua New Guinea is resource cursed.</li> </ul>
2	3-5	<p><b>Scope:</b></p> <ul style="list-style-type: none"> <li>• At least 2 different reasons to why it is resource cursed (e.g. economic leakage, overreliance on extractive industry, corruption)</li> </ul> <p><b>Resource:</b></p> <ul style="list-style-type: none"> <li>• Use at least 2 Resources</li> <li>• Relevant and accurate data for most points</li> </ul> <p><b>Explanation:</b></p> <ul style="list-style-type: none"> <li>• There are gaps in the elaboration of reasons.</li> </ul>
1	1-2	<p><b>Scope:</b></p> <ul style="list-style-type: none"> <li>• At least 1 reason to why it is resource cursed (e.g. economic leakage, overreliance on extractive industry, corruption)</li> </ul> <p><b>Resource:</b></p> <ul style="list-style-type: none"> <li>• Limited or no use of the Resource.</li> <li>• Even when data is cited, it is either inaccurate or irrelevant.</li> </ul> <p><b>Explanation:</b></p> <ul style="list-style-type: none"> <li>• Little to no elaboration of reason.</li> </ul>
0	0	No credit worthy response.

(d) With reference to all Resources, and your own knowledge, discuss the role of governments in helping countries to avoid the resource curse.

[9]

*Levels-marked using H2 generic level descriptors for 9m DRQ*

Indicative content

There are 2 ways to achieve a balanced argument:

1) *Government plays an important role, but so are other actors (in this case, supranational organisation such as the World Bank since it is stated in Resource 9).*

OR

2) *The role of the government is important, but there are certain limitations that the government may face (e.g. corruption—since it is shown in Resource 8)*

Governments can play an important role in helping their country avoid the resource curse through diversifying the economy to reduce the over reliance on the extractive industry, and designing fiscal policies with the volatility of the markets in mind through creating a stabilization fund.

- Governments can “encourage private sector growth and jobs in the non-resources sector” (Resource 9) to diversify the economy and prevent it from being over-reliant on the extractive industry. For example in Papua New Guinea, instead of being “highly dependent on imports for manufactured goods”, expansion of the country’s industrial sector (excluding mining) that currently “accounts for about 9% of GDP and contributes little to exports” provides opportunities for growth beyond the extractive industry. Moreover, with a population that is “young and growing with about 40% of PNG’s population under 15 years of age”, PNG may take advantage of possible lower labour cost to attract FDI that are labour intensive.
- Governments could also create a stabilisation fund where a portion of the profits from the extractive industry must be either set aside for future emergencies, or invested in other industries to earn a return. This could allow the country to improve its “financial resilience” as mentioned in Resource 9. Thus countries like PNG could set aside a portion of its increasing revenue (seen from R8) for this fund.
- To reduce leakage due to high foreign ownership as seen in Resource 7, governments could implement more corporate tax, joint ventures to promote local employment, or require the transfer of technologies from the foreign firm to local companies.

However, the government’s ability to play an effective role in avoiding the resource curse can be limited by the presence of corruption.

- As seen in the Resource 8, the control of corruption in Papua New Guinea fell from 20.6% in 2000 to 3.8% in 2009—indicating an increase in the perception of corruption within the country. To overcome this, governments could make a conscious effort to release annual financial reports detailing how the revenue earned was spent in order to prevent the unaccounted usage of money by corrupted officials.

Also, governments may require the assistance of other stakeholders in trying to avoid the resource curse—thus it is not only the role of the government that is important only.

- Governments could work with international organisations such as the World Bank (seen in (Resource 9), where financial aid could be spent on infrastructure development and services to provide more ‘effective and inclusive services’ such as building more schools in rural areas. Moreover, with a growing population, providing more education would ensure that citizens are adequately educated that may allow PNG to move up the value chain to engage in more higher-skilled manufacturing activities that in turn generates more income for the country as well as for the people through higher exports and salaries respectively.

Level	Marks	Descriptors
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3	7-9	<p>Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.</p> <ul style="list-style-type: none"> <li>• Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Makes a decision which clearly addresses different elements of the issue and/or interest of different stakeholders</li> </ul>
2	4-6	<p>A satisfactory response that is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.</p> <ul style="list-style-type: none"> <li>• Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Shows some attempt to address different elements of the issue and/or views of different stakeholders when making a decision but is not well-developed</li> </ul>
1	1-3	<p>Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response.</p> <ul style="list-style-type: none"> <li>• Provides little or no evaluation</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Evidence of decision-making, if present, is simple and may be flawed</li> </ul>
0	0	No creditworthy response.

### Theme 3: Sustainable Development

#### Solar energy and liveability in North Carolina, USA

- 4 Resource 10 shows the distribution of towns and solar farms in North Carolina, USA. Resource 11 shows the characteristics of four solar farms found in North Carolina, USA. Resource 12 shows town residents' opinions (positive/negative word choices) when asked about solar farms in general and living near a solar farm. Resource 13 shows a Word Cloud of residents' responses when asked about solar farms in general and living near a solar farm.

(a) Describe the distribution of solar farms and towns in Resource 10.

[3]

*Point-marked*

Indicative content

Any 3 points covering **both** solar farms and towns:

- Most of the towns (5 of 9) are located in the Southern region of map along the coast.
- With the exception of those towns on the coast, the remaining towns (4 of 9) are located to the North in close proximity (<2km) to the solar farms.
- The solar farms are clustered in the central region of the map.
- The solar farms are equally distributed with 2 of 4 along the coast and the remaining 2 further inland.

(b) With reference to Resource 11, describe the size and capacity of solar farms in North Carolina, USA.

[4]

*Point-marked*

Indicative content

Any 4 points covering **both** size and capacity:

- Total capacity of the solar farms is 32.15 MW
- Total size of the solar farms is 161.82 acres
- The largest solar farm is Chocowinity Solar (51.95 acres).
- The smallest solar farm is Andrew Solar (30.32 acres).
- The solar farm with the lowest capacity is Chocowinity Solar (4.15 MW).
- The solar farm with the largest capacity is Albemarle Solar Center (15 MW).

(c) With reference to Resource 12, compare opinions about solar farms and living near solar farms among town residents living less than 2km and more than 2km from solar farms.

[5]

*Levels-marked*

Indicative content

Note: Town residents living less than 2km denoted by X; Town residents living more than 2km denoted by Y

Opinions about solar farms:

- For both X and Y, opinions are mostly positive (57% and 70 %)
- Opinions among Y is more positive than X ( 23% pts)
- X has more negative opinions than Y ( 6% pts)

Opinions about living near solar farms:

- For both X and Y, opinions are mostly neutral (46% and 48 %)
- Opinions among Y is more positive than X ( 2% pts)
- X has more negative opinions than Y ( 4%pts)

Comparing opinions about solar farms vs living near solar farms:

- More town residents for both X and Y have positive opinions of solar farms (X- 57% and Y- 70%) than opinions of living near solar farms (X- 45% and Y- 47%)
- The disparity between positive opinions on solar farms vs living near solar farms is greater for Y ( X – 12%pts , Y– 23% pts)

Level	Marks	Descriptors
3	5	<p><b>Scope:</b> Covers 1 similarity and 1 difference of opinions on solar farms and living near solar farms for X and Y. Covers both opinions on solar farms and living near solar farms. In addition, comparison may also be made between opinions on solar farms and opinions on living near solar farms for X and Y.</p> <p><b>Resource:</b> Accurate and relevant data from Resource 12 supports all points.</p>
2	3-4	<p><b>Scope:</b> Covers 1 similarity and 1 difference of opinions on solar farms and living near solar farms for X and Y. Covers both opinions on solar farms and living near solar farms.</p> <p><b>Resource:</b> Accurate and relevant data from Resource 12 supports some points.</p>
1	1-2	<p><b>Scope:</b> Covers only similarity OR difference</p> <p><b>Resource:</b> Limited or no specific details cited from Resource 12 to support points.</p>
0	0	No creditworthy response.

- (d) With reference to Resource 13, suggest possible reasons why residents are supportive of solar farms.

[6]

*Levels-marked*

Indicative content

Major reasons ( larger words = more frequently found in responses of residents)

- Cheaper electricity for consumers – *savings, cheaper*

- Uses a renewable resource unlike fossil fuels - *efficient*
- Reduction in GHG and impact on climate change – *environmentally friendly , clean*
- Able to help address rising demand for energy - *needed*

\*Minor reasons ( smaller words = less frequently found in responses of residents)

- Allows sustainable use of current fossil fuel resources - *conservation*
- Safer than nuclear – *safe*
- A move towards a more pro-environment mindset – *progressive*

Level	Marks	Descriptors
3	5-6	<p><b>Scope:</b> Covers at least 2 key reasons for residents' support of solar farms</p> <p><b>Resource:</b> Accurate and relevant data from Resource 13 supports all points.</p> <p><b>Explanation:</b> Response contains good explanation of reasons for residents to support solar farms</p>
2	3-4	<p><b>Scope:</b> Covers at least 2 key reasons for residents' support of solar farms or 1 key reason and 1 minor* reasons</p> <p><b>Resource:</b> Accurate and relevant data from Resource 13 supports some points</p> <p><b>Explanation:</b> Response contains explanation of reasons for residents to support solar farms. Some gaps in explanation</p>
1	1-2	<p><b>Scope:</b> Covers only 1 key reason or 2 minor reasons for residents' support of solar farms</p> <p><b>Resource:</b> Limited or no specific details cited from Resource 13 to contextualise points</p> <p><b>Explanation:</b> Response contains limited explanation of reasons for residents to support solar farms. Large gaps in explanation</p>
0	0	No creditworthy response.

(e) With reference to Resources 10, 11 and 13, and your own knowledge, suggest possible reasons why residents might oppose solar farms.

[7]

*Levels-marked*

Indicative content

- High initial setup cost for solar farms , R13 - expensive , waste of money

- Inefficient given size of land. R12 – largest farm Chocowinity Solar (51.95 acres) has lowest capacity (4.15 MW). R13 – Waste of Space
- Unattractive visually for nearby town residents. R13 – Eyesore , Unsightly
- Possible air pollution and potential congestion causing issues to nearby town residents due to movement of vehicles involved in solar farm (employee commute etc) R10- farms are located in close proximity ( <2km) to residents of 4 towns
- Takes up land i.e replaces 'green' areas and impacts on wildlife in terms of habitat loss. R11– Total acres 161.82 acres. R4 – harmful to wildlife

Level	Marks	Descriptors
3	6-7	<p><b>Scope:</b> Covers at least 2 reasons for residents' to oppose solar farms</p> <p><b>Resource:</b> Accurate and relevant data from all resources are utilised to support all points. Responses may be further supplemented with own knowledge.</p> <p><b>Explanation:</b> Response contains good explanation of reasons for residents to oppose solar farms</p>
2	3-5	<p><b>Scope:</b> Covers at least 2 reasons for residents' support of solar farms</p> <p><b>Resource:</b> Accurate and relevant data from some resources are utilised to support some points. Resources may be further supplemented with own knowledge.</p> <p><b>Explanation:</b> Response contains explanation of reasons for residents to oppose solar farms. Some gaps in explanation.</p>
1	1-2	<p><b>Scope:</b> Covers only 1 reason for residents' support of solar farms</p> <p><b>Resource:</b> Limited or no specific details cited from resources.</p> <p><b>Explanation:</b> Response contains limited explanation of reasons for residents to oppose solar farms. Large gaps in explanation</p>
0	0	No creditworthy response.





CANDIDATE  
NAME

CG

INDEX NO

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**GEOGRAPHY**

**9751/02**

Paper 2

**18 September 2019**

INSERT

**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

This Insert contains all the Resources referred to in the questions.

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This document consists of **15** printed pages and **1** blank page.

Resource 1 for Question 1

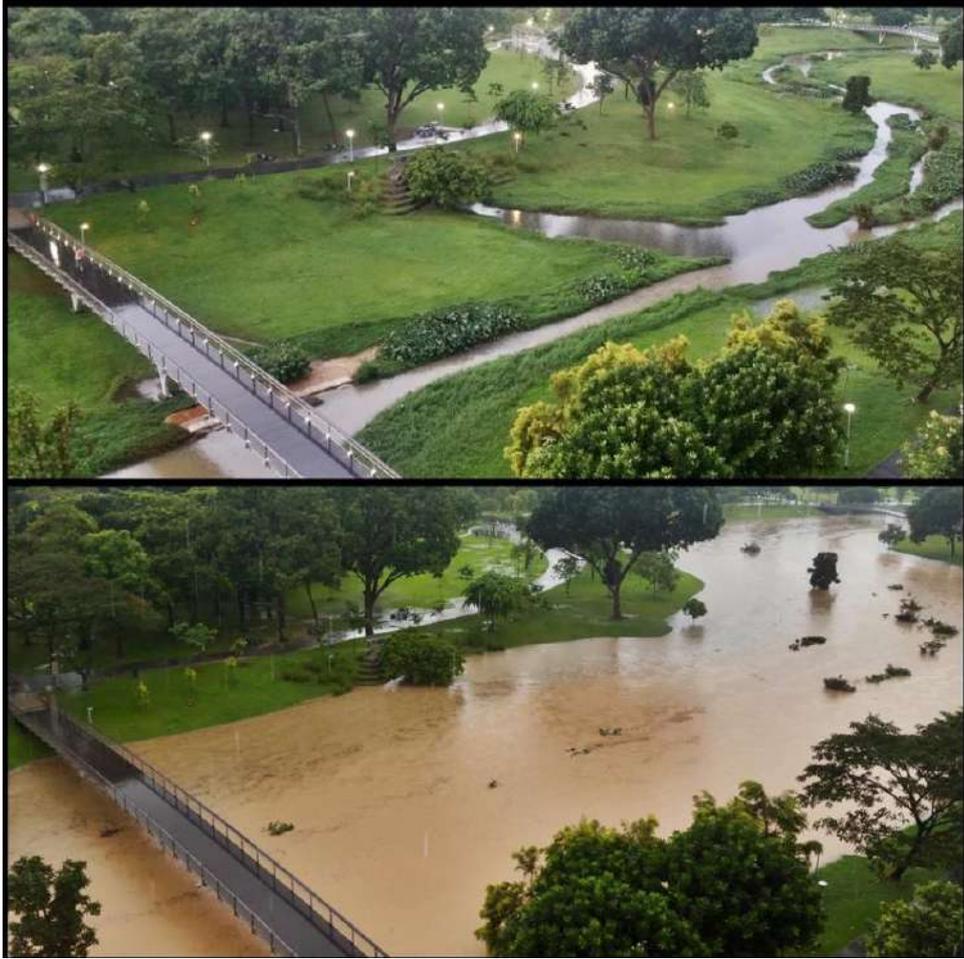
Photograph of the Kallang River at Bishan Park

The location where students conducted the observation studies is marked 'X'



Resource 2 for Question 1

Photographic evidence of the major flood incident in 2017 at Bishan Park



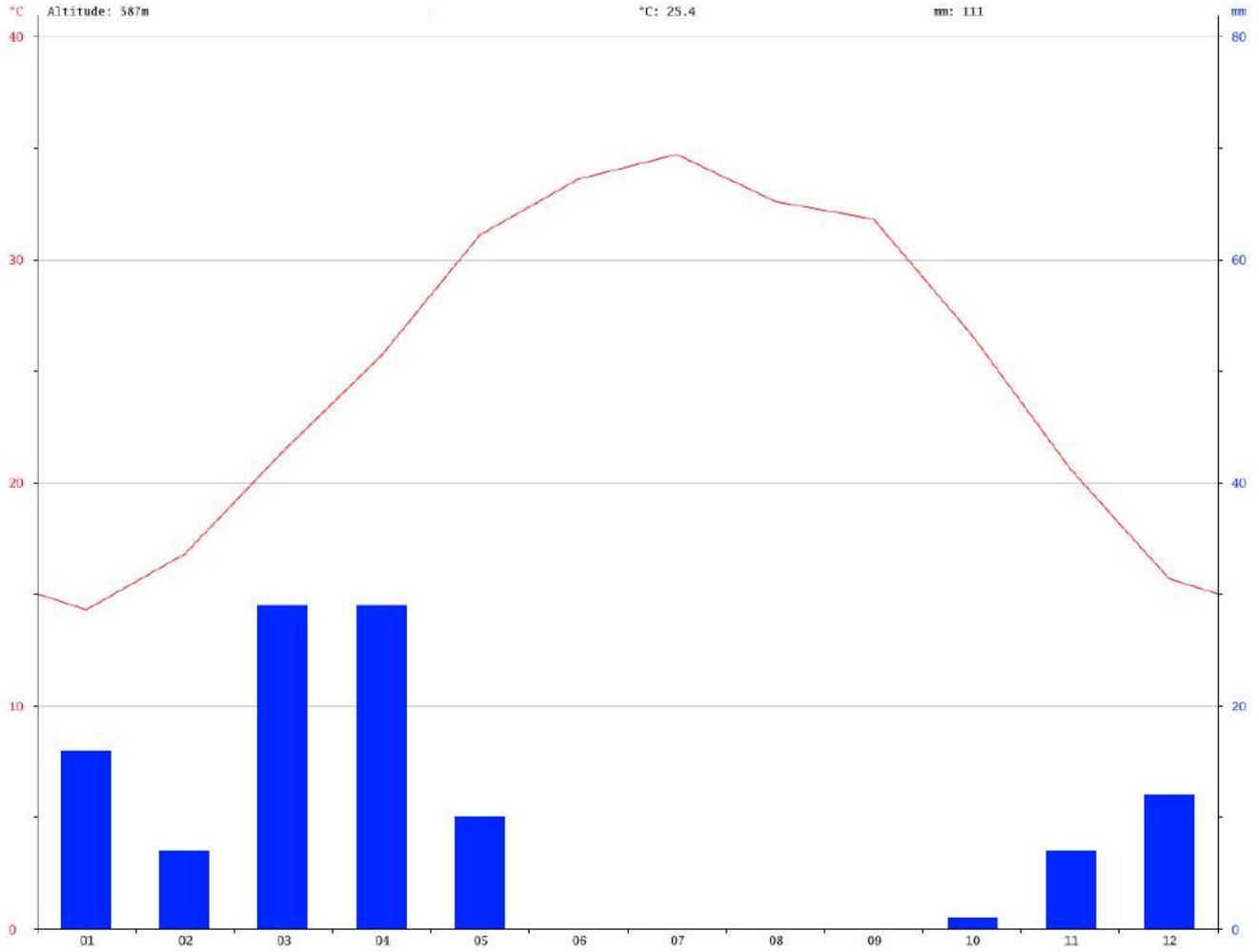
## Resource 3 for Question 1

## Data collected from the observation studies

TIME	LOCATION	HUMAN ACTIVITY	NUMBER OF PEOPLE
8.00am	Along the river	Jogging	Many people
9.00am	At the river	Playing in the river	A few young children and adults
10.00am	On the grass patch next to the river	Flying kite	5 teenagers

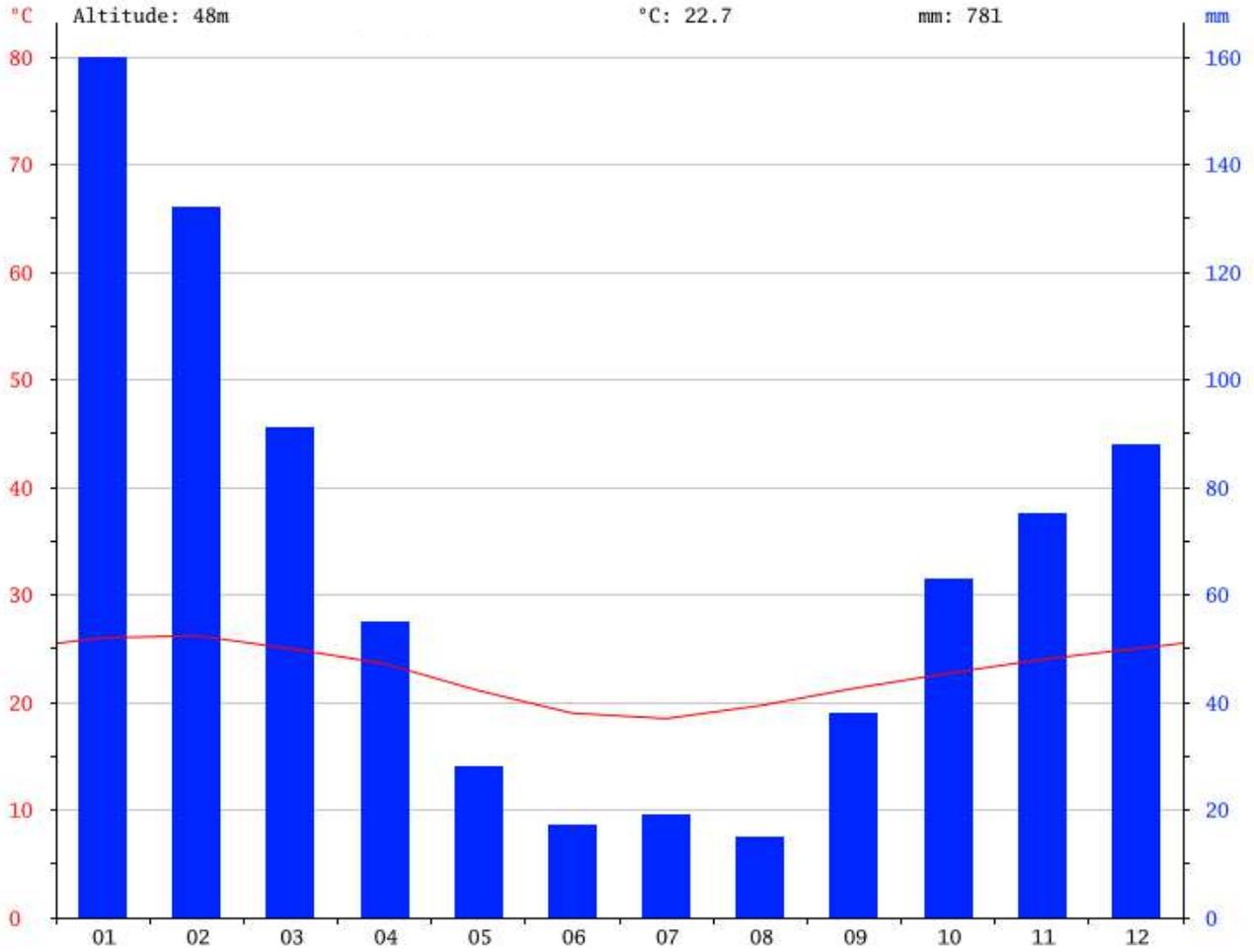
Resource 4 for Question 2

Climograph of Riyadh, Saudi Arabia



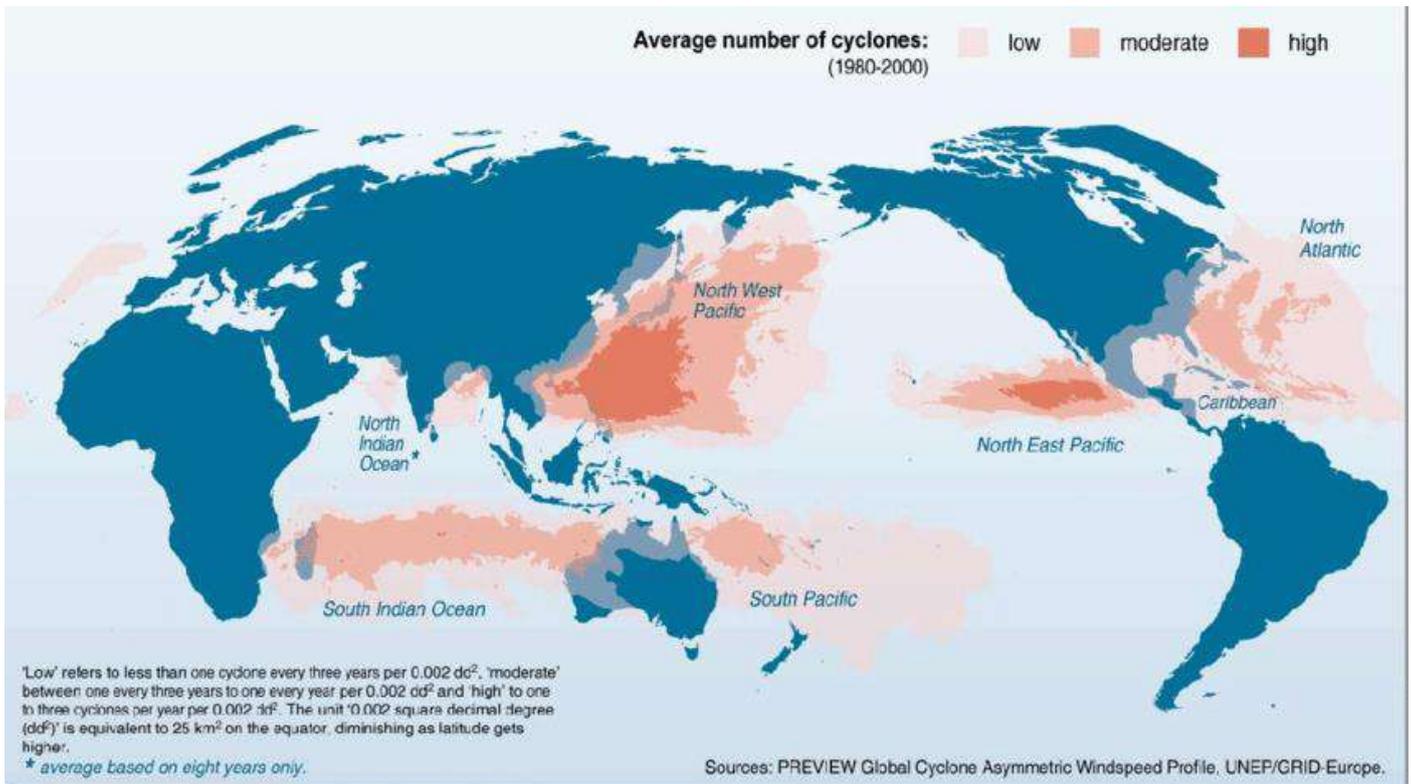
Resource 5 for Question 2

Climograph of Maputo, Mozambique



## Resource 6 for Question 2

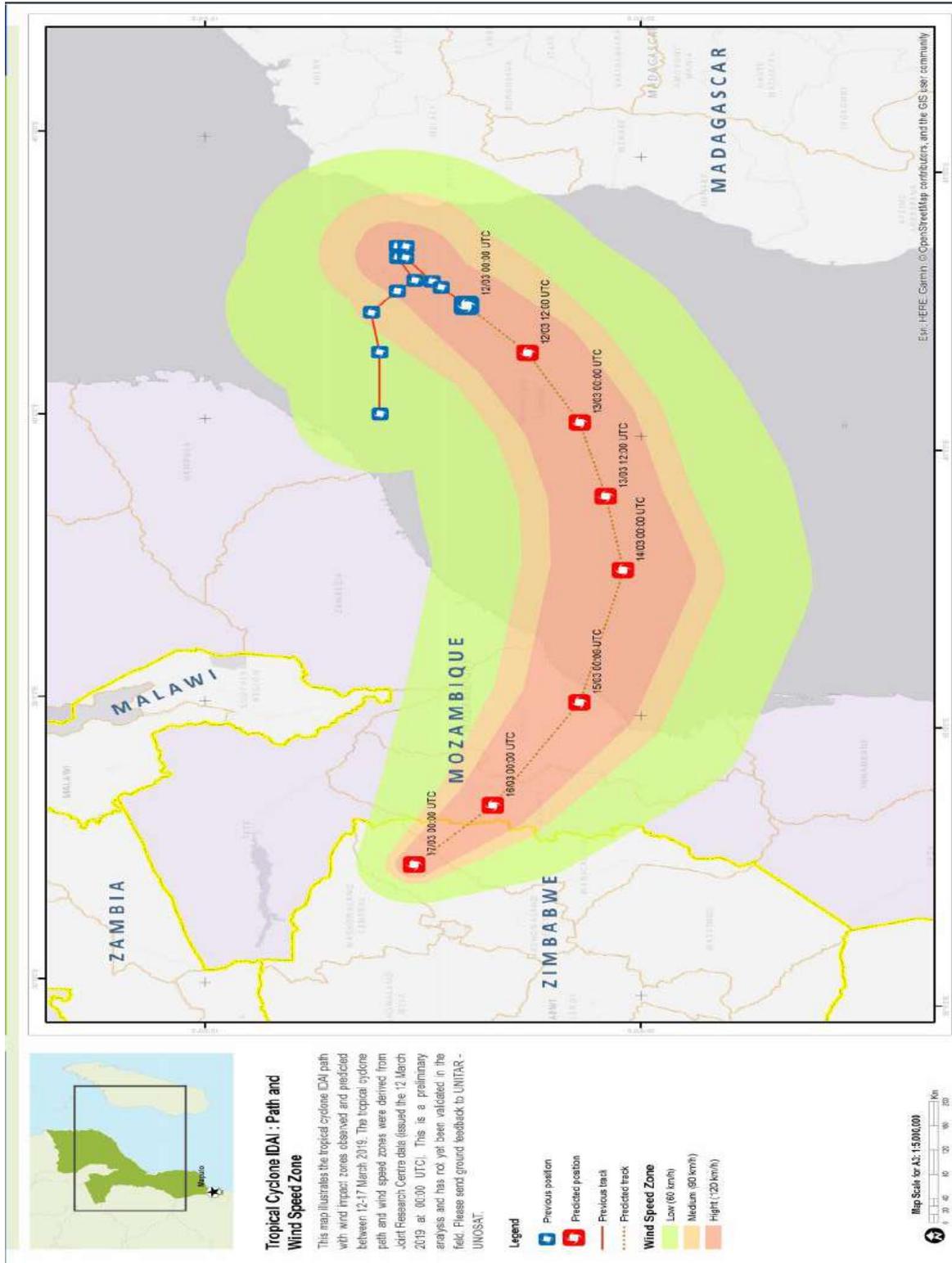
## Global distribution of tropical cyclones between 1980 and 2000



Note: 'Low' refers to less than one cyclone every three years per  $0.002\text{dd}^2$ , 'moderate' between one every three years to one every year per  $0.002\text{dd}^2$ , and 'high' is one to three cyclones per year per  $0.002\text{dd}^2$ . The unit '0.002 square decimal degree ( $\text{dd}^2$ )' is equivalent to  $25\text{km}^2$  on the equator, diminishing as latitude increases.

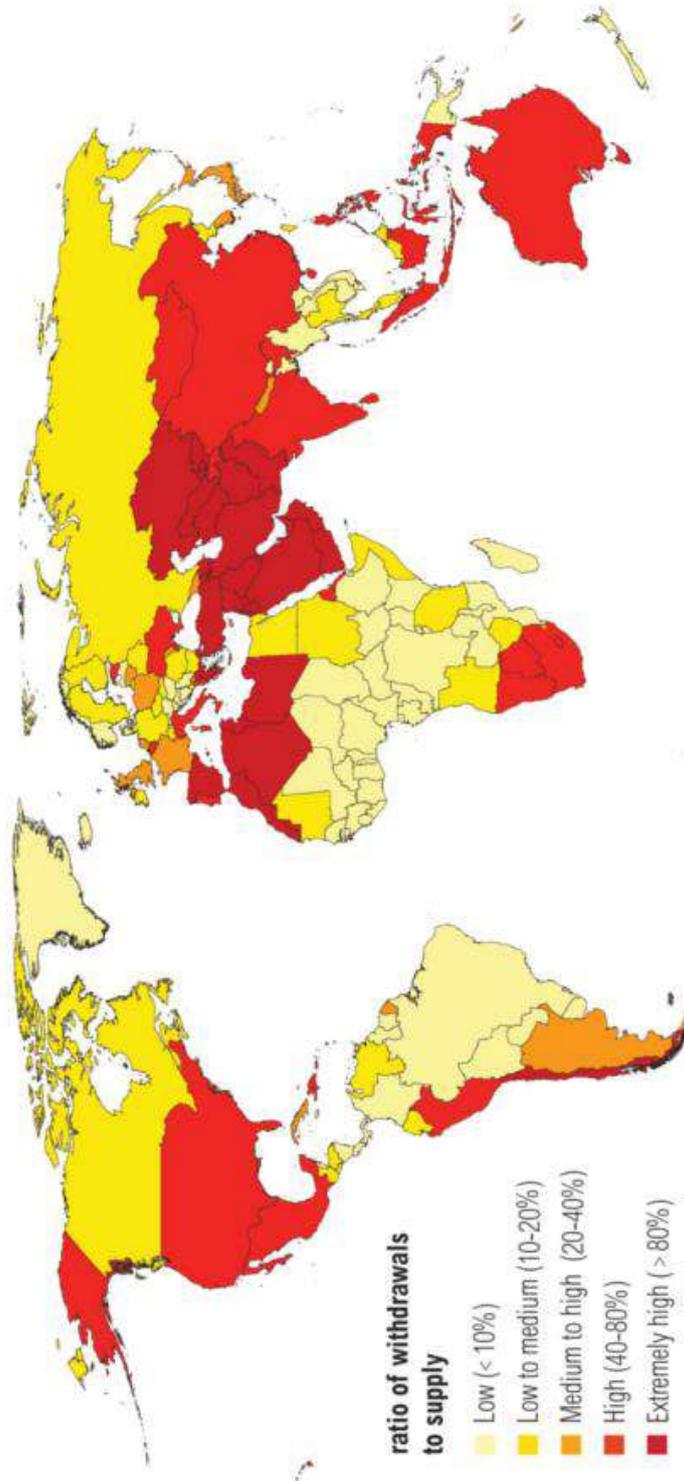
Resource 7 for Question 2

Path of Tropical Cyclone Idai



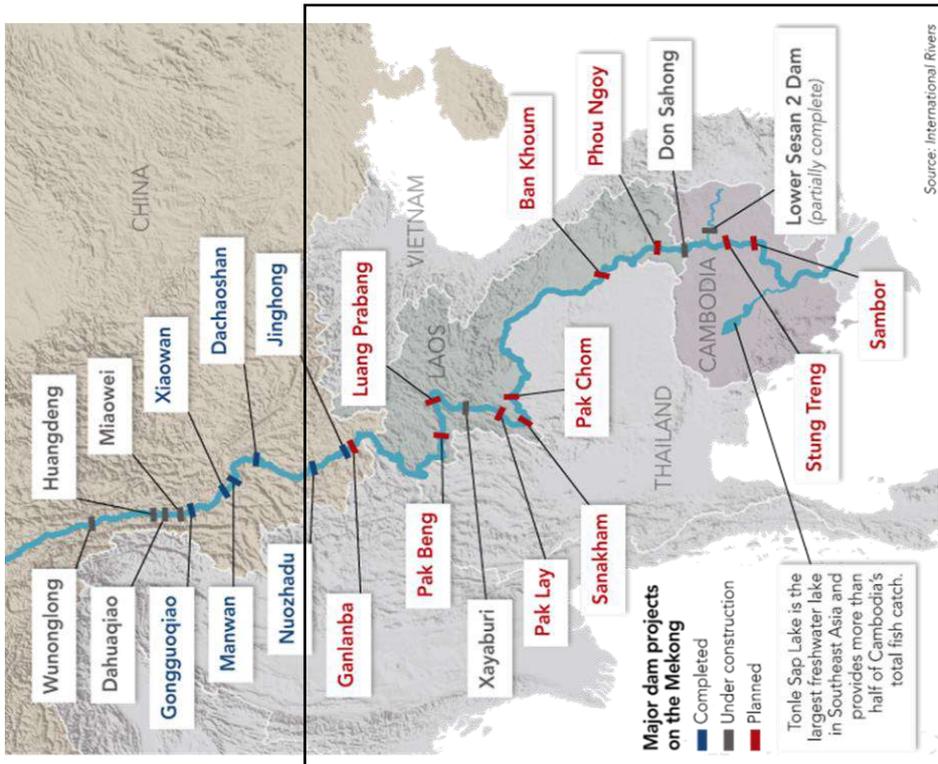
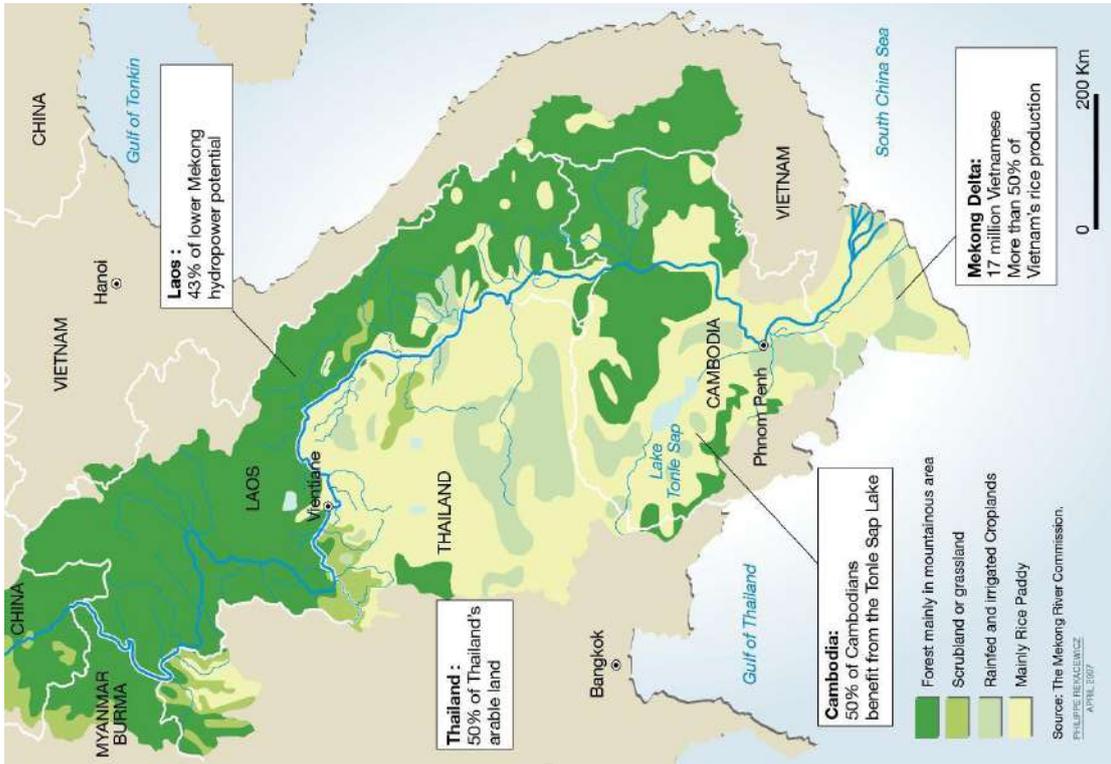
Resource 8 for Question 3

Projection of water stress by country in 2040



Resource 9 for Question 3

Dams along the Mekong River Basin



**Resource 10 for Question 3****Extract of an opinion piece on the Mekong River Commission**

Although Laos, Thailand, Cambodia and Vietnam pledged in 1995 to “cooperate in the maintenance of flows on the main stream”, the Lao have the whip hand; the Thai are ambivalent; and the downstream countries, Vietnam and Cambodia, can only protest ineffectively.

Matters became tense in 2011. In meetings of the Mekong River Commission (MRC), senior officials from the riparian states considered the proposal for the construction of a dam and hydropower plant near Xayaburi, a northern Lao town. Supported by Cambodia, Vietnam argued that the construction should be delayed pending further study of the downstream impacts of the dam. Though conscious of protests by environmentalists and farmers’ groups in their nation’s northeastern provinces, Thai officials were heavily swayed by the dam’s Thai developer and the dam’s beneficiary, the Thai national power company. Lao officials listened and declared that, having honored their nation’s obligations under MRC to hold a consultation session, they would greenlight the project.

It has been easy to detect China’s influence in the saga. The Chinese dam builders’ quest for new business on the middle Mekong merged nicely with their government’s pursuit of dominance over Southeast Asia. On the other hand, Lao leaders were charmed by the idea that their poor and landlocked nation could become “the battery of Southeast Asia,” and use revenues earned from the sale of hydropower to neighbouring states such as Thailand to fund its economic development.

Resource 11 for Question 4

Waste generation and Gross Domestic Product by Country



## Resource 12 for Question 4

## Top 10 Most Congested Cities in the United Kingdom in 2018

Rank	Urban area	Hours lost in congestion	Inner city last-mile travel time (minutes)	Inner city last-mile speed (mph)	Cost of congestion (per drive)*	Cost of congestion (per city)*
1	London	227	8	7	£1680	£4.9B
2	Birmingham	134	5	12	£994	£388.7M
3	Glasgow	99	5	13	£736	£320.4M
4	Manchester	156	6	10	£1157	£212.7M
5	Bristol	149	8	8	£1099	£212.0M
6	Edinburgh	165	8	7	£1219	£211.4M
7	Sheffield	149	6	10	£1101	£205.3M
8	Leicester	155	6	11	£1145	£182.9M
9	Leeds	143	5	12	£1057	£180.6M
10	Liverpool	119	6	9	£878	£174.6M

\* The cost of congestion per drive and per city was based on average hourly wage per capita, not household.  
 Extracted from INRIX on 13 August 2019

## Resource 13 for Question 4

**Excerpt of Citylab's article on London's Congestion Charge**

London's congestion charge turned 15 in February and it is showing its age. When the charge was introduced, no one foresaw the rapid proliferation of private hire vehicles like Uber. From 2013 to 2017, private hire vehicle registrations soared by over 75 percent: These cars are exempt from paying the congestion charge. A new approach to road pricing is needed to address the changes in the way people and vehicles move around the city and to generate much-needed funds for London's transport system.

Introduced in 2003, London's congestion charge is a simple system: a daily charge of approximately \$16.20 for entering the 13-mile square congestion charging zone between 7 a.m. and 6 p.m. on weekdays. Registered disabled people can travel for free, while congestion zone residents pay ten percent of the fee to enter the zone during those times.

By many important measures, the charge has been a success: The number of vehicles driving into Central London is a quarter lower than a decade ago. The charge has been particularly successful at deterring personal use cars from entering Central London: the number of private cars entering the zone fell 39 percent between 2002 and 2014.

Yet, competition for space on London's streets remains high. While the congestion charge discouraged some drivers, the number of private hire vehicles is up. With private hire vehicles exempt from paying the congestion charge, this leaves London without an effective means of managing the numbers of them on the capital's roads on weekdays. And London's busy roads also reflect lifestyle changes: data shows that people make fewer personal transit trips, and there are more deliveries and more cab rides.

Source: <https://www.citylab.com/transportation/2018/04/londons-congestion-charge-needs-updating/557699/>

Resource 14 for Question 4

2009 European Green City Index – London



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CANDIDATE  
NAME

CG

INDEX NO

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## GEOGRAPHY

**9751/01**

Paper 1

**4 September 2019**

**3 hours**

Additional Materials: Answer Paper

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### READ THESE INSTRUCTIONS FIRST

Write your name and class in the spaces at the top of this page.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid/tape.

The use of an approved scientific calculator is expected, where appropriate.

Answer **three** questions in total. **One** from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.

Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.

The world outline map may be annotated and handed in with relevant answers.

You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

**Start each question on a fresh sheet of paper.**

**Section A – Tropical Environments**

Answer **one** question from this section.

- 1 (a) Explain the various fluvial processes that might occur in the tropics. [12]
- (b) To what extent is river discharge the most influential factor in affecting channel morphology? [20]
- 2 (a) Explain how soils can form in the tropics. [12]
- (b) Discuss the extent to which climate is the most important factor in the formation of landforms and landscapes in the tropics. [20]

**Section B – Development, Economy and Environment**

Answer **one** question from this section.

- 3 (a) Explain the different ways of thinking about development in countries at varying levels of development. [12]
- (b) 'Transnational corporations bring about more harm than good to the economies they operate in.' Discuss. [20]
- 4 (a) Explain how resources can be classified around the world. [12]
- (b) 'Having an abundance of resources is more a misery than a blessing for low-income countries.' Evaluate the validity of this statement. [20]

## Section C – Sustainable Development

Answer **one** question from this section.

- 5 (a) Explain why the nature of sustainable development may be contested at different scales. [12]
- (b) Assess the extent to which countries have been able to achieve sustainable development through their responses to climate change. [20]
- 6 (a) Explain the variations in urbanisation at the global scale. [12]
- (b) 'Strategies to improve urban liveability have successfully met the needs of various social groups in cities.' Discuss. [20]

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CANDIDATE  
NAME

CG

INDEX NO

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## **GEOGRAPHY**

**9751/02**

Paper 2

**18 September 2019**

**3 hours**

Additional Materials: Answer Paper  
Insert

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### **READ THESE INSTRUCTIONS FIRST**

Write your name and class in the spaces at the top of this page.  
Write in dark blue or black pen.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, highlighters, glue or correction fluid/tape.

The use of an approved scientific calculator is expected, where appropriate.

Answer **all** questions.

The Insert contains all the Resources referred to in the questions.  
You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.  
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.  
The world outline map may be annotated and handed in with relevant answers.  
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

**Start each question (i.e. 1, 2, 3 and 4) on a fresh page.**

## Section A

## Theme 4: Geographical Investigation

- 1 A group of six students were tasked to carry out an investigation along the Kallang River at Bishan Park in Singapore to ascertain flood risk to residents in the surrounding housing estates.

The following hypothesis was selected for the investigation:

***The closer the houses are to the river, the higher the flood risk.***

The students obtained some background information about the river as part of the investigation. They learnt that since parts of the river channel has been naturalised in 2012, there has been one major flooding incident recorded in 2017. They collected photographic evidence of the incident from the local newspaper.

They also decided to observe the intensity of human activities at the park. They carried out the observation studies on a weekday morning from 8am to 10am at the location marked 'X' in Resource 1.

Resource 1 is a photograph of Kallang River at Bishan Park. Resource 2 is a photographic evidence of the major flooding incident in 2017 at Bishan Park. Resource 3 shows data collected from the observation studies.

- (a) Suggest an improved hypothesis and state **one** reason why it is better than the given hypothesis. [2]
- (b) With reference to Resource 3, explain **two** ways to improve the data collection method for the observation studies on the intensity of human activities at the park. [4]
- (c) With reference to Resources 1, 2 and 3, explain **two** risks that students could face and ways to mitigate them as they conduct the observation studies. [4]
- (d) In addition, the students decided to conduct a survey with the residents as part of their investigation. Design a questionnaire which they could use to conduct the survey. [6]
- (e) Evaluate the usefulness of Resources 2 and 3 in determining flood risk to the residents living near Bishan Park. [9]

**Theme 1: Tropical Environments****Tropical climates and tropical cyclones**

- 2 Resource 4 shows the climate of Riyadh, Saudi Arabia. Resource 5 shows the climate of Maputo, Mozambique. Riyadh is located at 24.7°N while Maputo is located at 25.9°S. Resource 6 shows the global distribution of tropical cyclones between 1980 and 2000. Resource 7 shows the path of Cyclone Idai in 2019.
- (a) Using Resources 4 and 5, compare and contrast the climates of Riyadh and Maputo. [4]
  - (b) With reference to Resources 4 and 5, account for the climates of Riyadh and Maputo. [6]
  - (c) Using Resource 6, describe the distribution of tropical cyclones between 1980 and 2000. [3]
  - (d) With reference to Resources 5, 6, 7 and your own knowledge, explain the atmospheric and surface conditions necessary for the development of tropical cyclones. [6]
  - (e) With reference to Resources 6 and 7 and your own knowledge, explain if the impact(s) of tropical cyclones can be successfully managed. [6]

**Theme 2: Development, Economy and Environment****Water Resource Management**

- 3** Resource 8 shows water stress by country, projected for 2040. Resource 9 shows the distribution of dams along the Mekong River Basin. The Mekong River extends from the Tibetan Plateau in China down to the Mekong Delta in Vietnam. Resource 10 is an extract of an opinion piece on the Mekong River Commission.
- (a)** Describe the distribution of projected water stress in Resource 8. [4]
- (b)** Briefly explain **two** possible causes of water stress in Resource 8. [2]
- (c)** Besides dams, explain **two** other strategies that countries may adopt to manage the projected water stress as shown in Resource 8. [4]
- (d)** Using Resource 9 and your own knowledge, explain the impact(s) of hydropower projects on the Mekong River Basin. [6]
- (e)** With reference to Resources 8, 9, 10 and your own knowledge, assess the effectiveness of strategy(s) in managing transboundary sources of water supply and their associated conflicts. [9]

**Theme 3: Sustainable Development****Issues in Sustainable Urban Development**

- 4 Resource 11 shows waste generation and gross domestic product (GDP) by country. Resource 12 shows the top ten most congested cities in the United Kingdom in 2018. Resource 13 shows an excerpt from a Citylab article on London's congestion charge. Resource 14 shows London's city portrait from the 2009 European Green City Index.
- (a) Describe the trend(s) observed in Resource 11. [4]
- (b) Using Resource 11, account for the pattern of waste generation. [6]
- (c) With reference to Resource 12, briefly explain **three** reasons for the occurrence of traffic congestion in these cities. [3]
- (d) With reference to Resource 12, explain **two** possible impacts arising from traffic congestion. [4]
- (e) Using Resources 12, 13, 14 and your own knowledge, assess the effectiveness of strategy(s) used to manage traffic congestion in urban areas. [8]

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