

# 2019

## JC2 H1 Geography

1.	ACJC	
2.	CJC	
3.	EJC	
4.	NYJC	
5.	SAJC	



# ANGLO-CHINESE JUNIOR COLLEGE

## JC2 H1 Geography Preliminary Examinations (2019)

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### H1 GEOGRAPHY

8813/01

Insert

30 August 2019

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 Insert consists of 8 printed pages.**

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**Resource 1 for Question 1**  
**Photos of Kallang area before and after development**

**Before:**



**After:**





**Resource 2 for Question 1**  
**Current land-use map of Kallang area**



**COMMUNITY FACILITIES**



Browsing required. Visit <https://dev.sportshub.com.sg/view/2555/community-facilities> to book your slots.

**Resource 3 for Question 1**  
**Sample of the survey questions crafted by the students**

## Survey Form on Kallang

**1. Age of interviewee \***

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**2. Kallang caters well to different groups of people. \***

*Mark only one oval.*

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

**3. Kallang meets my needs as a resident \***

*Mark only one oval.*

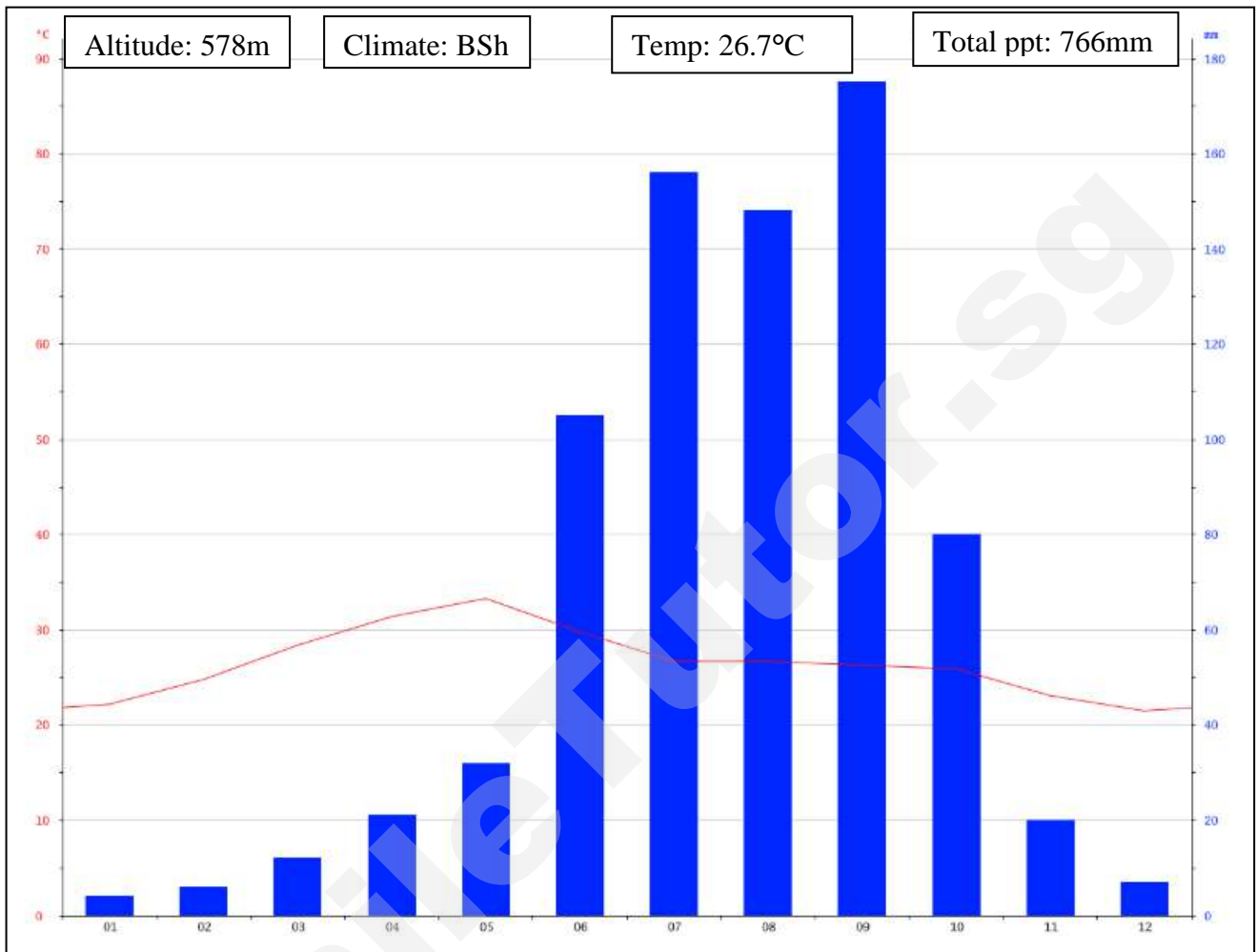
- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

**4. What are your main issues about living in Kallang? \***

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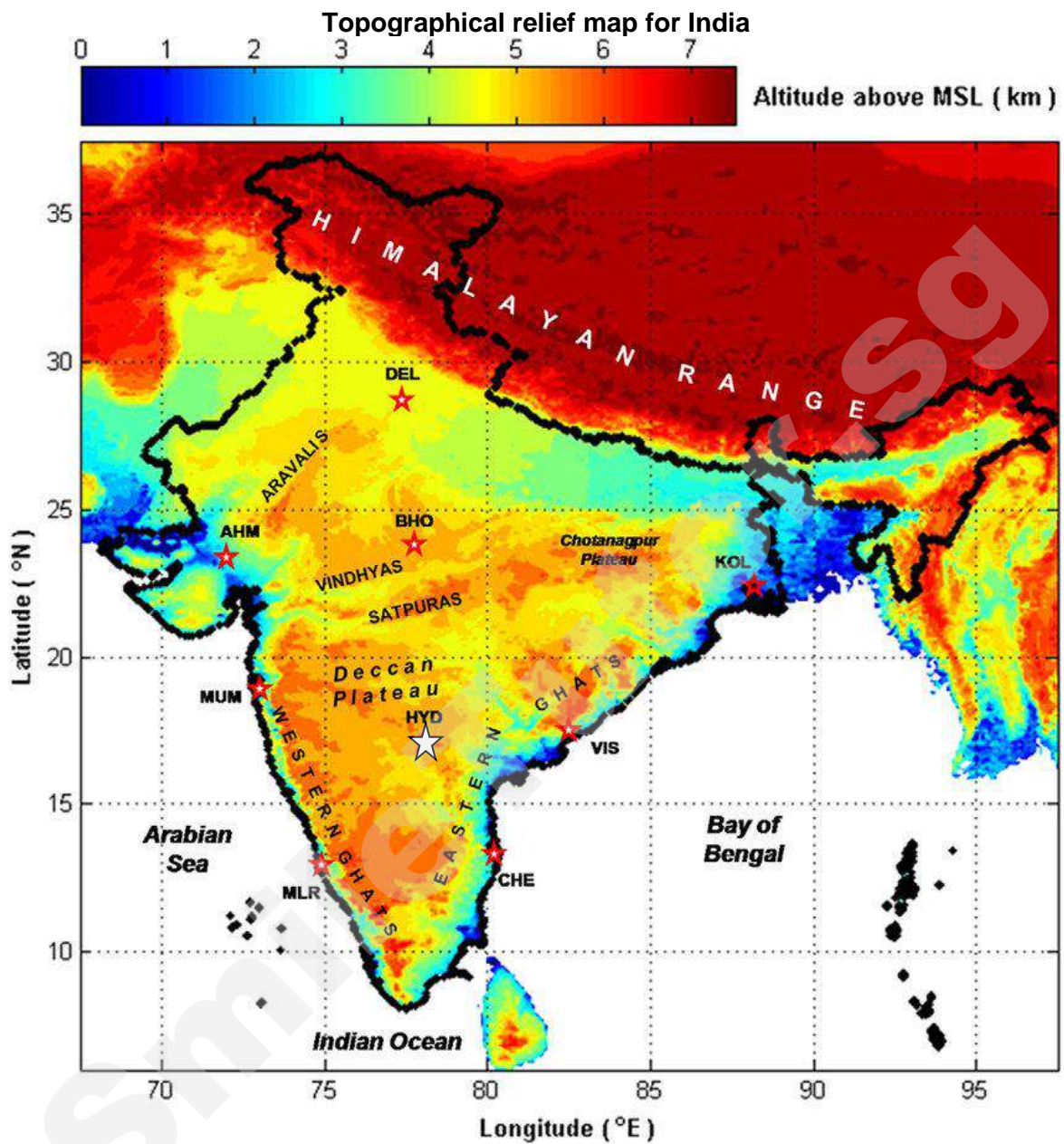
## Resource 4 for Question 2

## Climograph for Hyderabad, India





## Resource 5 for Question 2



## Resource 6 for Question 2

## Position of ITCZ in July and January



Legend:

☆ : Location of Hyderabad



## Resource 7 for Question 2

## Path taken by Cyclone Hudhud, 2014



Acknowledgement of Resources	
Resource 1:	<a href="https://roots.sg/Roots/learn/stories/kallang-a-trailblazer/story">https://roots.sg/Roots/learn/stories/kallang-a-trailblazer/story</a> <a href="https://www.archdaily.com/523365/singapore-sportshub-dparchitects/53b4e06cc07a803772000092-singapore-sportshub-dparchitects-image">https://www.archdaily.com/523365/singapore-sportshub-dparchitects/53b4e06cc07a803772000092-singapore-sportshub-dparchitects-image</a>
Resource 2:	<a href="https://www.sportshub.com.sg/map">https://www.sportshub.com.sg/map</a>
Resource 3:	ACJC Geography department
Resource 4:	<a href="https://en.climate-data.org/asia/india/hyderabad/hyderabad-2801/">https://en.climate-data.org/asia/india/hyderabad/hyderabad-2801/</a>
Resource 5:	<a href="https://www.researchgate.net/figure/Topographic-Map-of-India.jpg">https://www.researchgate.net/figure/Topographic-Map-of-India.jpg</a>
Resource 6:	<a href="https://courseware.e-education.psu.edu/courses/earth105new/graphics/L05_ITCZ.png">https://courseware.e-education.psu.edu/courses/earth105new/graphics/L05_ITCZ.png</a>
Resource 7:	<a href="https://smedia2.intoday.in/indiatoday/images/stories/2014October/hudhud-map_650_101314115826.jpg">https://smedia2.intoday.in/indiatoday/images/stories/2014October/hudhud-map_650_101314115826.jpg</a>

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# ANGLO-CHINESE JUNIOR COLLEGE

## JC2 H1 Geography Preliminary Examinations (2019)

### H1 GEOGRAPHY

8813/01

#### Paper 1

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 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 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.

At the end of the examination, your answers to each question should be securely fastened and separated into 4 bundles. The cover page must be attached as the top sheet to your answers to Section A.

This question paper consists of **4** printed pages of questions and **1** Insert.

[Turn over

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## Section A

## Theme 3: Geographical Investigation

- 1 The Kallang area occupies an important position in Singapore's culture and history, particularly due to the several iconic sports locations sited within its boundaries. The area has also hosted numerous high-profile sporting events.

A group of 25 students from a Junior College wanted to examine the accessibility of the Kallang area for different groups of people living in the neighborhood. The students took one week during their December vacation to conduct the study via site observations and the use of a questionnaire survey on 100 respondents, administered at the entrance of the Stadium MRT station. They also have access to secondary data including photos and a land-use map.

Resource 1 shows the photos of the Kallang area before and after development. Resource 2 shows the current land-use map of the Kallang area, including several flagship landmarks.

Resource 3 shows a sample of the survey questions crafted by the students.

- (a) Suggest a suitable research question for the students' investigation and explain two reasons why the research question is at a suitable scale. [5]
- (b) Explain how Resources 1 and 2 could provide information to investigate the accessibility of the Kallang area. [4]
- (c) With reference to Resource 2, explain how this group of students could minimize potential risks in their investigation. [3]
- (d) The group concluded that the results of their questionnaire survey may not be reliable. Using Resources 2 and 3, suggest how this process of data collection could be improved. [6]
- (e) The Urban Redevelopment Authority (URA) has asked the group to gather information to assess the success of urban reimagining of Kallang area. Outline how the group would go about collecting the information. [7]

[Turn over

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**Section B****Theme 1: Climate Change and Flooding****Climatic and flooding in Hyderabad, India**

- 2 Hyderabad is a city in India. Resource 4 shows the climograph of Hyderabad. Resource 5 shows the topographical relief for India in July. Resource 6 shows the position of the Inter-Tropical Convergence Zone (ITCZ) in July and January. Resource 7 shows the path of Cyclone Hudhud in 2014.
- (a) Using Resource 4, describe the climatic characteristics of Hyderabad. [3]
  - (b) Using Resources 5 and 6, account for the climatic characteristics of Hyderabad as shown in Resource 4. [5]
  - (c) With the aid of Resource 4 and a labelled diagram, explain the storm hydrograph of a river downstream of Hyderabad in August. [5]
  - (d) Using Resource 7, explain the formation of tropical cyclone. [4]
  - (e) Using Resource 7 and your own knowledge, evaluate the extent to which tropical cyclones contribute to flooding in the tropics. [8]

**[Turn over****Need a home tutor? Visit [smiletutor.sg](http://smiletutor.sg)**



### Section C

Answer **two** questions from this section.

Answer **either** Question 3 **or** Question 4, and **either** Question 5 **or** Question 6.

#### Theme 1: Climate Change and Flooding

- 3 (a) Explain the causes of contemporary climate change in countries at low levels of development. [9]
- (b) Discuss the effectiveness of different strategies in managing climate change. [16]
- 4 (a) Explain the role of climate in affecting the flows and stores of the hydrological cycle in the humid and arid tropics. [9]
- (b) 'Hard-engineering strategies are the most effective in managing floods.'
- How far do you agree with this statement? [16]

#### Theme 2: Urban Change

- 5 (a) Explain the reasons for the development of urban slums in countries at low levels of development. [9]
- (b) Discuss the challenges in managing non-hazardous solid waste in urban areas. [16]
- 6 (a) Explain how urban liveability can be measured in countries at high levels of development. [9]
- (b) To what extent does the social environment contribute to the extent of crowding in urban areas? [16]

[End

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# ANGLO-CHINESE JUNIOR COLLEGE

## JC2 H1 Geography Preliminary Examinations (2019)

### Mark Scheme / Suggested Answers

Question	Answer	Marks															
1(a)	<p>Suggest a suitable research question for the students' investigation and explain two reasons why the research question is at a suitable scale.</p> <p>Possible research question: How accessible is the Kallang area through public transport?</p> <p>Reasons why question is at a suitable scale</p> <ul style="list-style-type: none"> <li>• Suitable Scale: Time is adequate to obtain 100 questionnaires from the residents</li> <li>• Capable of Research: Groups have access to various sources of secondary data</li> <li>• OR students are able to craft a likert scale (existing methodology) to measure variables of accessibility</li> <li>• Clearly defined: accessibility as a variable can be measured/quantified</li> </ul> <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> <input type="checkbox"/> Response demonstrates clear knowledge and understanding of the different factors  <input type="checkbox"/> Uses relevant, detailed and accurate factual information from the resources to support the answer  <input type="checkbox"/> Reflects strong critical thinking skills  <input type="checkbox"/> Source(s) is well used to support the response. </td></tr> <tr> <td>2</td><td>3-4</td><td> <input type="checkbox"/> Research question is suitable and emphasis on accessibility is seen.  <input type="checkbox"/> Uses factual information and conceptual understanding that is generally relevant to the given context but lacks detail and may contain some inaccuracies.  <input type="checkbox"/> Displays critical thinking skills, but limited in response where answers are descriptive in parts. </td></tr> <tr> <td>1</td><td>1-2</td><td> <input type="checkbox"/> Response attempts to give a suitable research question but may not have a clear emphasis on accessibility.  <input type="checkbox"/> Answer lacks explanation of the reasons on why it is of suitable scale. </td></tr> <tr> <td>0</td><td>0</td><td> <input type="checkbox"/> No creditworthy response. </td></tr> </tbody> </table>	Level	Marks	Descriptors	3	4-5	<input type="checkbox"/> Response demonstrates clear knowledge and understanding of the different factors <input type="checkbox"/> Uses relevant, detailed and accurate factual information from the resources to support the answer <input type="checkbox"/> Reflects strong critical thinking skills <input type="checkbox"/> Source(s) is well used to support the response.	2	3-4	<input type="checkbox"/> Research question is suitable and emphasis on accessibility is seen. <input type="checkbox"/> Uses factual information and conceptual understanding that is generally relevant to the given context but lacks detail and may contain some inaccuracies. <input type="checkbox"/> Displays critical thinking skills, but limited in response where answers are descriptive in parts.	1	1-2	<input type="checkbox"/> Response attempts to give a suitable research question but may not have a clear emphasis on accessibility. <input type="checkbox"/> Answer lacks explanation of the reasons on why it is of suitable scale.	0	0	<input type="checkbox"/> No creditworthy response.	[5]
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0	0	<input type="checkbox"/> No creditworthy response.															

<b>1(b)</b>	<p>Explain how Resources 1 and 2 could provide information to investigate the accessibility of the Kallang area.</p> <p><u>Indicative content</u></p> <p>Resource 1:</p> <ul style="list-style-type: none"> <li>Shows the changes made in the area after development</li> <li>These changes can also affect liveability through the creation of an MRT station, corridors and roads which will increase the accessibility of the area.</li> </ul> <p>Resource 2:</p> <ul style="list-style-type: none"> <li>Shows a current land-use map of the Kallang area which displays the various roads that people can use to access the area</li> <li>There is also the MRT indicated which is in close proximity to the various sporting facilities found in the area.</li> <li>The whole area is also accessible through foot with walkways linking each of the different facilities.</li> </ul> <p><i>Point marked. Maximum 3m awarded if no data cited from resource.</i></p>	<b>[4]</b>
<b>1(c)</b>	<p>With reference to Resource 2, explain how this group of students could minimize potential risks in their investigation.</p> <p><u>Indicative content</u></p> <p>Risk: General safety</p> <ul style="list-style-type: none"> <li>Do a recce trip to map out places of potential hazards and places that can give first aid while looking for wet weather alternative routes too.</li> </ul> <p>Conditions</p> <ul style="list-style-type: none"> <li>Check weather forecast and to do data collection on another day if the event of bad weather and lightning alert</li> <li>Ensure that there is first-aider and first aid kit for the groups</li> <li>Wear proper footwear to protect from sharp objects</li> <li>Wear hats or use umbrella when the weather is too hot and have proper hydration</li> </ul> <p>Risk: Proximity to large water bodies</p> <ul style="list-style-type: none"> <li>Brief students regarding dangers of entering the water bodies found within the site.</li> </ul> <p>Risk: Timing of primary data collection</p> <ul style="list-style-type: none"> <li>Ensure that the data collection is done in the morning when it could be too hot and possible problem of dehydration</li> <li>Stop investigation before sunset as the late timing may lead to students reaching home very late, issues of safety</li> </ul> <p>Award 3 marks for a strategy to minimize the risk identified.</p>	<b>[3]</b>

<p><b>1(d)</b></p>	<p>The group concluded that the results of their questionnaire survey may not be reliable. Using Resources 2 and 3, suggest how this process of data collection could be improved.</p> <p>Indicative Content:</p> <p>Questions asked: Questions asked may not be relevant to their research.</p> <p>Data collected: The data collected may not be sufficient to provide a good overview of how Accessible Kallang . Can expand investigation to areas within the Kallang area.</p> <p>Timing: The collection of data is only done during the December holidays which may affect the accuracy of the results. To conduce the fieldwork on another day at the same timing so that it is more Representative.</p> <table border="1" data-bbox="289 772 1382 1283"> <thead> <tr> <th>Level</th><th>Marks</th><th>Descriptors</th></tr> </thead> <tbody> <tr> <td>3</td><td>5-6</td><td> <input type="checkbox"/> Response demonstrates accurate knowledge of data collection methods, issues with both accuracy and/or reliability of these and relevant improvements.  <input type="checkbox"/> Reflects a good understanding of the context of the investigation and of data collection techniques. </td></tr> <tr> <td>2</td><td>3-4</td><td> <input type="checkbox"/> Response demonstrates good knowledge of data collection methods.  <input type="checkbox"/> Provides an explanation of issues relating to reliability and/or accuracy with some reference to possible improvements.  <input type="checkbox"/> Description may be limited in depth and detail. </td></tr> <tr> <td>1</td><td>1-2</td><td> <input type="checkbox"/> Some reference is made to issues with accuracy and reliability but may recommend inappropriate or irrelevant improvements or provide incorrect explanation of methods.  <input type="checkbox"/> Response may be of limited relevance to the given context. </td></tr> <tr> <td>0</td><td>0</td><td> <input type="checkbox"/> No creditworthy response. </td></tr> </tbody> </table>	Level	Marks	Descriptors	3	5-6	<input type="checkbox"/> Response demonstrates accurate knowledge of data collection methods, issues with both accuracy and/or reliability of these and relevant improvements. <input type="checkbox"/> Reflects a good understanding of the context of the investigation and of data collection techniques.	2	3-4	<input type="checkbox"/> Response demonstrates good knowledge of data collection methods. <input type="checkbox"/> Provides an explanation of issues relating to reliability and/or accuracy with some reference to possible improvements. <input type="checkbox"/> Description may be limited in depth and detail.	1	1-2	<input type="checkbox"/> Some reference is made to issues with accuracy and reliability but may recommend inappropriate or irrelevant improvements or provide incorrect explanation of methods. <input type="checkbox"/> Response may be of limited relevance to the given context.	0	0	<input type="checkbox"/> No creditworthy response.	<p><b>[6]</b></p>
Level	Marks	Descriptors															
3	5-6	<input type="checkbox"/> Response demonstrates accurate knowledge of data collection methods, issues with both accuracy and/or reliability of these and relevant improvements. <input type="checkbox"/> Reflects a good understanding of the context of the investigation and of data collection techniques.															
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0	0	<input type="checkbox"/> No creditworthy response.															
<p><b>1(e)</b></p>	<p>The Urban Redevelopment Authority (URA) has asked the group to gather information to assess the success of urban reimagining of Kallang area. Outline how the group would go about collecting the information.</p> <p><u>Indicative Content:</u></p> <p>Developing a plan:</p> <ol style="list-style-type: none"> <li>1. Data: establish the data needed to prove the hypothesis, e.g. primary &amp; secondary data (quantitative &amp; qualitative) of will have to be collected</li> <li>2. Timing: Candidates to decide the length of time</li> </ol> <p>Data Collection:</p> <ol style="list-style-type: none"> <li>1. Sampling method: systematic sampling with the selection of five sites around the various parts of the Kallang area.</li> <li>2. Candidates can conduct bi-polar surveys or interviews to gather data of residents opinion regarding the Kallang area.</li> <li>3. Candidates can consider the use of vehicle count and pedestrian count. Consider research ethics: e.g. to obtain permission to conduct the investigation in Kallang, consideration for the public especially near walkways and roads; minimize noise disturbance, avoid littering</li> </ol>	<p><b>[7]</b></p>															



Consider limitations: e.g. the sample size, the lack of time and data collected not be conclusive.  
Present and analyse data collected: establish a data representation method e.g. bar graph to see the opinion of the public.

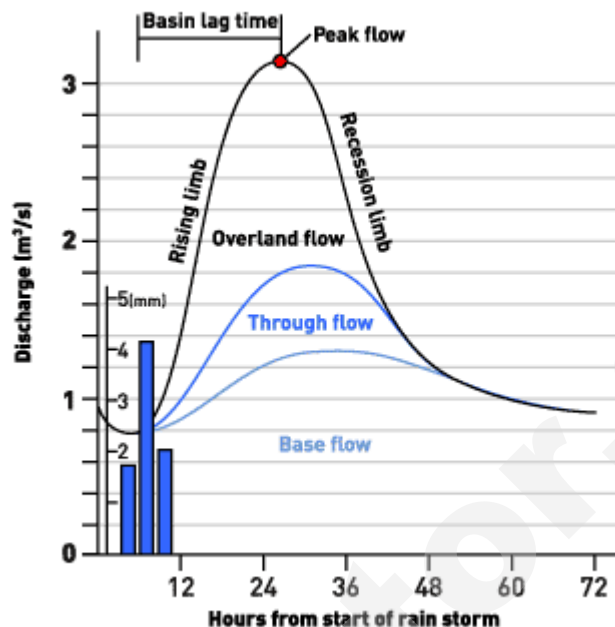
Level	Marks	Descriptors
3	6-7	Response demonstrates accurate knowledge of geographical investigation methods. Outlines a relevant and coherent plan with reference to data collection, methods, investigation limitations and risk mitigation strategies. Response is relevant to context of question throughout
2	4-6	Response demonstrates some knowledge of geographical investigation methods. Outlines a clear plan with some reference to data collection, methods, investigation limitations and risk mitigation strategies. Response is mostly relevant to context of question but may lack clarity and coherence.
1	1-3	Response demonstrates limited or no knowledge of geographical investigation methods. Outline of plan is limited and may not refer to one or more of the facets of an investigation in their outline plan. Much of the response may not be relevant to context of question.
0	0	No creditworthy response.

Question	Answer	Marks
2(a)	<p>Using Resource 4, describe the climatic characteristics of Hyderabad.</p> <p><u>Indicative content</u></p> <p>Temperature:</p> <ul style="list-style-type: none"> <li>High annual temperature of 26.7°C with small temperature range of 10°C from 23°C to 33°C.</li> </ul> <p>Precipitation:</p> <ul style="list-style-type: none"> <li>Relatively low annual precipitation of 766mm.</li> </ul> <p>Seasonality:</p> <ul style="list-style-type: none"> <li>Strong seasonal pattern with distinct wet and dry season</li> <li>Wet season: From June to October, with total precipitation amounting to 400mm which is more than half of the year's precipitation in 5 months</li> <li>Dry season: From November to May, where average rainfall per month in the dry season is 10mm or less</li> </ul> <p><i>Point marked. Maximum 2m awarded if no data cited from resource.</i></p> <p><b>Examiner comments:</b></p> <ul style="list-style-type: none"> <li>Candidates were generally able to do well for this question, citing data and supporting their answers.</li> <li>There were only a few candidates who tended to over-generalise their answers, causing a loss in credit in their answers.</li> </ul>	[3]
2(b)	<p><b>Using Resources 5 and 6, account for the climatic characteristics of Hyderabad as shown in Resource 4.</b></p> <p>Candidates are expected to use Resource 5 discuss the continental location of Hyderabad, and to use the ITCZ in Resource 6 to account for the variation in temperature and rainfall of Hyderabad shown in Resource 4.</p> <p><u>Indicative content:</u></p> <ul style="list-style-type: none"> <li>ITCZ's position is near Hyderabad in July as seen in Resource 6.</li> <li>With ITCZ near Hyderabad, it indicates that there is high insolation resulting in high temperature of up to 33°C, accounting for high convectional rainfall.</li> <li>With ITCZ also near Hyderabad, there is a low pressure zone, causing winds to converge on the region. This results in moisture-laden onshore winds moving towards Hyderabad, resulting in high rainfall of up to 80mm experienced in the months around July.</li> <li>When the ITCZ migrates to the southern hemisphere as seen in Resource 6, the northeast Trade winds from the high pressure belt blow southwards as in dry continental winds blowing across Hyderabad and going offshore, causing the dry</li> </ul>	[5]

	<p>season in the months between November and March as seen in Resource 4. This can also account for the drop in average temperature over the region as seen in Resource 4, with temperatures dropping to around 22°C.</p> <ul style="list-style-type: none"> <li>Hyderabad's location, being more inland as seen in Resource 5, results in it not experiencing high moisture levels experienced by coastal regions.</li> <li>The topography of the regions prevents it from experiencing high rainfall as it is in the rainshadow of the Ghats in India.</li> </ul> <p><i>Level marked. Candidates are graded according to the level descriptors as shown below</i></p> <p><b>Examiner comments:</b></p> <ul style="list-style-type: none"> <li>Generally, candidates tend to be generic in their explanation, and do not go into the details, which causes lapses in their explanation resulting in a loss of credit.</li> <li>Given the data provided, there were many candidates who did not refer to the data for information to support their answers and claims, which also resulted in a loss of credit.</li> <li>Stronger candidates tend to base their answers on the data provided, and make links to their explanation, which resulted in them getting more credit.</li> </ul>	
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	Level	Marks	Descriptors	
	3	4-5	<input type="checkbox"/> Response demonstrates clear knowledge and understanding of the conditions relating to temperature and precipitation in Hyderabad, India. <input type="checkbox"/> Uses relevant, detailed and accurate factual information from the resources to support the answer (Resource 4 to cite temperature and precipitation, Resource 5 to cite inland location, Resource 6 to cite ITCZ position). <input type="checkbox"/> Reflects strong critical thinking skills, demonstrated through linking how altitude and ITCZ can affect temperature and precipitation <input type="checkbox"/> Source(s) is well used to support the response.	
	2	3-4	<input type="checkbox"/> A satisfactory response which is generally sound and contains relevant points relating to temperature and precipitation in Hyderabad, India, but may not always focus on Hyderabad and may tend to be more general <input type="checkbox"/> Uses factual information and conceptual understanding that is generally relevant to the given context but lacks detail and may contain some inaccuracies. <input type="checkbox"/> Displays critical thinking skills, but limited in response where answers are descriptive in parts. <input type="checkbox"/> Source(s) is used to support parts of the response.	
	1	1-2	<input type="checkbox"/> Response shows a poor understanding of climatic conditions in Hyderabad. <input type="checkbox"/> Uses basic factual information and conceptual understanding which has some, but limited, relevance to the question. <input type="checkbox"/> Answer lacks explanation, and tend to be more descriptive of the climatic conditions but without any explanation. <input type="checkbox"/> Source(s) is not used or not accurately used to support the response. <input type="checkbox"/> Provides little or no evaluation.	
	0	0	<input type="checkbox"/> No creditworthy response.	
2(c)	<b>With the aid of Resource 4 and a labelled diagram, explain the storm hydrograph of a river downstream of Hyderabad in August.</b>  Candidates are required to draw a storm hydrograph of Hyderabad, based on the information provided by the resource.  <u>Sample labelled hydrograph diagram:</u>			[5]





Marker to note: Parts circled in red are components that need to be labelled. Units to be included, with the main components as listed below included:

- Precipitation bar graph
- Rising Limb
- Recession Limb
- Lag Time

Explanation of hydrograph:

High peak rainfall: Due to the high rainfall experienced in August of 145mm, there will be high peak rainfall experienced during storm events.

Short lag time: Due to high rainfall experienced, coupled with Hyderabad bring an arid climate, there will be a short lag time due to rapid runoff and low infiltration of water into the sub-surface.

Flashy hydrograph: Due to lack of infiltration, the rising limb of the hydrograph will be steep, as overland flow (likely the Hortonian type) is quickly channelled to the mouth of the river.

*Point marked. Award 2m for correctly labelled hydrograph, 1m each for explanation of Hydrograph. Maximum 4m awarded if no data from Resource 4 used to substantiate answer.*

**Examiner comments:**

- With this question being on the hydrograph, there were only a few candidates who managed to score well due to the lack of adequate accurate labels on the hydrograph sketch.

	<ul style="list-style-type: none"> <li>Most candidates attempted to explain the hydrograph and reasons for the various parts, but were unable to provide adequate complete explanations that resulted in a loss of credit.</li> <li>There were some candidates that, perhaps due to being unsure of their concepts, attempted to write down everything they know about hydrology in their answers. To remind candidates that such practices are frowned upon, and for candidates to think through their answers before committing to it.</li> </ul>	
<b>2(d)</b>	<p><b>Using Resource 7, explain the formation of tropical cyclone.</b></p> <p>Candidates are to explain the process of cyclone formation with the aid of Resource 7.</p> <p><u>Indicative content:</u></p> <ul style="list-style-type: none"> <li>Cyclones are initially formed far from land, over large water bodies where there is sufficient depth of water for latent heat to be released for energy to drive the formation and increase in strength of the cyclone. This is seen in Resource 7 by the cyclone initially forming at the South-East area off the coast of India.</li> <li>Cyclones will initially gain heat and start to gather air mass around it. This results in it gaining wind speeds, and move towards mainland India as air moves from high pressure to low pressure. This can be seen in Resource 7 as the windspeed of the cyclone increases as it moves inland, up to 64 knots.</li> <li>In addition, the cyclone must be formed away from the equator for the Coriolis effect to take effect. This causes the cyclone to deflect to the right as it moves into the northern hemisphere. This can be seen in Resource 7 as the cyclone deflects to the right as it moves from its origin to continental India.</li> <li>Eventually, as the cyclone makes landfall, it will lose its speed due to the absence of warm water bodies, resulting in a drop in wind speed as seen in Resource 7.</li> </ul> <p><i>Point marked. Award 1m for each observation, 1m for data that supports the observation. Maximum 4m awarded if no data cited from the resource.</i></p> <p><b>Examiner comments:</b></p> <ul style="list-style-type: none"> <li>Generally, this question was well done by most candidates, with almost all candidates who attempted it getting a minimum of 3 marks.</li> <li>Candidates have to take note to use the information from the data to support their answers, which is something that resulted in them losing credit in their answers when they do not actively refer to data provided.</li> </ul>	<b>[4]</b>
<b>2(e)</b>	<p><b>Using Resource 7 and your own knowledge, evaluate the extent to which tropical cyclones contribute to flooding in the tropics.</b></p> <p>Candidates have to first discuss the impact of tropical cyclones on communities, and how the occurrence of cyclones can contribute and cause flooding to happen in the tropics. Stronger candidates are able to provide case studies to substantiate their answers, and</p>	<b>[8]</b>

	<p>to provide other factors that may also cause flooding to corroborate their stand on how cyclones do or do not cause flooding.</p> <p><u>Indicative content: Causes of flooding</u></p> <p>Note that points listed are not exhaustive, and are only selected points that candidates may have chosen to expound upon.</p> <p>Cyclones:</p> <ul style="list-style-type: none"> <li>• The onset of cyclones, due to its onshore nature of the wind, carries with it a huge amount of moisture.</li> <li>• When making landfall, the moisture condenses into water droplets, and eventually falls to the ground as precipitation.</li> <li>• The huge amount of precipitation falling on the area may result in overland flow to form as a result of subsurface stores becoming saturated, preventing any more water from infiltrating into the subsurface.</li> <li>• From Resource 7, it is apparent that when cyclones make landfall, they bring with them heavy moisture and precipitation as seen when Hudhud made its landfall onto India, after picking up moisture across the Bay of Bengal.</li> <li>• Some examples of cyclones that cause flooding at Cyclone Hudhud in 2014, which resulted in coastal India being flooded, and Cyclone Nargis in 2008, which afflicted many areas in Myanmar causing widespread flooding</li> </ul> <p>Subsidence of land</p> <ul style="list-style-type: none"> <li>• In many areas in the world, local communities rely on groundwater for their source of drinking water for their daily use.</li> <li>• As communities increase in population, the demand for freshwater also increases, resulting in an increased drawing of groundwater through wells.</li> <li>• This increased in drawing of groundwater causes subsidence of the land, causing the ground to be more susceptible to flooding as the land may now be below the previous flood levels and even below sea level.</li> <li>• Some examples of this include Bangkok, Thailand, and Jakarta, Indonesia, where the increased drawing of water in these cities as a result of increased consumption needs result in subsidence of up to 30cm per year occurring in some areas of Bangkok.</li> </ul> <p>Land use change</p> <ul style="list-style-type: none"> <li>• With cities becoming increasingly urbanised, more land is being cleared for large buildings to be built.</li> <li>• This increase in buildings in cities result in more impermeable land being created, as cement and other material are used to cover up the previously permeable ground.</li> <li>• As a result, with more impermeable surfaces due to urbanisation, cities are now more susceptible to floods as water cannot infiltrate into the ground as easily.</li> <li>• This lack of infiltration results in more water pooling on the surface, resulting in higher flood risk from occurring.</li> </ul>	
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- Some examples of such include Singapore, where the huge extent of impermeable land as a result of concrete surfaces has seen an increase in the number of flash floods.

#### Presence of man-made structures

- In order to manage floods, local authorities and governments have been advocating for the construction of hard flood protective measures.
- Some of these measures may help to manage floods, but on the other hand may cause a worsening of floods in other regions.
- For example, the construction of the Xayaburi dam in the Mekong may bring benefits to the community due to its hydroelectrical power generation, but the presence of the dam disrupts the flow of the river.
- Upstream areas of the dam are flooded as water is accumulated, causing a rise in water level. Similarly, downstream areas are also flooded when water is being released into the downstream sections, causing floods to occur.

#### Climate change

- With climate changing around the world, the increase in temperatures globally also has an effect on local weather conditions.
- With increase in temperature, there is more air instability.
- This increase in air instability may result in more rainfall happening, as the increase air instability may result in more air rising, causing more precipitation to happen over the area.
- The increase in precipitation may cause heavy flooding over the area, when rainfall intensity is higher than that of infiltration capacity.

#### Levels marked using H1 Generic Level Descriptors

H1 Generic Level Descriptors for 8m DRQ on Themes 1 and 2

Level	Marks	Descriptors
3	7–8	Response demonstrates 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. Source(s) is well used to support the response. <ul style="list-style-type: none"> <li>Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints</li> </ul> OR <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	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 relevant 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>Provides an evaluation, which may be limited in depth and insufficient evidence and support used</li> </ul> OR <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 or exemplified.</li> </ul>
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 <ul style="list-style-type: none"> <li>Provides little or no evaluation</li> </ul> OR <ul style="list-style-type: none"> <li>Evidence of decision-making, if present, are simple and may be flawed and contains no reference to views of stakeholders</li> </ul>
0	0	No creditworthy response.

#### Examiner comments:

- Candidates need to be mindful of the need to explain the given factor (tropical cyclones) first, as the lack of explanation of the given factor may result in a loss of credit in their answers.



	<ul style="list-style-type: none"> <li>• In addition, there were candidates that did not explain clearly how tropical cyclones lead to floods. Candidates need to be clear of the gaps and links in their explanation, to ensure that they receive maximum credit in their answers.</li> <li>• Candidates also need to be mindful to use and refer to data from the question, as a lack of reference to the data may cause a loss in credit.</li> </ul>	
<b>3(a)</b>	<p><b>Explain the causes of contemporary climate change in countries at low levels of development.</b></p> <p>In this question, candidates are to explain what causes climate change in our current context, and in particular reference it to countries at low level of development. Candidates must also recognise the difference in natural and anthropogenic causes of climate change, and be able to expand on the term contemporary and refer it to anthropogenic recent causes.</p> <p>Stronger candidates are able to bring in relevant examples and case studies to substantiate their claims.</p> <p><u>Indicative content:</u></p> <ul style="list-style-type: none"> <li>• Increase in atmospheric carbon: Burning of fossil fuels / coal for energy <ul style="list-style-type: none"> <li>○ LDCs require energy to fuel their development, be it for transport (petrol), cooking (coal or LPG/LNG), electricity generation and other means.</li> <li>○ The burning of fossil fuels for such purposes generates a release of carbon dioxide and carbon monoxide, all of which are greenhouse gases.</li> <li>○ With the increase in consumption of fossil fuels, there is a corresponding increase in greenhouse gas release into the atmosphere, which results in more heat being trapped.</li> <li>○ This causes global temperature averages to increase, bringing about climate change.</li> <li>○ Some examples of these include China, which burns huge amounts of coal for its domestic energy use.</li> </ul> </li> <li>• Increase in greenhouse gas concentration: Deforestation <ul style="list-style-type: none"> <li>○ Land in LDCs are cleared, with trees being cut down, either for resources (timber, wood) or to clear land for development.</li> <li>○ Trees and vegetation undergo a process known as photosynthesis, which takes in carbon dioxide, a greenhouse gas, and releases it back into the atmosphere as Oxygen.</li> <li>○ With the reduction in tree cover, there is less photosynthesis occurring in the region, resulting in more carbon dioxide present in the atmosphere. As carbon dioxide is a greenhouse gas, this results in an increase in global temperatures, leading to climate change.</li> <li>○ In addition, with the exposure of the land to atmospheric heat and air, there will be more oxidation of the soil.</li> <li>○ This oxidation will result in a release of sub-surface carbon into the air, causing an increase in carbon which will react with oxygen to form carbon dioxide.</li> <li>○ These two processes act together as a result of deforestation, which results in global increase in temperature.</li> </ul> </li> </ul>	<b>[9]</b>

	<ul style="list-style-type: none"> <li>○ One such example is that of the Amazon rainforest, where large swathes of land are being cleared not just for timber to be exported, but also for forests to be converted for agricultural purposes.</li> <li>○ In the process of forest clearance with minimal effort and financial cost, slash and burn is practised, for example in many parts of Southeast Asia, particularly in Indonesia and Malaysia. Combustion of this type of organic fossil fuel adds more greenhouse gases into the atmosphere.</li> <li>○ Locations with large tracts of forest lost include the Amazonian forest (resulting from land clearance for cattle ranching and cash crops like soy bean and oil palm), and in Southeast Asia to cater to the needs of the growing population for housing, industries, and cash crops like oil palm.</li> <li>● Change in land use: Urbanisation <ul style="list-style-type: none"> <li>○ Urbanisation is the process where cities undergo a rapid transformation from rural low level built up areas to huge areas of concrete buildings.</li> <li>○ When more buildings are built up in a city, it creates two effects: increase in energy consumption, and a change in local climate (urban heat island)</li> <li>○ With more energy required to sustain the needs of the city, there will be an increase in burning of fossil fuels to generate electricity. This results in an increase in the overall carbon dioxide levels in the atmosphere, which will correspond to an increase in the global temperatures experienced by the city.</li> <li>○ In addition, with more concrete buildings present, there will be more heat retention on the surface, resulting in surface temperatures increasing. This will lead to an increase in surface temperatures, which will have a knock-on effect on the atmosphere.</li> <li>○ One such example of a city that experiences the urban heat island effect is that of Singapore. With a highly urbanised environment, Singapore has been heating up rapidly, with our mean annual temperature increasing year on year, having the highest recorded temperature seen in 2017.</li> </ul> </li> <li>● Change in land use: Irrigation, agriculture, and dams <ul style="list-style-type: none"> <li>○ With agricultural processes becoming more streamlined, there is an increase in more structured irrigation systems being developed.</li> <li>○ This creates a need for large water bodies to be built via the process of reservoirs and dams for the purposes of agriculture.</li> <li>○ With such large bodies of water, the local albedo factor and number is altered, causing a change in local climate.</li> <li>○ Having large amounts of water will also result in an enhancement of local evaporation and transpiration rates.</li> <li>○ This change in local evaporation and transpiration rates, coupled with the difference in albedo, may result in an alteration of the formation of clouds, resulting in climate change.</li> <li>○ The large dams in the tropics are often formed through the drowning of large extensive tracts of tropical forests. These drowned vegetation rot and releases GHGs.</li> </ul> </li> </ul> <p>Levels marked</p>	
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	<p>H1 Generic Level Descriptors for 9m SEQ sub-part (a)</p> <table border="1"> <thead> <tr> <th>Level</th><th>Marks</th><th>Descriptors</th></tr> </thead> <tbody> <tr> <td>3</td><td>7–9</td><td>Response is consistently analytical and explanatory rather than descriptive. There is a clear focus on the question. Depth of relevant knowledge and understanding exemplified throughout. The response is coherent and the use of terminology is accurate.</td></tr> <tr> <td>2</td><td>4–6</td><td>Response includes analysis and explanation but is generally dominated by description for weaker responses. Response reflects relevant knowledge and understanding of the question. Response is structured and organised satisfactorily but may be unclear in parts. Use of terminology is generally accurate.</td></tr> <tr> <td>1</td><td>1–3</td><td>Response does not address the requirements of the question fully. Depth of knowledge and understanding shown is limited. 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.</td></tr> <tr> <td>0</td><td>0</td><td>No creditworthy response.</td></tr> </tbody> </table>	Level	Marks	Descriptors	3	7–9	Response is consistently analytical and explanatory rather than descriptive. There is a clear focus on the question. Depth of relevant knowledge and understanding exemplified throughout. The response is coherent and the use of terminology is accurate.	2	4–6	Response includes analysis and explanation but is generally dominated by description for weaker responses. Response reflects relevant knowledge and understanding of the question. Response is structured and organised satisfactorily but may be unclear in parts. Use of terminology is generally accurate.	1	1–3	Response does not address the requirements of the question fully. Depth of knowledge and understanding shown is limited. 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.	
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<p><b>3(b)</b></p>	<p><b>Discuss the effectiveness of different strategies in managing climate change.</b></p> <p>Candidates are to first explain the various strategies taken to manage climate change. Examples and case studies should be used to support their claims. Stronger candidates, when evaluating the effectiveness of strategies, will take heed of how the strategies are effective at different scales and compare the strategies' effectiveness on how it impacts on the different groups of people. Candidates could suggest that since it is difficult to attain high levels of effectiveness on the a global scale, it may be necessary to implement mitigation at the local scale, and furthermore, it must be complemented by strategies that combat the impact of climate change through adaptations.</p> <p><u>Indicative content:</u></p> <ul style="list-style-type: none"> <li>Adaptation: Improving of flood defences <ul style="list-style-type: none"> <li>With climate change, there will be a resultant melting of ice caps, causing a rise in sea levels. In addition, the increase in heat will also cause water bodies to undergo expansion, resulting in sea level rise.</li> <li>Furthermore, with climate change setting in, there will be more frequent occurrence of extreme weather events such as hurricanes, which will bring heavy precipitation.</li> <li>As such, due to the increase in onset of flooding, countries have been trying to improve their flood defences either through hard engineering methods of constructing flood walls and levees or soft engineering methods of educating the citizens to manage the negative impact of floods as a result of climate change.</li> <li>One such example is that of Maldives. Being low lying, the country has been actively shoring up its coastal defences, increasing the height of its seawalls to manage the negative impacts of sea level rise on the country. High income countries like Singapore and the Denmark for examples, have the advantage of wealth as they implement their climate change adaptations.</li> <li>LIMITATION: However, such strategies are not long-lasting, as when sea levels rise above the maximum capacity of the strategies, flooding will still occur. The only solution is to constantly keep increasing the height of the seawalls which is unsustainable. And for countries like Bangladesh and Tuvalu, with low income, and being very low-lying, the adaptation could eventually be to abandon the flooded areas.</li> </ul> </li> <li>Adaptation: Changing crop cultivation to more drought resistant crops</li> </ul>	<p><b>[16]</b></p>															

	<ul style="list-style-type: none"> <li>○ With an increase in global temperatures, there may be more dry spells occurring as a result of climate change.</li> <li>○ Dry spells would result in agricultural crops reliant on water being affected. The reduction in crop yield may result in a decrease in global food supply, which in serious cases may lead to famines. The need for food security forces many countries to consider this approach.</li> <li>○ As a result, countries have started to either change to more drought resistant crops (crops which need less water), or develop genetically modified crops that are able to be more drought resistant.</li> <li>○ One example is that of the change of maize crop variety in USA. Due to changes in precipitation pattern, the change to a more drought resistant variety of maize in USA has resulted in a drop in economic losses for farmers as a result of dry seasons, proving that such adaptations are useful.</li> <li>○ LIMITATION: However, such crop varieties and change in agricultural methods are expensive, and LDCs may not be able to afford such technologies, resulting in them still suffering from the climate change impact on their crops.</li> <li>● Mitigation: Transborder cooperation <ul style="list-style-type: none"> <li>○ With climate change being an issue that is not localised to an area but a global situation, there is a need for greater cooperation among countries across political borders.</li> <li>○ There are increasing calls for countries to work together, and some cooperative strategies are that of protocols and treaties between countries to work towards reducing emissions.</li> <li>○ Such treaties bind countries to concrete targets and strategies to reduce their carbon emissions, thereby reducing the impact of greenhouse gases on our climate.</li> <li>○ There are a few treaties drafted (Copenhagen Agreement, Kyoto Protocol), but the most recent one is the Paris Agreement. The Paris Agreement sets concrete targets for countries to reduce their greenhouse gas emissions through a series of actionable policies. Majority countries in the world have signed to the agreement, and this is effective in combating climate change.</li> <li>○ LIMITATION: However, such agreements and cooperative partnerships may not always be effective, as some countries may not join in the accords. One such example is that of the USA, where they have still yet to rectify the Paris Agreement, limiting the overall effectiveness of the efforts.</li> </ul> </li> <li>● Mitigation: Carbon pricing, carbon tax <ul style="list-style-type: none"> <li>○ With carbon being the main source of global warming, given that it can bond to form CO<sub>2</sub> and CO, there are strategies to reduce the release of carbon by taxing its release.</li> <li>○ Carbon pricing and carbon tax are strategies to increase the operating cost for firms who are discharging carbon into the atmosphere as part of their process. Firms have to buy carbon credits before they can discharge gases, which incentivises firms to either reduce their carbon consumption or use clean production processes</li> </ul> </li> </ul>	
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	<ul style="list-style-type: none"> <li>○ After the implementation of such taxes, firms have been observed to reduce their carbon emissions. For example in Australia, the implementation of the carbon tax has resulted in an overall reduction of up to 17 million tonnes of carbon, proving its effectiveness. Similarly, in the UK, coal use plummeted after the carbon tax in 2014 and in the second year of the carbon tax, GHG emission dropped by 1.4 %.</li> <li>○ LIMITATIONS: However, firms that are rich enough and have the financial muscle may not ascribe to the carbon tax, and instead choose to continue releasing carbon into the atmosphere, paying the large tax. This thus renders the policy ineffective. Unfortunately, in UK, just like Australia and France, when there is bi-partisan politics, and politicians need to win vote, the carbon tax is abolished shortly. France, for example withdraw the tax after backlash from voters angry about rising energy prices which started the prolonged street protests of the 'yellow jackets'.</li> <li>○ When carbon tax are imposed, it also increases the cost of production, and countries that impose this tax, will be faced with reduced global competitiveness for their goods and services.</li> <li>● Alternative energy sources: Solar, HEP, Wind <ul style="list-style-type: none"> <li>○ With the main source of energy coming from burning of fossil fuels which results in a release of carbon dioxide into the atmosphere, there have been calls to change to more green energy sources. Examples of these energy sources include solar energy, hydroelectric power and wind energy.</li> <li>○ Countries have been slowly changing to such alternative forms of energy, due to the need for more sustainable energy sources given that our fossil fuel reserves may run out anytime. Coupled with the lack of carbon emissions when using such green energy sources, the benefits of such methods of power generation are what attracts countries to it.</li> <li>○ One example of such an energy source is that of the Three Gorges Dam in China. The construction of the dam has allowed for not just a management of flooding in the area, but also generated immense electricity for the area, of up to 22,000 megawatts in 2016.</li> <li>○ LIMITATION: However, as much as these strategies are effective, the huge start-up cost for these strategies are a big stumbling block for countries who aim to implement it. LDCs are less likely to implement such strategies due to the huge cost involved, and instead still rely on fossil fuels which increases carbon emissions.</li> <li>○ Tropical dams: It was found that large tropical dams produced up to 20 times more methane than temperate ones during times when water level is low. Some researchers estimated than in 2007, methane from dams is responsible for 4% of human-caused climate change, and it was found that the Balbina Dam in Brazil produced 10 times more greenhouse gas emissions per unit of energy produced than coal.</li> <li>○ With the loss of large tracts of tropical forests drowned by the waters of dam, it reduces the size of the carbon sink with this process of deforestation.</li> </ul> </li> </ul>	
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- When biofuel is used as the alternative energy, two complications arise which reduces its effectiveness as an alternative energy source. First, biofuel from crops like sugar cane or oil palm often comes through the clearance of land through deforestation (once again reducing the carbon sink of forests). Second issue is that often land for food crop may be overtaken by cash crops for biofuel, and this leads to the issue of loss of cropland for food and loss of food security.
- REDD+
  - While cutting down the emission of GHGs is one major mitigation strategy for climate change, another is reduce the loss of the carbon sink, and in some countries, through reforestation and afforestation, to increase the carbon sink.
  - This is done through incentives being offer by the international community to countries and land owners in exchange for slowing down deforestation, and carrying out activities that promote reforestation and sustainable forest management.
  - Examples with some successes include the agreement between Norway and Brazil where deforestation slowed down significantly between 2005 and 2014. Unfortunately, with a change of President, with an agenda that favours economic development over conservation, there is roll back on conservation initiatives across the country, and rates of deforestation has gone up again. Currently (2019) large tracts of the Amazon forest is on fire with very meagre effort from the Brazilian authorities in fighting it.
  - Another example of REDD+ is the agreement between Norway and Indonesia, where in early 2019, Norway announced that it will provide payment to Indonesia as part of the REDD+ agreement the two nations signed in 2010. In was found that in 2017, Indonesia experienced a 60% drop in primary loss compared to 2016.

Candidates are to evaluate the effectiveness of each strategy, and assess how the different strategies can complement each other for better mitigation of climate change.

*Note that list is not exhaustive, and other factors may be accepted if well explained.*

H1 Generic Level Descriptors for 16m SEQ sub-part (b)

Level	Marks	Descriptors
4	13–16	Response shows strong evaluative elements. Evaluation is relevant and comprehensive. Response fully addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and well-supported by relevant material. Use of terminology is accurate.
3	9–12	Response displays a sound evaluative element. Response addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and supported by relevant material. Use of terminology is relevant and mostly accurate.
2	5–8	Response has some elements of evaluation but is broadly descriptive. Response exemplifies knowledge and understanding of the question and is generally relevant. The weakest responses may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Use of terminology is inconsistent though generally accurate.
1	1–4	Response shows little or no evaluation. 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 terminology.
0	0	No creditworthy response.



4(a)	<p>Explain the role of climate in affecting the flows and stores of the hydrological cycle in the humid and arid tropics.</p> <p>Candidates are to explain the hydrological cycle, and what are the various flows and stores of the hydrological cycles. After explaining the flows and stores, candidates are to compare the difference in the flows and stores between the humid and arid tropics, and explain how climate (temperature and precipitation) has an effect on the flows and stores of the hydrological cycle.</p> <p><u>Indicative content:</u></p> <ul style="list-style-type: none"> <li>• Precipitation affecting flows           <ul style="list-style-type: none"> <li>○ Humid areas: generally experience higher precipitation               <ul style="list-style-type: none"> <li>▪ With higher precipitation, there is more moisture and water present on the surface and the subsurface</li> <li>▪ Sub-surface flows: More interflow, throughflow and groundwater flow as there is more moisture moving downwards (percolation) through the soil profile</li> <li>▪ Surface flows: Due to high precipitation and presence of moisture, there is higher amount of overland flow present. Saturation Overland Flow (SOF) may be dominant due to the high amount of moisture in the hydrological system. (Link this to the role played by the dense vegetation cover – provides interception, prevents rainsplash and inwashing of fines, prevents soil compaction, passages into ground via the roots, and humus -&gt; good soil structures; all these leads to high infiltration and low generation of overland flow).</li> <li>▪ Channel flow (river discharge) for the humid tropics tends to be perennial where there is flow all through the year. For the locations with Am or Aw climate, channel flow is still perennial but the discharge will vary accordingly with the wet and dry season of the location.</li> <li>▪ Water table is generally higher.</li> </ul> </li> <li>○ Arid areas: generally experience lower precipitation               <ul style="list-style-type: none"> <li>▪ With lower precipitation, there is less moisture and water present in the surface and the sub-surface.</li> <li>▪ Sub-surface flows: There is a lack of sub-surface flows, as there is a lack of precipitation which results in a lack of moisture present in the subsurface. Interflow and throughflow are almost non-existent, while groundwater flow is more dominant in arid areas</li> <li>▪ Surface flows: Due to low precipitation, there is a lack of moisture, and coupled with the geology of the area may account for the lack of infiltration processes in the area.</li> <li>▪ The lack of infiltration process may result in a rise in Hortonian overland flow (HOF) when rainfall events happen, and this is the dominant overland flow process in arid areas.</li> </ul> </li> </ul> </li> </ul>	[9]
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	<ul style="list-style-type: none"> <li>▪ Channel flow is ephemeral where river discharge will only occur during and a short while after the rare storm event, and there is no channel flow for the rest of the year (ie, the channel is dry).</li> <li>▪ During the rare times where there is rainstorm event, flash floods occurs</li> <li>• Precipitation affecting stores <ul style="list-style-type: none"> <li>○ Humid areas: higher precipitation, higher water stores <ul style="list-style-type: none"> <li>▪ With higher precipitation, humid areas tend to have more groundwater flow, and this would equate also to an increase in the water table level due to more percolation as a result of higher precipitation</li> <li>▪ In addition, with high precipitation, surface stores are generally higher, as evidenced by the perennial streams and surface stores in humid areas.</li> <li>▪ Higher antecedent soil moisture.</li> </ul> </li> <li>○ Arid areas: lower precipitation, low water stores <ul style="list-style-type: none"> <li>▪ Having lower precipitation, arid areas tend to have low groundwater flow, and the water table is generally much lower than that of the humid areas.</li> <li>▪ In addition, there is a lack of surface stores in arid areas, as seen in the presence of ephemeral streams which exist only during rainfall periods. This is evidence of the lowered water table in arid regions, as compared to that of the humid areas.</li> <li>▪ Little or no antecedent soil moisture.</li> </ul> </li> </ul> </li> <li>• Temperature affecting flows and stores <ul style="list-style-type: none"> <li>○ The main impact temperature has on flows and stores is on the evapotranspiration rates in the hydrological system. <ul style="list-style-type: none"> <li>▪ Arid areas: higher temperatures, resulting in higher evapotranspiration loss of moisture in the hydrological system</li> <li>▪ Humid areas: slightly lower temperatures, resulting in more moisture present in the hydrological system.</li> </ul> </li> </ul> </li> </ul> <p><i>Candidates may choose to include case studies to elaborate more on their explanations.</i></p>	
4(b)	<p><b>‘Hard-engineering strategies are the most effective in managing floods.’ How far do you agree with this statement?</b></p> <p>Candidates should evaluate the various strategies critically in this question. There are a variety of strategies in managing floods, and candidates should not overly focus on the number of strategies present, but rather on how they help to manage floods.</p> <p>Higher level responses will draw on soft-engineering strategies in management of floods, and evaluate on how various strategies must work hand-in-hand for greater effectiveness in management of floods.</p>	[16]

Indicative content:

- Hard engineering methods: Channelisation
  - Channelization refers to the process where river channels are altered either through a straightening of the channels or smoothing of the channels.
  - Such processes help to increase the velocity of the flow of water, preventing floods from happening easily as runoff is diverted away from flood prone areas to open water bodies.
  - One example of that is Singapore, where our canals and waterways are constantly smoothed with concrete and lined in a trapezoidal shape to increase flow velocity, reducing the risk of flood to our city.
  - LIMITATION: Such methods may prove to be costly, and may need regular upkeep and maintenance due to the wear and tear experienced by river channels. As such, some cities may end up having smoothed channels, but lack the political will and money to upkeep it, resulting in a limitation of the effectiveness of such strategies.
- Hard engineering methods: Levees and embankments
  - Levees and embankments refer to raised mounds of either concrete or soil on river banks to increase the carrying capacity of rivers.
  - Levees are effective in containing flood waters, as the increase in floodwater capacity may help prevent overflowing of water to the surrounding areas, reducing the impact of flood to such locations.
  - One such example of levees and embankments is that in New Orleans, where there are levees lined up all along the water edge of Lake Ponchartrain, which help to keep the increase in floodwater out.
  - LIMITATION: However, levees and embankments have their own limit in the carrying capacity, and an overtopping of the levees and embankments may result in more severe economic losses. In addition, the presence of levees may also result in the levee effect, where people are lulled into a false sense of security and stay near the levees, which would cause more devastating damages when floods do happen.
- Hard engineering methods: Man-made stores and diversion of water
  - To prevent water from flooding an area, there are man-made structures (dams, water detention tanks) built to help divert water away from the flood prone regions.
  - Such structures help to prevent floodwaters from reaching flood prone areas rapidly. For example, dams such as a Xayaburi dam in Myanmar can help to retain water upstream, preventing flooding from happening immediately downstream. There is an element of control over the release of water, helping authorities to manage flood in areas.
  - One example of this is the Stamford Detention Tank in Singapore. The detention tank acts as an additional store of water, helping to divert water away from the main canals into the detention tank, to be released when the rainfall event is over, helping to prevent floods.

	<ul style="list-style-type: none"> <li>○ LIMITATION: Such methods are highly costly and expensive, and lower income countries may not subscribe to such methods due to the high startup cost.</li> <li>• Soft engineering methods: Risk mapping of flood prone areas <ul style="list-style-type: none"> <li>○ Flooding only occurs in low-lying areas near water bodies, and a mapping of such areas allows for risk management strategies to be planned specific to area.</li> <li>○ Such targeted measures allow for specific strategies to be devised for specific areas, increasing the overall effectiveness of the management strategy and developmental needs.</li> <li>○ Areas prone to flooding can be earmarked as high risk areas, and authorities can limit the type of development possible at such areas. This will reduce the economic and social impact of floods on the society when floods do happen, as the developments present then are of low value.</li> <li>○ In addition, by knowing which areas are more flood prone, authorities can take a proactive approach to allocate management resources such as emergency response teams to target said areas first in the event of floods.</li> <li>○ One such example of flood risk mapping is that done by the Urban Redevelopment Authority (URA) of Singapore. The URA, in conjunction with Singapore Land Authority (SLA) and Public Utilities Board (PUB), plans the land use of Singapore according to the risk areas, and actively avoids high flood risk areas for high value development.</li> </ul> </li> <li>• Soft engineering methods: Development of flood response teams <ul style="list-style-type: none"> <li>○ One way to manage the impact of floods is to have swift response to flood events, managing the floods as effectively as possible early on before the situation exacerbates.</li> <li>○ When flood events occur, the presence of a response team on-site to direct people and traffic away is invaluable, as it helps to minimise economic loss.</li> <li>○ Furthermore, with a quick response team on-site, order can be achieved and evacuation of people can be done effectively, helping to minimise the social impact of injuries and deaths.</li> <li>○ One such example is that of the flood management teams under Public Utilities Board (PUB) in Singapore. With up to 5 teams on the road at any one time, this allows for PUB to respond quickly to flood events, minimising any disruption to the general public during such events.</li> </ul> </li> <li>• Soft engineering methods: Education of the public <ul style="list-style-type: none"> <li>○ Knowing what to do during flood events is crucial, and the education of the public on flood responses is key to making flood management strategies work.</li> <li>○ By educating the public on flood responses and allowing them an insight into the actions they can take, the damages inflicted by flood events would be minimised as the public now knows what to do and what not to do during flood events.</li> <li>○ One example of this would be the outreach campaigns in Marikina Philippines, where government officials design lesson plan to increase flood awareness tips among the citizens, to minimise the flood impact on the community.</li> </ul> </li> </ul>	
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	<p><i>Note that the list is non-exhaustive, and candidates may look to describe other factors apart from the ones listed.</i></p> <p><i>Examiner's comments:</i></p> <ul style="list-style-type: none"> <li>• The Machchu Dam is useful as a 'cause' case study rather than an example of flood management. The dam was constructed for irrigation purposes, and not flood control; and its failure led to flooding.</li> <li>• Need to provide the accurate definition of hard and soft engineering.</li> <li>• To illustrate the success of hard engineering measures of Singapore, cite the significant reduction in the size of flood areas in the country since we embarked on intense channelization since the 1970s. Include also the Marina Barrage a part of the hard engineering measure although this took place more recently.</li> </ul>	
5(a)	<p><b>Explain the reasons for the development of urban slums in countries at low levels of development.</b></p> <p>Candidates are to explain the factors that have led to the development of urban slums. This can range from rural-urban migration to the role of the government. They should also be aware of the context which is focusing on countries of low levels of development.</p> <p><u>Indicative content:</u></p> <p>Population growth due to in-migration and international migration (demographic- social cause)</p> <ol style="list-style-type: none"> <li>1. In-migration – i.e. rural-urban migration. Often due to rural poverty, most of these migrants have very low financial capacities and find cheap housing within existing squatter settlement. While international migration was not a major factor, in recent years, refugee movements from neighbouring countries into some cities have led to refugee slum development. These slums have even more deprivation than others.</li> <li>2. Increasing poverty rates amongst some urban residents (economic cause) Slums see the highest concentration of urban poor within one locality. Slum conditions are caused by poverty. The cause-effect relationship becomes confusing.</li> <li>3. Coupled with inadequate housing response from the government, poverty and government failure becomes mutually reinforcing. LDC city governments are pressured to resolve many issues stemming from rapid urban growth; resulting to growth of urban population being faster than infrastructural growth</li> <li>4. Poor physical conditions that create low cost housing areas As mentioned as part of the characteristics, the condition of some areas make them unwanted for development for the moment. This allows the development of squatter</li> </ol>	[9]

	settlements. Terrain which is difficult to build infrastructure e.g. hilly terrain, swamplands. Areas that are pollutive and hazardous e.g. dumpsites, along train tracks	
<b>5(b)</b>	<p><b>Discuss the challenges in managing non-hazardous solid waste in urban areas.</b></p> <p>Candidates should evaluate the various strategies critically in this question. There are a variety of strategies in managing non-hazardous waste in urban areas, and candidates should not overly focus on the number of strategies present, but rather on each strategies strength and limitation in managing waste.</p> <p>Higher level responses will draw on not just disposal but also education in management of waste, and evaluate on how various strategies must work hand-in-hand for greater effectiveness in management.</p> <p><u>Indicative content:</u></p> <p>The key strategies to reducing the total volume of waste are</p> <ul style="list-style-type: none"> <li>(a) Reduce</li> <li>(b) Reuse</li> <li>(c) Recycling</li> </ul> <p><b>Reduce</b> Preventive approach where the key idea is to reduce the possibility of waste generation for example with a technology-driven strategy where leaner production can also be achieved by examining all phases of a product's life cycle from raw material extraction to its ultimate disposal – so called 'life-cycle assessment' or LCA. The amount of waste generated at any each phase will be identified and quantified as an 'environmental load'. Options for reducing these wastes will be assessed.</p> <p><b>Reducing consumption campaigns and awareness</b> Socially driven approach to make people aware of their over consumption Especially prominent in DC cities and promoted in schools Global initiative taken on by UN Environment Programme (UNEP), the UN Food and Agriculture Organization (FAO) and partners, the campaign – 'Think, Eat, Save. Reduce Your Foodprint' – seeks to accelerate action to eliminate wasteful practices and help countries share successful initiatives on these issues. It specifically targets food wasted by consumers, retailers and the hospitality industry. Evaluation: Takes a longer time to win over people as opposed to using monetary disincentives. However, once people are won over, it's a habit they will take with them in the long run</p> <p><b>Reducing industrial waste Using taxation</b></p>	<b>[16]</b>



	<p>Taxation has been suggested as a possible solution to the widespread problem of packaging waste. Imposition of a tax on packaging will effectively incorporate the social cost of a product into the retail price by including the cost of disposal of its wrapping.</p> <p>E.g. Denmark was one of the first countries to introduce a comprehensive waste taxation scheme to reduce waste in the mid-1980s. The policy was in response to the country's serious waste disposal problem where the per capita generation of waste was among the highest in Europe. Denmark was also running out of landfills and incinerators. The aim of the taxation was to achieve a 54% recycling rate for all waste by 1996 as no tax was levied on waste that is reused or recycled.</p> <p>Evidence of success: In the ten years from 1987 to 1996, Denmark achieved a reduction of 26% in the quantity of waste delivered to landfills and incinerators and had a recycling rate of 61% (exceeded target). By 2008, the national recycling rate reached 69%.</p> <p>Evaluation: Is taxation really necessary given that it is a politically unpopular policy? You will see in the next section under 'reuse' that the possibility of profits can encourage the reuse of waste products.</p> <p>(b) Reuse</p> <p>Reduces resource consumption by creating a closed loop between output (waste) and input (resource needed). In practice, waste products are reused when it is economically viable to do so and viability is assessed for a number of motives.</p> <p>E.g. Wastewater is commonly reused in many countries and is widely recognised as a significant and growing water source that is particularly important in drylands. In fact, as population and economic activity increases and freshwater is consumed, the amount of wastewater generated is expected to increase. The use of treated and untreated wastewater in landscaping and agriculture is common in many countries of the Middle East and North Africa including United Arab Emirates, which despite its affluence; also see the economic value of re-using wastewater. Less affluent countries within the region such as Yemen and Syria benefit from the use of wastewater as well. In Mexico, wastewater from almost all cities that have a sewerage system have been used to irrigate about 150,000ha of crops nationally.</p> <p>Limitations: In some cases, infectious diseases can be transmitted from sewage-irrigated crops to the general public. An outbreak of cholera in the capital of Israel, Jerusalem, in 1980 was thought to be caused by consumption of vegetables irrigated with wastewater. This could, however, have been prevented by limited the use of wastewater to certain crops (fruits and vegetables are less likely to carry disease.)</p> <p>(c) Recycle</p> <p>Compared to the past, there are more formalised schemes to recover useful materials. The collection points for materials such as paper and glass have become a common sight.</p>	
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	<p>Crucial factors that determine the success of recycling include the capacity of the recycling plant and equipment, the size of the market for recycled materials and government support.</p> <p>E.g. In Toronto, Canada, a local law states that daily newspapers must contain at least 50% recycled fibre or publishers will not be allowed to have vending boxes on the city's streets.</p> <p>LDC-style of recycling:</p> <p>Urban waste economy in Bangalore, India over 40 000 make a living scavenging by waste recovery (re-use) or recycling; representing about 2% of its workforce. Made of mainly women and children, these waste pickers have created a network of waste buyers of newspaper, plastic, glass, metals, clothes and other materials, small dealers, a great variety of enterprises including glass, paper, and aluminium recycling plants.</p> <p>Limitations: While effective in its work, most waste-pickers are women and children with no protective gears or insurance. Socially, these workers are rarely recognised for their work and economically, receive very little.</p> <p>(2) Processing of Waste and Waste Disposal</p> <p>All wastes are disposed into the environment but some enter the environment in a more controlled manner than others. Some wastes are emitted directly from the source without treatment, others are collected and sometimes treated before disposal. E.g. car exhaust can be treated with a catalytic converter that reduces the toxicity of gases produced.</p> <p>Landfills</p> <p>Most commonly used in most countries. About 64% of municipal waste generated in OECD countries was destined for landfills in 1995. The aim is to reduce this to 50% by 2020 with an increase in recycling efforts.</p> <p>Challenges:</p> <p>The key environmental problem we face as a result of landfills is groundwater pollution from leachates.</p> <p>Possible leakage of toxic substances can contaminate surface and groundwater. Groundwater contamination may result from leakage of very small amounts of leachate.</p> <p>If poorly managed, possibility of collapse and/or fire – resulting to unsafe living condition for the squatter settlements living in these sites</p> <p>Incineration</p> <p>Both processing and disposal are involved.</p> <p>Controlled burning of waste at a high temperature designed to attain its complete combustion can be used not only to reduce the bulk of wastes but to also break down hazardous compounds rendering them less dangerous. Incineration can also be used for generating energy.</p>	
6(a)	Explain how urban liveability can be measured in countries at high levels of	[9]

**development.**

Candidates are to explain the different ways to measure urban liveability. It is important that understand the effective assessment of urban liveability is based on objective and subjective indicators. This is because as mentioned in previous section, urban liveability looks at assessment based on the physical built environment and the (more subjective) lived experiences of individuals.

Thus in effectively measuring liveability, these non-overlapping measures should be used to complement each other in providing information on built urban characteristics.. They should also be aware of the context which is focusing on countries of high levels of development.

**Indicative content:****Monocle Global Quality of Life Survey**

Obj: Since 2007, Monocle, a culture and lifestyle magazine based in London, has compared the quality of life of cities around the globe. As every year, the 25 global cities have been graded on the quality of their community life. Besides the obvious indicators like unemployment rates, easiness to commute, connectivity, housing affordability and safety, Monocle also judges cities on the number of specific attributes: number of bookshops and museums, quality of food, drink and retail, are the cities dog-friendly, can you get a good meal after 22.00 and what is the average ambulance response time.

Score: Ranking based on the various data and opinion is derived

Criteria: Using a combination of both objective data and subjective opinion, a list of the top 25 most liveable cities in the world is derived.

**Economist Intelligence Unit (EIU) Liveability Index**

Obj: A measure of liveability that has been developed to specifically identify cities that would be attractive to highly-skilled people is the EIU's international liveability ranking.

The overall liveability score and average scores across five broad categories: stability, healthcare, culture environment, education and infrastructure

Score: Index is measured from a score of 100.

Criteria: The EUI Liveability Index considers both objective and subjective indicators.

Living conditions are assessed using about 30 indicators that links the results of subjective life-satisfaction surveys to the objective determinants of quality of life.

Measures look at aspects of stability, healthcare, culture and environment, education and infrastructure.

**Neighbourhood Environment Walkability Scale (NEWS)**

NEWS assesses residents' perception of neighborhood design features related to physical activity, including residential density, land use mix (including both indices of proximity and accessibility), street connectivity, infrastructure for walking/cycling, neighborhood

	aesthetics, traffic and crime safety, and neighborhood satisfaction. 67 items grouped into 8 factors:	
<b>6(b)</b>	<p><b>To what extent does the social environment contribute to the extent of crowding in urban areas?</b></p> <p>Candidates should evaluate the various factors critically in this question. In this question, candidates are to explain what causes crowding in urban areas. Candidates must discuss about social environment but also recognise the other factors that contribute to crowding too.</p> <p>Stronger candidates are able to bring in relevant examples and case studies to substantiate their claims. They should also be able to differentiate between factors that affect absolute and relative crowding as well.</p> <p><u>Indicative content:</u></p> <p>Crowding is a concept with both physical and psychological aspects.  Objective aspect of crowding: Physical crowding  Depends on two variables:  Subjective aspect of crowding: Psychological crowding</p> <p>Stand:  Social environment is one that causes crowding but there are other factors such as the physical environment, task environment and individual characteristics that play a role in crowding in urban areas.</p> <p><u>Social environment</u>  The greater the sense of neighbourliness, the less the perception of being crowded  Increasing heterogeneity in an urban population; especially with immigration  When immigrants are of a contrasting profile to the dominant ethnic group (e.g. presence of South Asian communities in British cities), xenophobia rises as dominant groups starts 'feeling' that their city is getting crowded.  Limited spaces for social interaction also creates a perception of being 'foreign' or 'alien'  Spaces for social interaction can be generic ones such as coffee joints/café, restaurants, parks, playgrounds  As well as specific ones, like places of worship, ethnic food and clothing outlets, elderly day care centres</p> <p><u>Physical environment</u>  Physical density is often seen as an antecedent to other factors in determining crowding</p> <p>Two sub-factors controlling urban density  Population size and area (space)</p>	<b>[16]</b>

	<p>Factors affecting population size</p> <p>Migration into cities and natural increase</p> <p>Factors affecting area (space)</p> <p>Physical amount of space available that limits urban sprawl</p> <p>Territorially determined Urban government may limit the extent of the city's boundaries</p> <p>Geographically or environmentally determined</p> <p>Urban design – design , colour</p> <p>Factors affecting task environment</p> <p>These are determined by the capacity of the infrastructure meant for the task</p> <p>E.g. of one task environment: public buses/trains for transportation into and out of the city</p> <p>Factors affecting individual characteristics</p> <p>Personal space preference which varies from person to person</p> <p>Influenced by various personal factors; e.g. age, gender, ethnic or cultural norms, personality (e.g. self-esteem)</p> <p>Attached to the discomfort of sharing a limited space with several people are multiple physical and psychological factors intervening the perception of crowding.</p> <p>Increased anxiety, stress and feeling of exhaustion</p> <p>Perceptions of risk to personal safety and security</p> <p>Feelings of invasion of privacy</p> <p>Propensity to arrive late at work</p>	
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General Rubrics for 9m Essays		
3	Marks: 7 – 9	<input type="checkbox"/> <b>OVERAL MATURITY:</b> Consistently analytical and explanatory essay rather than descriptive one <input type="checkbox"/> Consistently displayed <b>ANALYTICAL SKILLS</b> – some possible analysis include....(some of the following; rather than all) <ul style="list-style-type: none"> <li><input type="checkbox"/> <u>Categorisation</u>: Response clearly packages answers into coherent categories</li> <li><input type="checkbox"/> <u>Focus on the question</u> and <u>Links</u>: Clear reference back to question requirements</li> <li><input type="checkbox"/> <u>Organisation</u>: Presentation of ideas strategic to the question (Q5 Explain why – hence reasons and Q6 Explain challenges; hence presented as challenges)</li> </ul> <input type="checkbox"/> <b>CONTENT KNOWL:</b> Adequately displays depth of knowledge and understanding <input type="checkbox"/> <b>CASE STUDY KNOWL:</b> Consistently and effectively uses a <u>range</u> of examples <input type="checkbox"/> <b>PLANNING AND STRUCTURE OF ANS:</b> A coherent answer with well-organised paragraphs and with effective use of an introduction and a conclusion
2	Marks: 4 – 6	<input type="checkbox"/> <b>OVERAL MATURITY:</b> Some evidence of analysis and explanation but lacks depth and/or balance <input type="checkbox"/> Some display <b>ANALYTICAL SKILLS</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Basic requisites of analysis are present but inconsistent</li> <li><input type="checkbox"/> Weaker responses: Align to being more descriptive</li> <li><input type="checkbox"/> What prevents the access to a higher level – more limited in its analysis</li> </ul> <input type="checkbox"/> <b>CONTENT KNOWL:</b> Displays some awareness of appropriate knowledge and understanding but limited in its range or development <input type="checkbox"/> <b>CASE STUDY KNOWL:</b> While answer does bring up some examples, overall there is either limited use of examples or development of examples <ul style="list-style-type: none"> <li><input type="checkbox"/> What prevents the access to a higher level – limited use or devt such as only uses one named country, details in examples only occasionally illustrate the idea/s raised</li> </ul> <input type="checkbox"/> <b>PLANNING AND STRUCTURE:</b> While a structure is present, organisation is unclear in parts or is not strategic
1	Marks: 1 – 3	<input type="checkbox"/> <b>OVERAL MATURITY:</b> Almost entirely a descriptive essay <input type="checkbox"/> Almost void of <b>ANALYTICAL SKILLS</b> ; e.g. does not address the question fully <input type="checkbox"/> <b>CONTENT KNOWL:</b> Displays superficial awareness of knowledge and understanding (e.g. mere description of concepts/processes) and lacks depth <input type="checkbox"/> <b>CASE STUDY KNOWL:</b> Superficial or no use of example/s <ul style="list-style-type: none"> <li><input type="checkbox"/> What prevents the access to a higher level – superficial such as name dropping, mostly giving irrelevant details, wrong use of examples</li> </ul> <input type="checkbox"/> <b>PLANNING AND STRUCTURE:</b> Superficial use of introduction and/or conclusion. Haphazard organization of ideas with a lack of coherence
0		<input type="checkbox"/> No credit worthy response



General Rubrics for 16m Essays		
4	Marks: 13 – 16	<input type="checkbox"/> <b>OVERAL MATURITY OF ANS:</b> Response is perceptive, logical and has strong evaluative elements <input type="checkbox"/> Consistently displays <b>EVALUATIVE SKILLS</b> – some possible analysis include....(some of the following; rather than all) <ul style="list-style-type: none"> <li><input type="checkbox"/> Effectively addresses the demands of the question</li> <li><input type="checkbox"/> Effectively explains ideas using geographical concepts and processes</li> <li><input type="checkbox"/> Effectively shows the influence, interaction and/or relative significance of various factors/agencies</li> </ul> <input type="checkbox"/> <b>CONTENT KNOWL:</b> Displays accurate knowledge and understanding to effectively highlight depth of knowledge <input type="checkbox"/> <b>CASE STUDY KNOWL:</b> Consistently and effectively uses a <u>range</u> of examples that are adequately developed to support ideas raised <input type="checkbox"/> <b>PLANNING AND STRUCTURE OF ANS:</b> A well-organized and coherent answer with strategic development of discussion and with effective use of an introduction and a conclusion
3	Marks: 9 – 12	<input type="checkbox"/> <b>OVERAL MATURITY:</b> Response displays a sound evaluative element <input type="checkbox"/> Consistently displays <b>EVALUATIVE SKILLS</b> – some possible analysis include....(some of the following; rather than all) <ul style="list-style-type: none"> <li><input type="checkbox"/> Attempts to address the demands of the question</li> <li><input type="checkbox"/> Attempts to explain using geographical concepts and processes</li> <li><input type="checkbox"/> Adequately highlights the influence of various factors/agencies</li> </ul> <input type="checkbox"/> <b>CONTENT KNOWL:</b> Displays accurate knowledge and understanding to highlight some depth of knowledge <ul style="list-style-type: none"> <li><input type="checkbox"/> What prevents the access to a higher level – unable to show synthesis between various content areas and/or lack of in-depth explanation</li> </ul> <input type="checkbox"/> <b>CASE STUDY KNOWL:</b> Adequately uses a range of examples with relevant explanation and details to support ideas raised <ul style="list-style-type: none"> <li><input type="checkbox"/> What prevents the access to a higher level – limited in terms not being most appropriate examples and/or explanation</li> </ul> <input type="checkbox"/> <b>PLANNING AND STRUCTURE:</b> Well-organized and coherent response that is generally effective
2	Marks: 5 – 8	<input type="checkbox"/> <b>OVERAL MATURITY:</b> While some evaluative elements are present, essay remains mostly descriptive with a relevant focus of the question <input type="checkbox"/> Vague display <b>EVALUATIVE SKILLS</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Basic requisites of evaluation attempted but not consistent – e.g. answers that may lack depth or balance</li> </ul> <input type="checkbox"/> <b>CONTENT KNOWL:</b> Displays some awareness of appropriate knowledge and understanding but limited in its range or development and/or some inaccuracy in content presented <input type="checkbox"/> <b>CASE STUDY KNOWL:</b> While answer does bring up some examples, overall there is either limited use of examples or development of examples <ul style="list-style-type: none"> <li><input type="checkbox"/> What prevents the access to a higher level – limited use or development such as only uses one named country, details in examples only occasionally illustrate the idea/s raised</li> </ul> <input type="checkbox"/> <b>PLANNING AND STRUCTURE:</b> While a skeletal structure is coherent, org of ideas not well-planned (e.g. some elements of a good intro/conclusion but overall presentation not strategic)
1	Marks: 1 – 4	<input type="checkbox"/> <b>OVERAL MATURITY:</b> Almost entirely a descriptive essay but with a lack of focus on the question <input type="checkbox"/> Mostly void of <b>EVALUATIVE SKILLS</b> – Arguments based on unsupported assertions and/or arguments with little or no link back to the question <input type="checkbox"/> <b>CONTENT KNOWL:</b> Limited or no use of terminology and/or displays superficial awareness of knowledge and understanding (e.g. limited or no use of concepts/theories/processes) <input type="checkbox"/> <b>CASE STUDY KNOWL:</b> Superficial or no use of example/s <ul style="list-style-type: none"> <li><input type="checkbox"/> What prevents the access to a higher level – superficial such as name dropping, mostly giving irrelevant details, wrong use of examples</li> </ul> <input type="checkbox"/> <b>PLANNING AND STRUCTURE:</b> Superficial use of introduction and/or conclusion. Haphazard organization of ideas with a lack of coherence
0		<input type="checkbox"/> No credit worthy response



**Catholic Junior College**  
**JC2 Preliminary Examinations**  
**Higher 1**

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**GEOGRAPHY**

**8813/01**

Paper 1

**2 September 2019**

**3 Hours**

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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.

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 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**.  
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

### Theme 3: Geographical Investigations

- 1 A group of five 18-year-old students from Singapore wanted to study the liveability of residents in the neighbourhood of Tiong Bahru, Singapore. The students conducted their investigation from 9am to 12pm on a Saturday morning.

The students conducted a landuse survey of the neighbourhood by walking around the neighbourhood and recording the different landuse functions. They presented their findings in a landuse map.

They also conducted a bi-polar survey to assess the perception of the residents with regards to the facilities that were currently available. They stood in front of the Tiong Bahru Market which had high human traffic to distribute the questionnaire survey to the first 20 people who were willing to take the survey.

Resource 1 shows the landuse map of the Tiong Bahru neighbourhood. Resource 2 shows the bi-polar survey questions. Resource 3 shows selected results of the survey.

- (a) Suggest a research question for the investigation and explain why it is capable of research. [3]
- (b) Explain the limitations of the data representation methods shown in Resource 1 and 3, and suggest how it can be improved. [4]
- (c) The group concluded that the data collected for their questionnaire survey may not have been completely reliable and/or accurate. [6]
- With reference to the preamble and Resource 2, explain why this is so and suggest how the data collection process of the students' geographical investigation could be improved.
- (d) Explain a potential risk in carrying out the research that you may encounter and propose how you would minimise it. [4]
- (e) Discuss the extent to which the findings in the investigation is a good measure of the liveability of residents in the Tiong Bahru neighbourhood. [8]

## **Section B**

### **Theme 2: Urban Change**

#### **Atmospheric and Hydrological Processes in the Atacama Desert**

- 2** The Atacama Desert has an average of less than 15mm of rain each year. Resource 4 shows the wind patterns and moisture available for precipitation in March, 2015, over South America. Resource 5 shows a satellite image of the Atacama Desert in South America. Resource 6 shows sea surface temperature anomalies along the Eastern Pacific Ocean during 20-24 March, 2015. Resource 7 shows the impacts of floods in the Atacama Desert as reported in 27 March, 2015.
- (a)** Describe variations in the total precipitable water over land in South America as shown in Resource 4. [3]
- (b)** With reference to Resource 4 and 5, account for the amount of total precipitable water over the Atacama Desert [4]
- (c)** With reference to Resource 4 and 6, and your own knowledge, explain why there may be an increase in temperature and rainfall over the Atacama Desert in March, 2015. [6]
- (d)** Suggest how the accumulated rainfall amount shown in Resource 7 may affect the flows and storages in the Atacama Desert. [5]
- (e)** With reference to some resources and your own knowledge, explain the factors that contributed to the impacts of floods in the Atacama Desert as shown in Resource 7. [7]

### 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 the anthropogenic activities in Less Developed Countries that have contributed to global warming. [9]
- (b) To what extent is alternative energy the best response to contemporary climate change? [16]
- 4(a) Explain the flood management strategies that countries with limited financial resources can use. [9]
- (b) "Global warming can bring about serious negative impacts to all countries." To what extent do you agree with this statement? [16]

#### Theme 2: Urban Change

- 5(a) Explain the waste management problems faced by countries with low levels of development. [9]
- (b) 'Lack of funding poses the greatest challenge to achieving urban liveability.' With reference to some strategies, to what extent do you agree with the statement? [16]
- 6(a) Explain the reasons for **either** fear **or** crowding in different parts of the city [9]
- (b) Discuss the effectiveness of strategies used to manage **either** fear **or** crowding in cities. [16]

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





**Catholic Junior College**  
**JC2 Preliminary Examinations**  
**Higher 1**

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**GEOGRAPHY**

**8813/01**

Paper 1

**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.

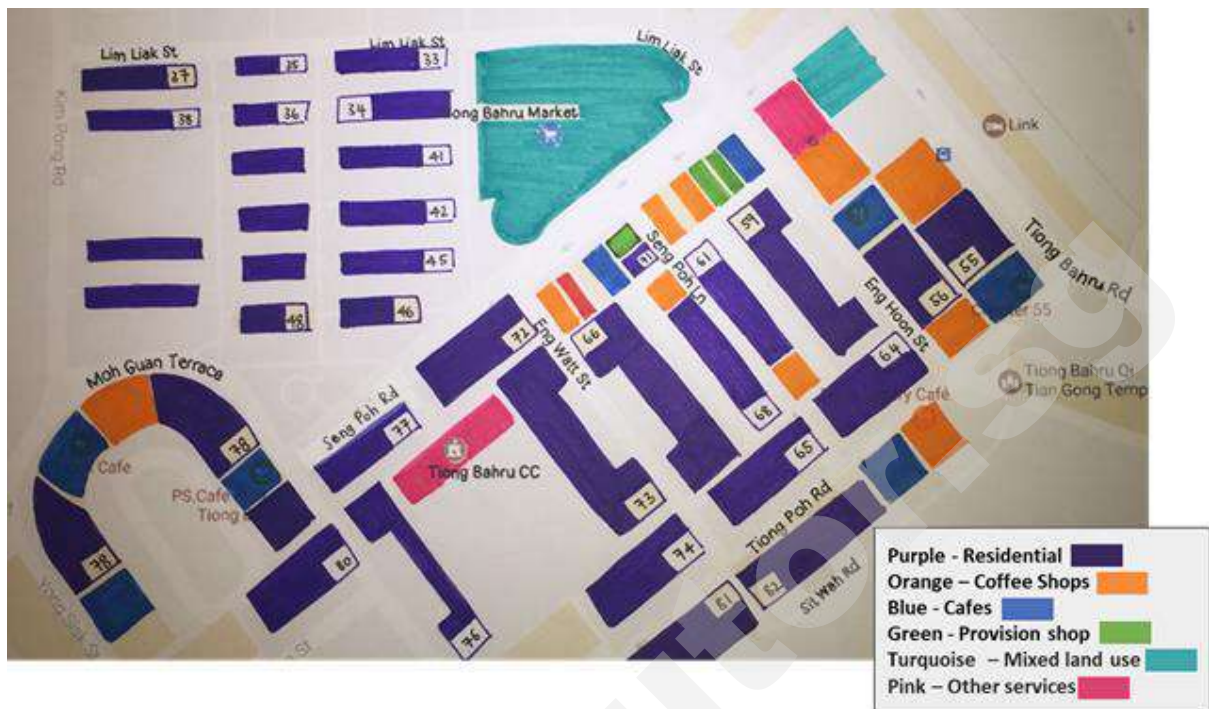
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### Resource 1 for Question 1



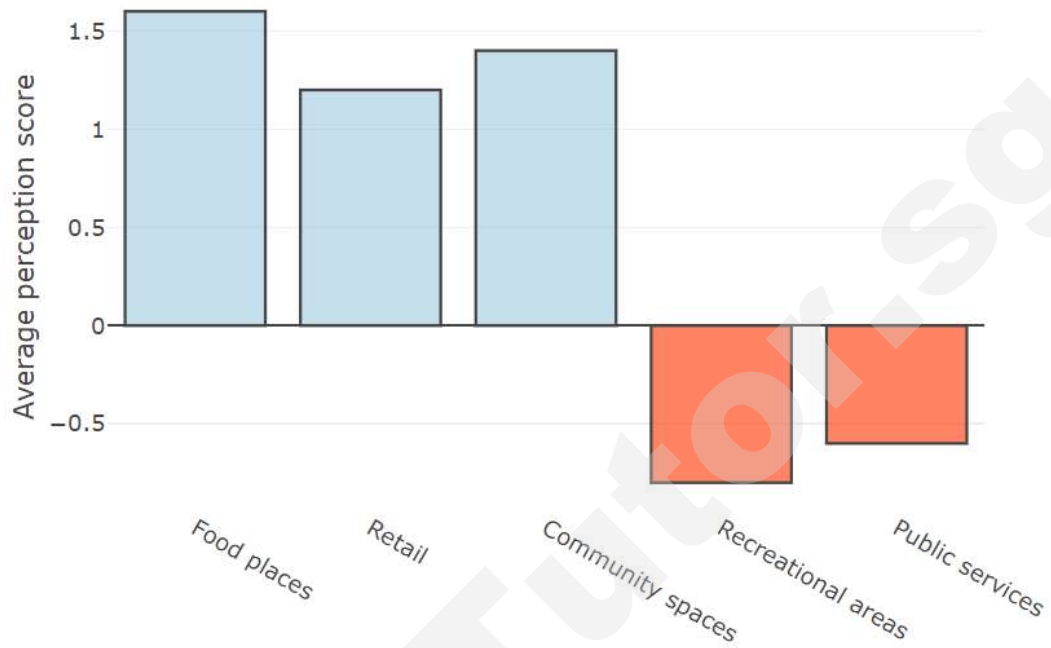
### Resource 2 for Question 1

#### Bi-polar Survey Questions

<b>Resident in Tiong Bahru: Yes/No</b> <b>Gender: Male/Female</b> <b>Age: _____</b>						
<b>Sufficiency of services and amenities index</b>						
<b>Lower Quality</b>	<b>-2</b>	<b>-1</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>Higher Quality</b>
Insufficient food places						Sufficient food places
Insufficient retail stores						Sufficient retail stores
Insufficient community spaces						Sufficient community spaces
Insufficient recreational areas						Sufficient recreational areas
Insufficient public services						Sufficient public services
<b>Total score:</b>						

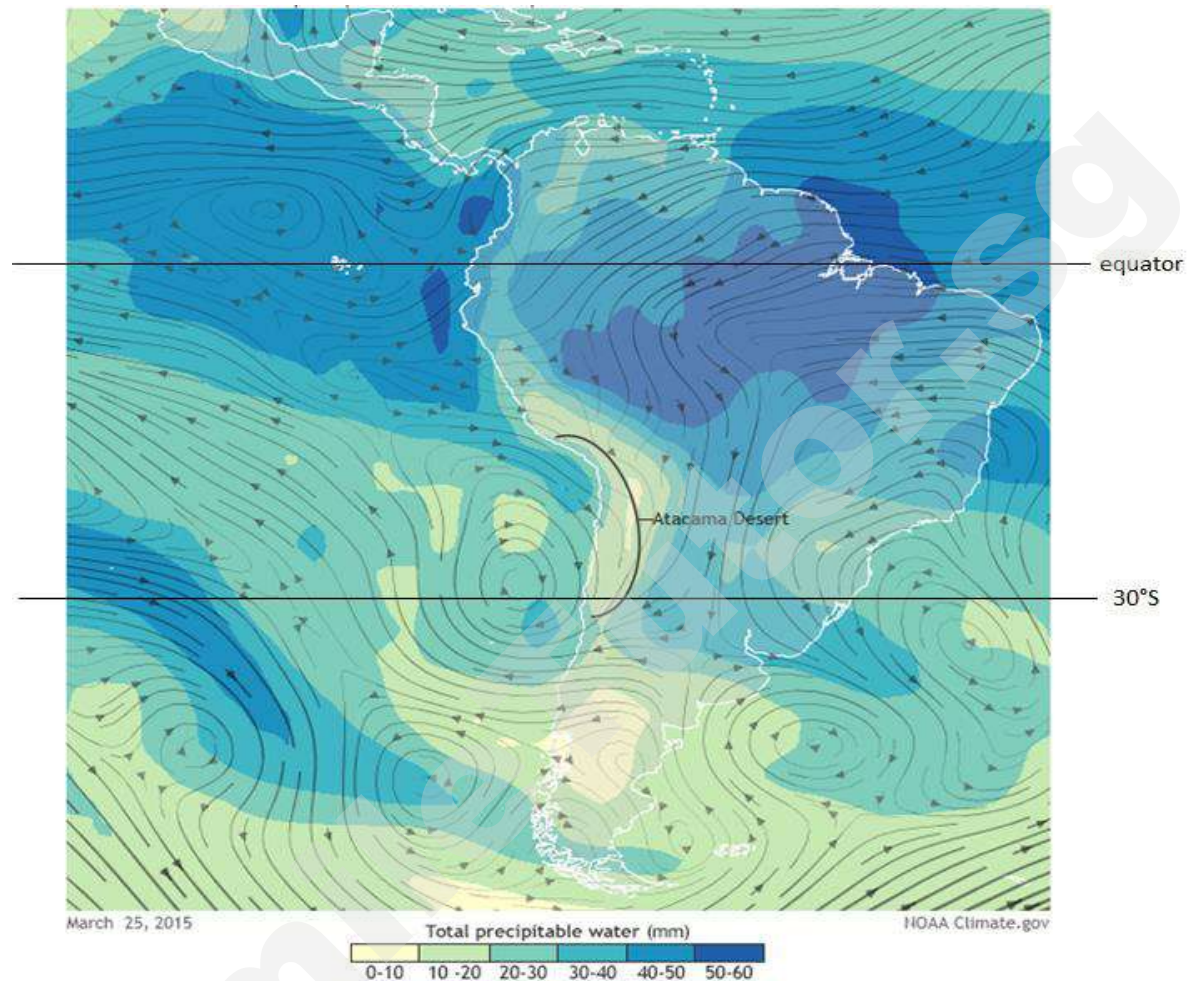
### Resource 3 for Question 1

Sufficiency of services and amenities in the Tiong Bahru neighbourhood



## Resource 4 for Question 2

Wind patterns and moisture available for precipitation in March, 2015, over South America



→ Wind direction

\***Total Precipitable water** is the amount of water potentially available in the atmosphere for precipitation i.e. amount of water vapour available.

[Source: <https://www.climate.gov/news-features/event-tracker/flooding-chile%E2%80%99s-atacama-desert-after-years%E2%80%99-worth-rain-one-day>]

**Resource 5 for Question 2**

**Satellite image of the Atacama Desert in South America**

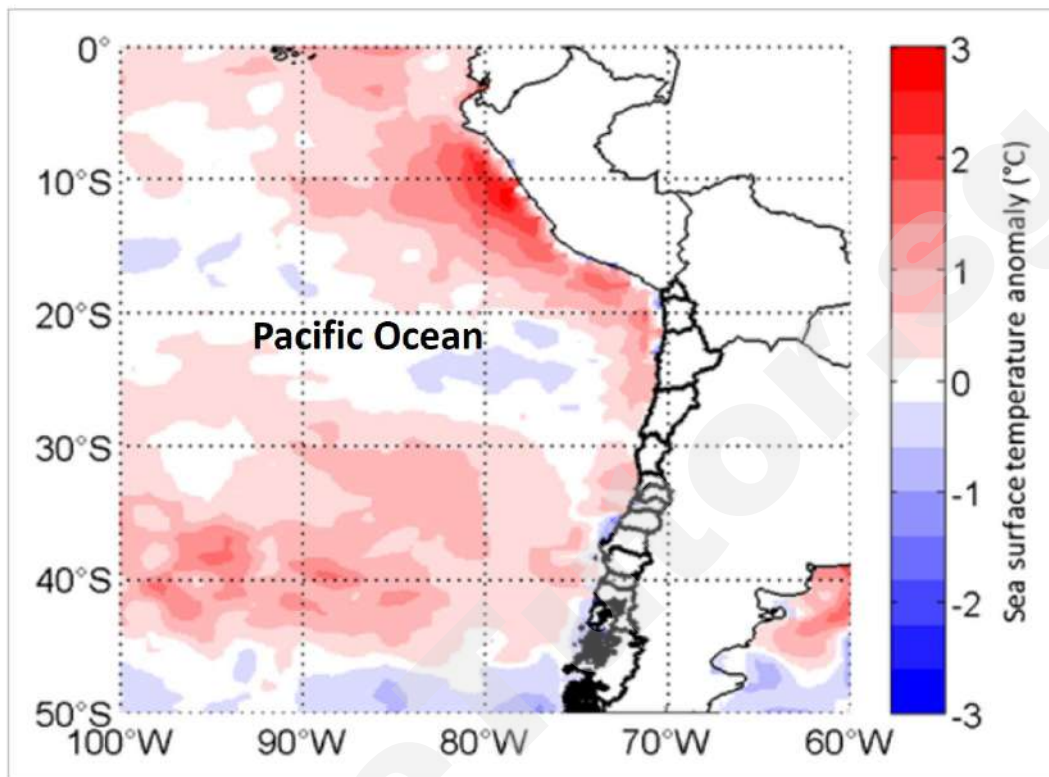


[Source: <https://visibleearth.nasa.gov/view.php?id=73630>]



**Resource 6 for Question 2**

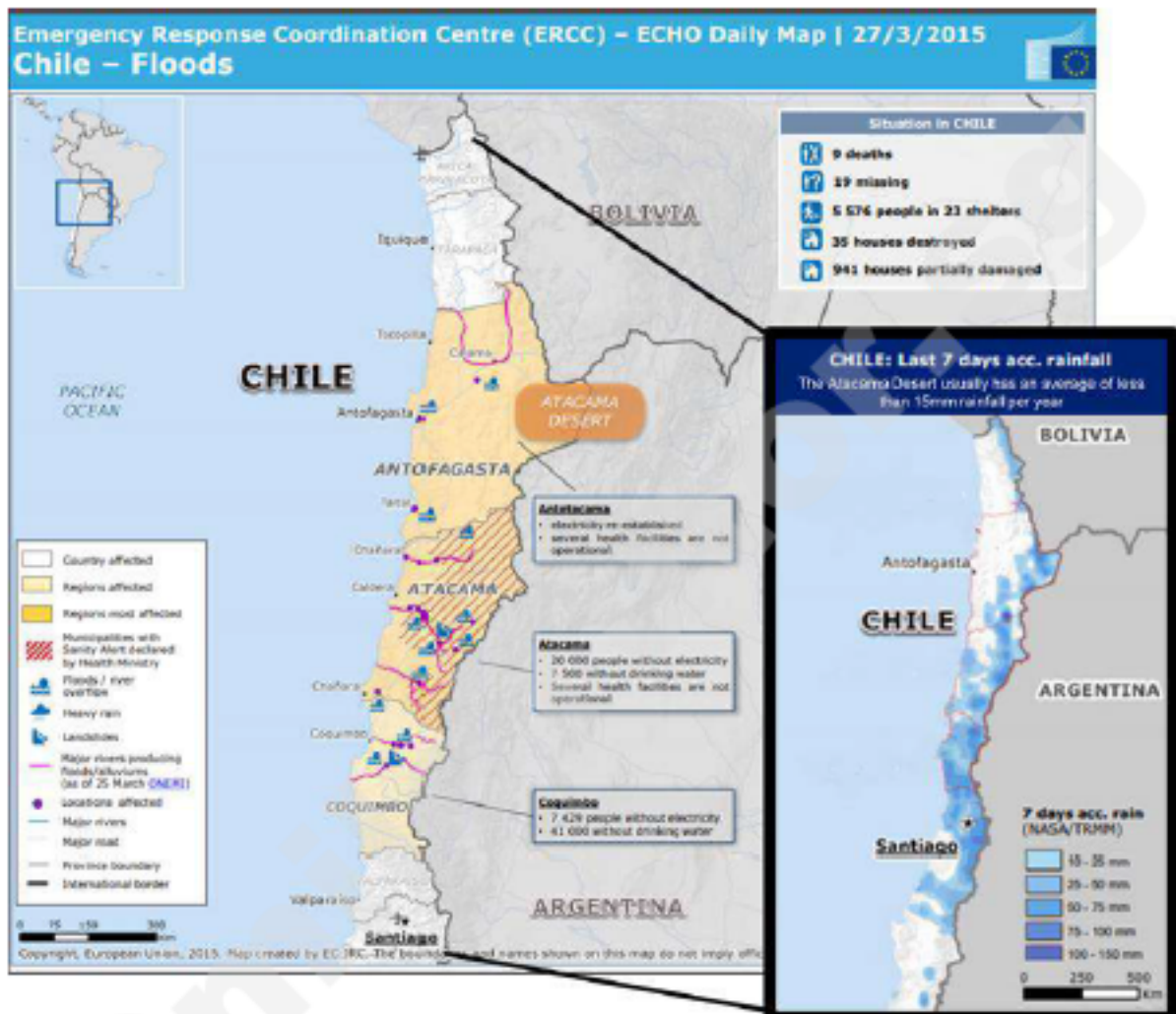
**Sea surface temperature anomalies along the Eastern Pacific Ocean for 20-24 March, 2015**



[Source: <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2016JD024835>]

## Resource 7 for Question 2

### Impacts of floods in the Atacama Desert, Chile



[Source: <https://reliefweb.int/map/chile/chile-floods-echo-daily-map-2732015>]



**Catholic Junior College**  
**JC2 Preliminary Examinations**  
**Higher 1**

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**GEOGRAPHY**

**8813/01**

Paper 1

**2 September 2019**

**3 Hours**

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**Section A**

Answer Question 1.

**Section B**

Answer Question 2.

**Section C**

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## Section A

### Theme 3: Geographical Investigations

- 1 A group of five 18-year-old students from Singapore wanted to study the liveability of residents in the neighbourhood of Tiong Bahru, Singapore. The students conducted their investigation from 9am to 12pm on a Saturday morning.

The students conducted a landuse survey of the neighbourhood by walking around the neighbourhood and recording the different landuse functions. They presented their findings in a landuse map.

They also conducted a bi-polar survey to assess the perception of the residents with regards to the facilities that were currently available. They stood in front of the Tiong Bahru Market which had high human traffic to distribute the questionnaire survey to the first 20 people who were willing to take the survey.

Resource 1 shows the landuse map of the Tiong Bahru neighbourhood. Resource 2 shows the bi-polar survey questions. Resource 3 shows selected results of the survey.

- (a) Suggest a research question for the investigation and explain why it is capable of research. [3]

#### Point-marked

- Are there sufficient services and amenities for residents in the Tiong Bahru neighbourhood?
- Capable of research because: 3 hours sufficient, five 18 year olds enough to cover just 1 site, site is accessible and easy to find residents, data is measurable

- (b) Explain the strengths and limitations of the landuse map shown in Resource 1 and suggest how it can be improved. [4]

#### Point marked

- Resource 1 (Landuse map): Lack of clarity in the definition of some categories (e.g. 'other services', 'mixed land use', colours may be too similar. To improve: clearly define the categories (e.g. specify type of services)
- Resource 2 (bi-polar bar graph): Average perception score may not provide information on how results may vary across ages, Upper and lower limit of the perception score not stated. To improve: Create more bar graphs to represent different categories of age groups, state the upper and lower limit of the perception score.

- (c) The group concluded that the data collected for their questionnaire survey may not have been completely reliable and/or accurate. [6]

Explain why this is so and suggest how the data collection process of the students' geographical investigation could be improved.

Levels marked

Possible points:

- Sensitive questions (age) → provide an age range option instead
- Lack of preamble to ensure confidentiality, residents may not be fully honest → include a preamble/introduction explaining rationale of survey and to ensure privacy of data
- No definition of some categories such as community spaces and public services

Sampling method (convenience sampling) + duration/timing of investigation, hence results may not be representative → conduct quota/stratified sampling + survey large sample size / frequency

Level	Marks	Descriptors
3	5-6	<ul style="list-style-type: none"> <li>• Response demonstrates accurate knowledge of geographical investigation skills and methods relevant to the given context</li> <li>• Reflects a good understanding of the context of liveability and appropriate select of data required to measure it.</li> </ul>
2	3-4	<ul style="list-style-type: none"> <li>• Response demonstrates good knowledge of geographical investigation skills and methods.</li> <li>• Description may be limited in depth and detail.</li> <li>• Some of the responses may focus on generic urban fieldwork issues and improvements may 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 geographical investigation skills and methods</li> <li>• Explanation may be incorrect, inappropriate or irrelevant to the context of the investigation.</li> </ul>
0	0	No creditworthy response.

- (d) Explain one potential risk in carrying out the research that you may encounter and propose suitable ways of minimising them. [4]

Point marked

Potential conflict during the distribution of questionnaire surveys due to unhappiness from survey respondents

- Conduct fieldwork in pairs to ensure safety
- Use appropriate language during the distribution of questionnaire surveys
- Assure respondents on privacy of data and do not force them to take the survey if they are unwilling to do so

- (e) Discuss the extent to which the findings in the investigation is a good measure of the liveability of residents in the Tiong Bahru neighbourhood. [8]

#### Levels marked

Level	Marks	Descriptors
3	7-8	<ul style="list-style-type: none"> <li>• Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the context of Tiong Bahru</li> <li>• Provides a logical and well-developed evaluation that reflects strong critical thinking skills and a good understanding of the requirements of the question, including links to reliability, accuracy and validity of data.</li> </ul>
2	4-6	<ul style="list-style-type: none"> <li>• Response demonstrates good knowledge and understanding of geographical investigation skills and methods relevant to the context of Tiong Bahru.</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>
1	1-3	<ul style="list-style-type: none"> <li>• Response shows inadequate knowledge and understanding of geographical investigation skills and methods relevant to the context of Tiong Bahru.</li> <li>• Provides a little or no evaluation.</li> <li>• May include material that is irrelevant to the question.</li> </ul>
0	0	<ul style="list-style-type: none"> <li>• No creditworthy response.</li> </ul>

#### Possible points for usefulness of findings

- Secondary data may not be available, hence primary data of residents perception would be useful in measuring liveability
- Sufficiency of services and amenities a relevant benchmark of measuring liveability as they contribute to the well-being and standard of living of the residents

#### Possible points for limitations of findings

- Data collection method not completely reliable due to small sample size, lack of qualitative data

- Needs of certain groups may not be covered (especially minority groups such as the elderly and the disabled)
- Sufficiency of services and amenities not the only benchmark to measure liveability. Also need consider other factors such as accessibility to transport, affordability of services, traffic congestion, pollution.

## Section B

### Theme 2: Urban Change

## Section B

### Theme 1: Climate Change and Flooding

#### Atmospheric and Hydrological Processes in the Atacama Desert

- 2 The Atacama Desert has an average of less than 15mm of rain each year. Resource 4 shows the wind patterns and moisture available for precipitation in March, 2015. Resource 5 shows a satellite image of the Atacama Desert in South America. Resource 6 shows sea surface temperature anomalies along the Eastern Pacific Ocean during 20-24 March, 2015. Resource 7 shows the impacts of floods in the Atacama Desert as reported in 27 March, 2015.

- (a) Describe variations in the total precipitable water over land in South America as shown in Resource 4. [3]

#### Point marked

- High precipitable water (30-50mm) concentrated around NE of South America near the equator
- Low precipitable water (0-20mm) around West coast and South of South America
- Moderate precipitable water (20-30mm) around the Eastern and Northern most part of South America

- (b) With reference to Resource 4 and 5, account for the amount of total precipitable water over the Atacama Desert. [5]

#### Levels marked

Level	Marks	Descriptors
3	5	<ul style="list-style-type: none"> <li>• <b>Accurate knowledge</b> of the likely reasons for the amount of total precipitable water over the Atacama Desert.</li> <li>• <b>Uses resources accurately.</b></li> <li>• <b>Clear focus</b> on the question with <b>detailed account</b> of the reasons for the amount of total precipitable water over the Atacama Desert.</li> </ul>

2	3-4	<ul style="list-style-type: none"> <li>• <b>Adequate knowledge</b> of the amount of total precipitable water over the Atacama Desert.</li> <li>• <b>Uses resource</b> to respond to the question but may be <b>limited or lacks accuracy</b>.</li> <li>• Lacks depth, breadth and clear focus on the question.</li> </ul>
1	1-2	<ul style="list-style-type: none"> <li>• <b>Limited knowledge</b> and identifies some reasons for the amount of total precipitable water over the Atacama Desert.</li> <li>• <b>Largely descriptive</b>.</li> <li>• <b>Little or no use of resource</b>.</li> <li>• Use of resource where present will <b>lack accuracy</b>.</li> </ul>
0	0	No creditworthy response.

Possible points:

- Total precipitable water mostly between 10-20mm, with a small strip along the coast between 20-30mm
- Lack of water potentially available for precipitation due to lack of exposed water bodies in the desert for evaporation to occur (low ACTET), soil moisture deficit
- Absence of vegetation reduces evapotranspiration rates
- Position near 20-30S near sinking limb of the Hadley cell, descending air prevents evaporation and condensation from taking place
- Position at leeward side of Andes mountains
- Slightly higher precipitable water near the coast due to evaporation from the Pacific ocean forming clouds + direction of wind blowing towards the Atacama Desert may bring about more moisture

- (c) With reference to Resource 4 and 6, and your own knowledge, explain [6]  
why there may be an increase in rainfall over the Atacama Desert in March, 2015.

Levels marked

Level	Marks	Descriptors
3	5-6	<ul style="list-style-type: none"> <li>• <b>Accurate knowledge</b> of the likely reasons for the increase in rainfall over the Atacama Desert.</li> <li>• <b>Uses resources accurately</b>.</li> <li>• <b>Clear focus</b> on the question with <b>detailed account</b> of the reasons for the increase in rainfall over the Atacama Desert.</li> </ul>
2	3-4	<ul style="list-style-type: none"> <li>• <b>Adequate knowledge</b> of the likely reasons for the increase in rainfall over the Atacama Desert.</li> <li>• <b>Uses resource</b> to respond to the question but may be <b>limited or lacks accuracy</b>.</li> <li>• Lacks depth, breadth and clear focus on the question.</li> </ul>
1	1-2	<ul style="list-style-type: none"> <li>• <b>Limited knowledge</b> and identifies some reasons for the increase in rainfall over the Atacama Desert.</li> <li>• <b>Largely descriptive</b>.</li> </ul>

		<ul style="list-style-type: none"> <li>• <b>Little or no use of resource.</b></li> <li>• Use of resource where present will <b>lack accuracy.</b></li> </ul>
0	0	No creditworthy response.

Possible points include:

- Wind direction blowing from Pacific ocean towards land, brings moisture to the area
- Increase in SST anomalies (around 0.5 to 2.5 degrees Celsius of positive anomaly) along Eastern Pacific Ocean increases evaporation rates → may lead to condensation at dewpoint temperature and rain
- This increase in temperatures may be due to El Nino and/or global warming. Explain in detail.

- (d) With reference to Resource 5 and 7, suggest how the accumulated rainfall amount as shown in Resource 7 may affect the flows and storages in the Atacama Desert. [4]

Point marked

- Increase HOF due to sudden increase in rainfall (between 10-75mm of rain over 7 days when annual average is 15mm) & baked desert ground that may be low in porosity
- Increase in infiltration may lead to increase in soil moisture storage and throughflow due to higher rainfall and low antecedent soil moisture
- Increase in percolation may lead to increase in groundwater storage and baseflow
- Increase in channel flow due to higher input levels and contributions from the above flows

- (e) With reference to some resources and your own knowledge, explain the factors that contributed to the impacts of floods in the Atacama Desert as shown in Resource 7. [7]

Levels marked

Level	Marks	Descriptors
3	6-7	<ul style="list-style-type: none"> <li>• <b>Accurate knowledge</b> of the factors that contributed to the impacts of floods in the Atacama Desert.</li> <li>• <b>Uses resources accurately.</b></li> <li>• <b>Clear focus</b> on the question with <b>detailed account</b> of the reasons for the factors that contributed to the impacts of floods in the Atacama Desert.</li> </ul>
2	3-5	<ul style="list-style-type: none"> <li>• <b>Adequate knowledge</b> of the likely reasons for the factors that contributed to the impacts of floods in the Atacama Desert.</li> <li>• <b>Uses resource</b> to respond to the question but may be <b>limited or lacks accuracy.</b></li> </ul>



		<ul style="list-style-type: none"> <li>Lacks depth, breadth and clear focus on the question.</li> </ul>
1	1-2	<ul style="list-style-type: none"> <li><b>Limited knowledge</b> and identifies some reasons for the factors that contributed to the impacts of floods in the Atacama Desert.</li> <li><b>Largely descriptive.</b></li> <li><b>Little or no use of resource.</b></li> <li>Use of resource where present will <b>lack accuracy.</b></li> </ul>
0	0	No creditworthy response.

Possible points include:

- Desert ground low in permeability → high rates of surface run off (HOF) increasing overland flow and subsequently channel flow contributing to the extent of flood
- Proximity to ocean increases flood vulnerability
- Unexpected large amount of rainfall compared to usual rainfall amounts → lack of flood preparation measures such as warning systems, hard and soft engineering methods to cope with floods
- Lack of preparedness worsen with possibly poor existing infrastructure easily susceptible to damage to electricity, water supply and inadequate health facilities

### 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 the anthropogenic activities in Less Developed Countries that have contributed to global warming. [9]

Responses should consider a range of human activities in LDCs that have contributed to global warming. Points could include the increase focus on agriculture, animal farming, rapid urbanisation and industrialisation, little funds to invest in alternative energy sources. Explanation as to how these has contributed to global warming is required.

Better responses will explain the contextualisation of human activities from LDCs in detail, and rank the significance of these activities in contributing to global warming.

- (b) To what extent is alternative energy the best response to contemporary climate change? [16]

Responses should consider the range of strategies that can be used to address or adapt to climate change. They include increasing carbon sinks, adaptation strategies like agricultural practices, geoengineering to cope with the heat, water conservation. All have their pros and cons.

Better responses will be able to articulate that the best response is that which is holistic and suited for the context of the country's resources and needs. Evaluation criteria can include the longevity of strategies, the cost effectiveness for country involved and if they address the root cause of the problem. Better responses also have detailed examples consistently used to argue for their points.

- 4(a) Explain the flood management strategies that countries with limited financial resources can use. [9]

Responses should focus on soft and hard measures of flood protection – hard engineering e.g. levees, walls etc, as well as soft measures e.g. zoning, evacuation, monitoring, afforestation. Better responses will contextualise to cheaper methods.

- (b) "Global warming can bring about serious negative impacts to all countries." To what extent do you agree with this statement? [16]

Responses should consider that while there are negative impacts to be had, there are possibly good impacts for some, and the type and extent of negative impacts will differ across all countries.

Better responses will be able to articulate that a country's level of development, geophysical condition, access to strategies will determine the extent of negative impacts. Better responses will also have detailed examples that are consistently used.

## **Theme 2: Urban Change**

- 5(a) Explain the waste management problems faced by countries with low levels of development. [9]

Reasons should explain the reasons for waste management problems in countries with low levels of development. This may include difficulties in the collection of waste, the dependency on scavenging as a source of livelihood, and the lack of financial resources / government planning to invest in more environmentally friendly waste disposal methods.

- (b) 'Lack of funding poses the greatest challenge to achieving urban liveability.' With reference to some strategies, to what extent do you agree with the statement? [16]

Students should provide a well-evaluated argument to discuss the extent to which political factors determine the effectiveness of strategies used to achieve urban liveability. These factors should be contrasted against other factors such as socio-economic and environment factors. A range of urban liveability issues such as urban reimagining, meeting the needs of minority groups and coping with fear in the city should be discussed. Arguments should be well-exemplified. Overall stand should be consistent and well justified.

Better responses would also analyse how the effectiveness of strategies is dependent on the type of strategies being implemented as the success of some strategies may be more easily achieved through a top-down approach from the government than others.

- 6(a) Explain the reasons for **either** fear **or** crowding in different parts of the city [9]

Reasons should include links to the environmental and social thesis for fear in the city. This includes reasons associated with the physical and social characteristics of the place, along with the characteristics of the individual that may alter the perception of fear. Better responses will have clear examples and focus on linking the factors to the different parts of cities.

- (b) Discuss the effectiveness of strategies used to manage **either** fear **or** crowding in cities. [16]

Students should provide a well-evaluated argument to discuss the effectiveness of different strategies at the individual and government scale used to manage fear in the cities. Links should be made to both the fear of crime and the fear of terrorism. Arguments should be well-exemplified. Overall stand should be consistent and well justified.

Better responses should include an analysis of how the context of the cities and the varying reasons for the fear would affect the relative effectiveness of such strategies

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



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## GEOGRAPHY

Paper 1

**8813/01**

**16 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.  
You may use an HP pencil for any diagrams, graphs or rough working.  
Write your answer to each question on a fresh sheet of paper.  
Do not use paper clips, highlighters, 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 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.

All 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.

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This document consists of **4** printed pages.

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## Section A

### Theme 3: Geographical Investigation

- 1 A class of 16 Geography students from a secondary school in Singapore wanted to compare the liveability of elderly residents of 2 housing towns. They selected Toa Payoh, the second oldest housing town in Singapore, and Punggol a new housing town for their geographical investigation.

The students conducted secondary research on the population, percentage of the elderly population and the number of facilities in the housing towns. They collected primary data from the elderly residents (65 and above) through a questionnaire survey. 20 elderly residents were surveyed at each housing town. To conduct their questionnaire surveys, the students situated themselves at the MRT station of each housing town on a weekday afternoon. They selected their respondents using convenience sampling.

Elderly residents were asked to rate their satisfaction with the facilities located in each housing town, including the MRT station, shopping centres, food courts and clinics.

Resource 1 shows the location of the 2 housing towns. Resource 2 shows the secondary data on population and number of facilities for the 2 towns. Resource 3A and Resource 3B show the satisfaction level of facilities rated by the elderly residents.

- (a) Using Resource 1, suggest a research question for the students' investigation, and briefly explain why it is of a suitable scale. [3]
- (b) With reference to Resource 1, provide a reason for the choice of Toa Payoh and Punggol housing towns for this geographical investigation. [2]
- (c) Explain two possible challenges the students will face when conducting their questionnaire surveys and suggest how they can overcome them. [6]
- (d) Explain how the data from Resource 2, 3A and 3B help the students compare the liveability of the elderly residents in the 2 housing towns. [6]
- (e) Evaluate this investigation on the liveability of the elderly residents in the two housing towns and explain how it could be improved and extended. [8]

## Section B

### Theme 1: Climate Change and Flooding

#### Flooding in Bangladesh

- 2** The Ganges and Brahmaputra Rivers are transboundary rivers flowing through India and Bangladesh. The two rivers originate from the western Himalayas and flow through North India into Bangladesh, before reaching the Bay of Bengal.

The discharge of the Ganges and Brahmaputra basin are influenced by the monsoons. About 84% of the total rainfall received in Bangladesh occurs during the wet monsoon in June to September, making the country vulnerable to extreme floods during this period.

In the Ganges Brahmaputra delta, home to 170 million people, the surviving wetlands are up to 1.5 metres above the embanked and reclaimed land. When the wetlands are disconnected from the rivers, the land no longer naturally builds up with the sea level rise.

Resource 4A shows the location of the Ganges and Brahmaputra in Bangladesh. Resource 4B shows an excerpt of an article on impact of climate change on Bangladesh. Resource 5 shows the river regimes of Ganges, Brahmaputra and Upper Meghna during an average flood year and an extreme flood year. Resource 6 shows the summer and winter monsoon over India. Resource 7 shows the relationship between carbon dioxide in the atmosphere and human emission of carbon dioxide from 1880 – 2010.

- (a) With reference to Resource 5, compare the variations in discharge of Ganges and Brahmaputra in an average flood year and an extreme flood year. [4]
- (b) Using Resource 4A, 6 and your own knowledge, explain how monsoons affect the rainfall distribution in Bangladesh. [5]
- (c) Explain how humans are responsible for climate change as evident in Resource 7. [3]
- (d) With reference to Resource 4A, 4B, 5, 6 and your own knowledge, explain how rising sea levels will impact Bangladesh. [5]
- (e) Using the resources and your own knowledge, to what extent are low income countries like Bangladesh most vulnerable to climate change? [8]

### 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 how human activities cause floods in the humid tropics. [9]
- (b) To what extent is the shifting of the Inter-Convergence Zone (ITCZ) responsible for the rainfall patterns across the tropics? [16]
- 4 (a) Explain the evidence of climate change since the last ice age. [9]
- (b) “We can mitigate effects of climate change and adapt to its consequences.” How far to you agree to this statement? [16]

#### Theme 2: Urban Change

- 5 (a) Explain how urban reimagining may affect different urban dwellers in cities at high levels of development. [9]
- (b) ‘Strategies to manage traffic congestion in cities vary in success due to the level of development.’ How far do you agree with this statement? [16]
- 6 (a) Explain how sources of fear in cities can affect the liveability of cities in high levels of development. [9]
- (b) Evaluate the success of strategies used to address fear in the cities to improve liveability. [16]



EUNOIA JUNIOR COLLEGE  
JC2 Preliminary Examination 2019  
General Certificate of Education Advanced Level  
Higher 1

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## GEOGRAPHY

**8813/01**

**16 September 2019**

**3 hours**

Additional Materials

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

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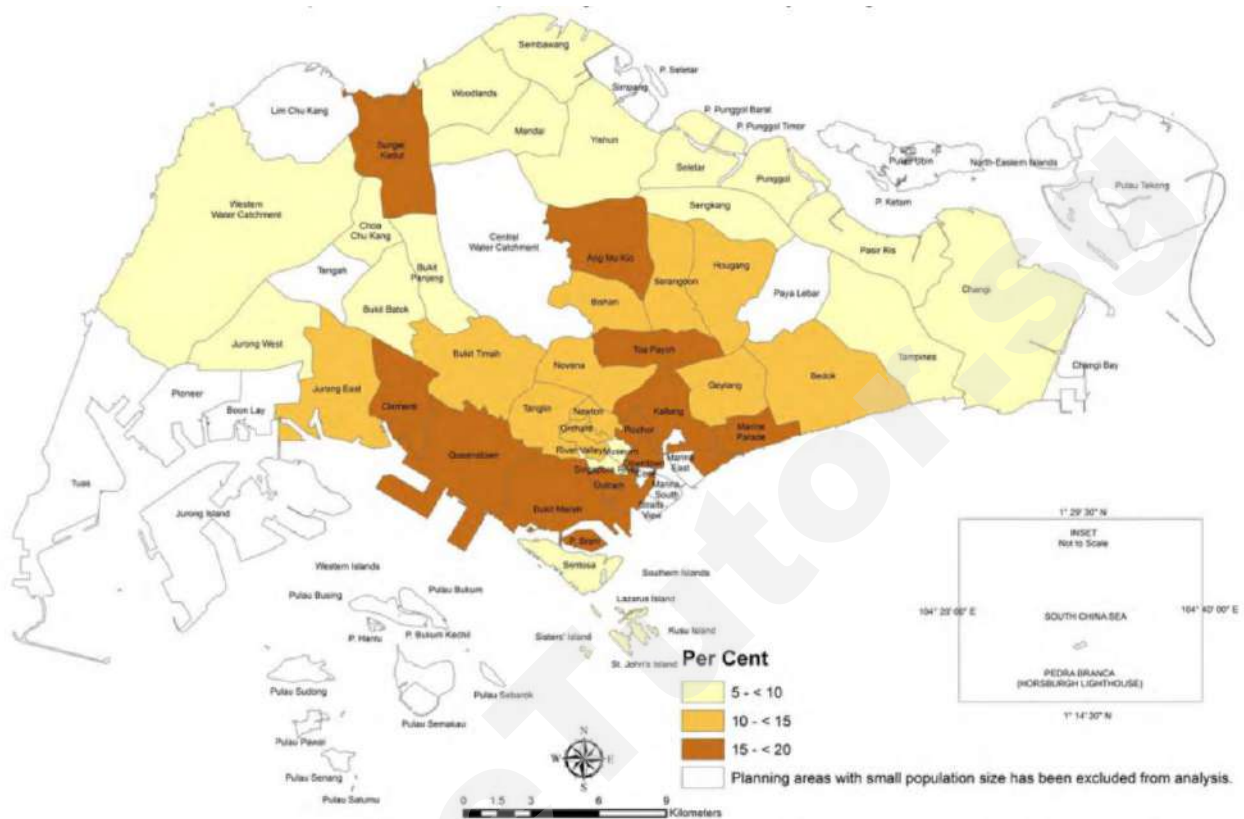
This document consists of **6** printed pages.

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## Resource 1 for Question 1

### Proportion of resident population aged 65 years and over by planning area



## Resource 2 for Question 1

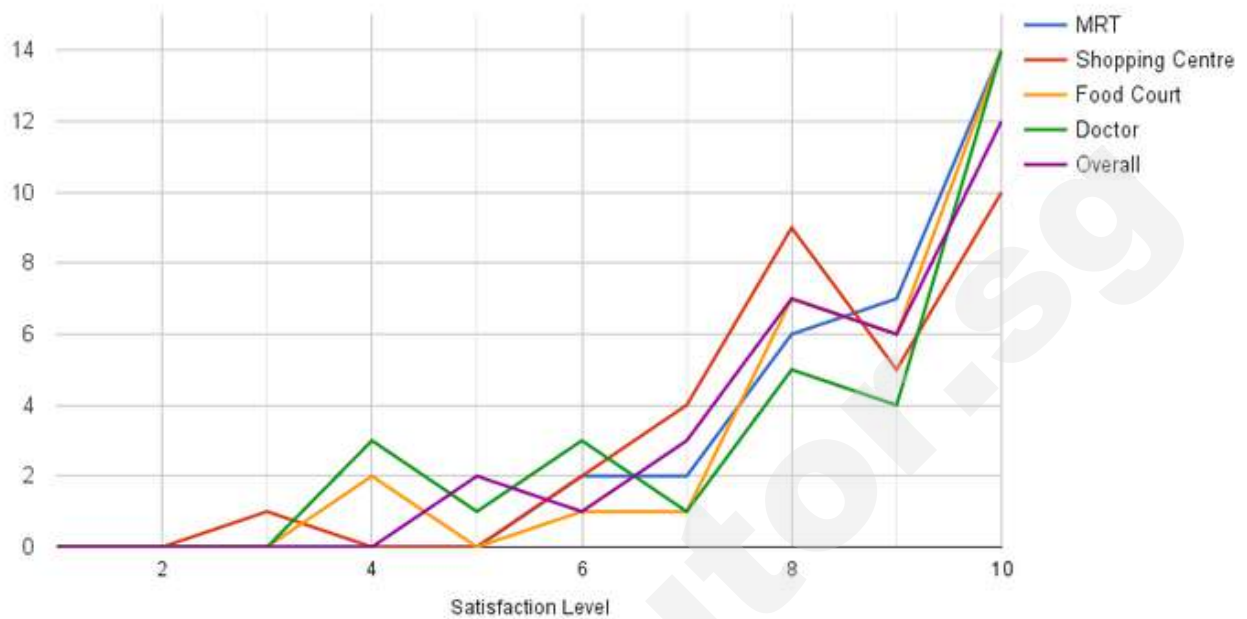
### Secondary data on population and facilities in Toa Payoh and Punggol

	Toa Payoh	Punggol
Total number of residents	126,720	98,140
Number of residents per km <sup>2</sup>	14,080	10,255
Number of food courts / hawker centres	10	2
Number of residents per food court / hawker centre	12,672	49,070
Number of clinics	36	15
Number of residents per clinic	3,520	6,542

### Resource 3A for Question 1

#### Satisfaction level of facilities by elderly residents for Toa Payoh

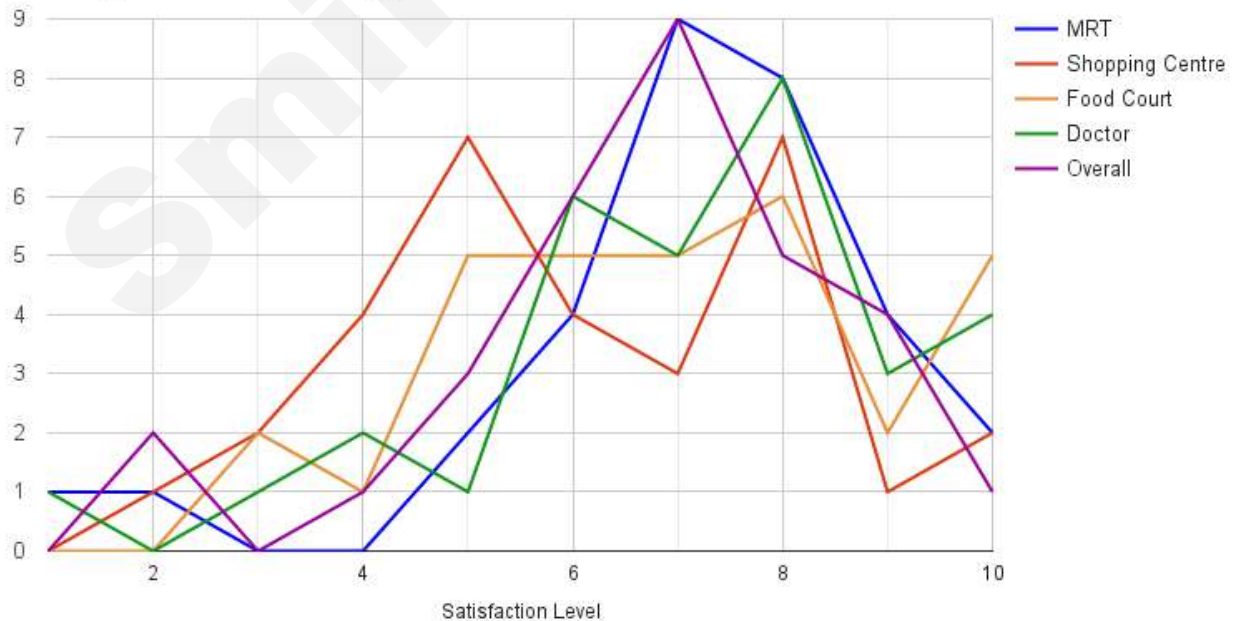
Range of Results for Toa Payoh



### Resource 3B for Question 1

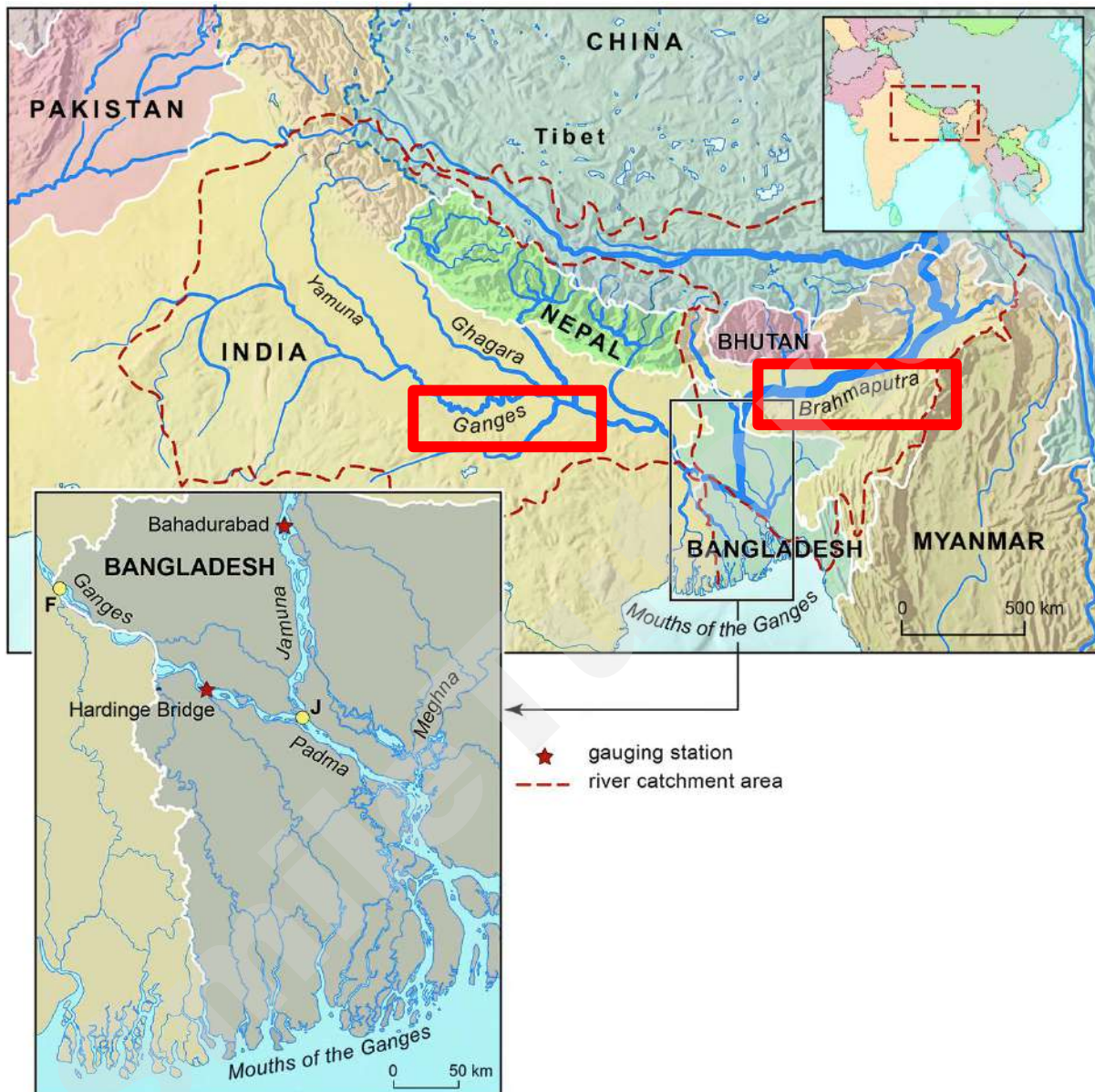
#### Satisfaction level of facilities by elderly residents for Punggol

Range of Results for Punggol



## Resource 4A for Question 2

### Location of Ganges and Brahmaputra rivers



## Resource 4B for Question 2

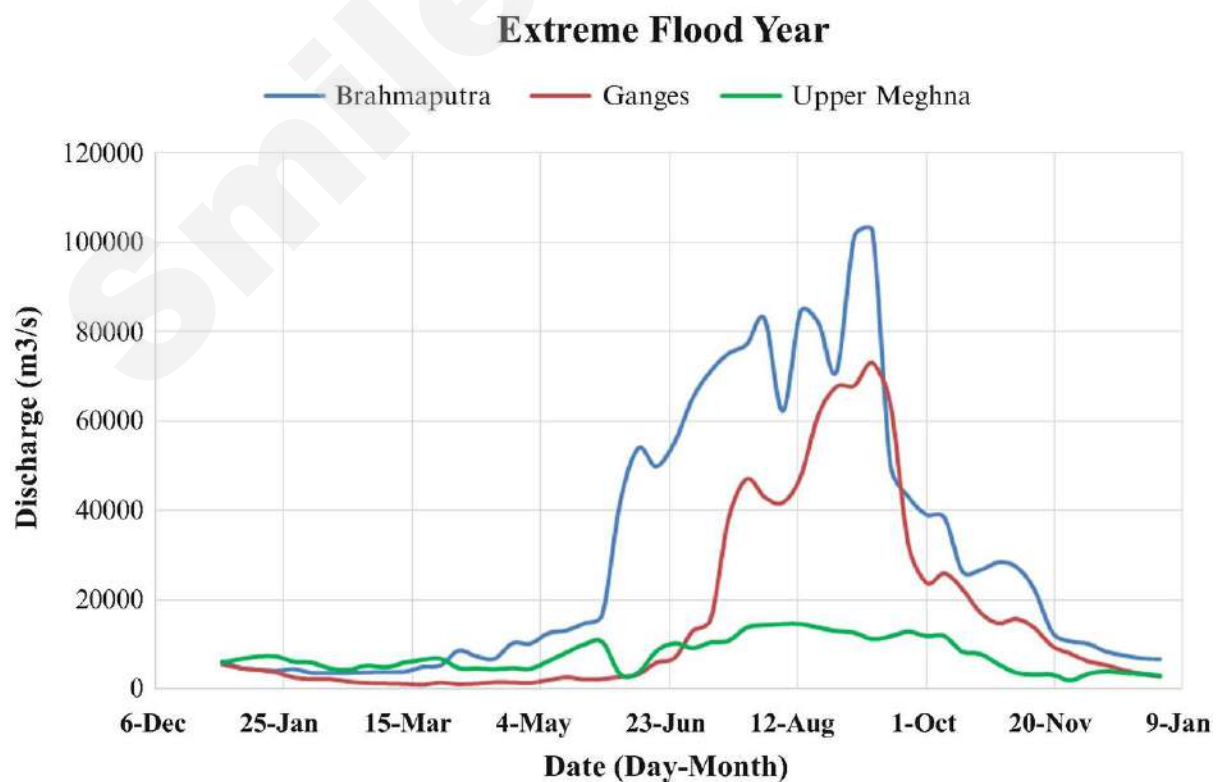
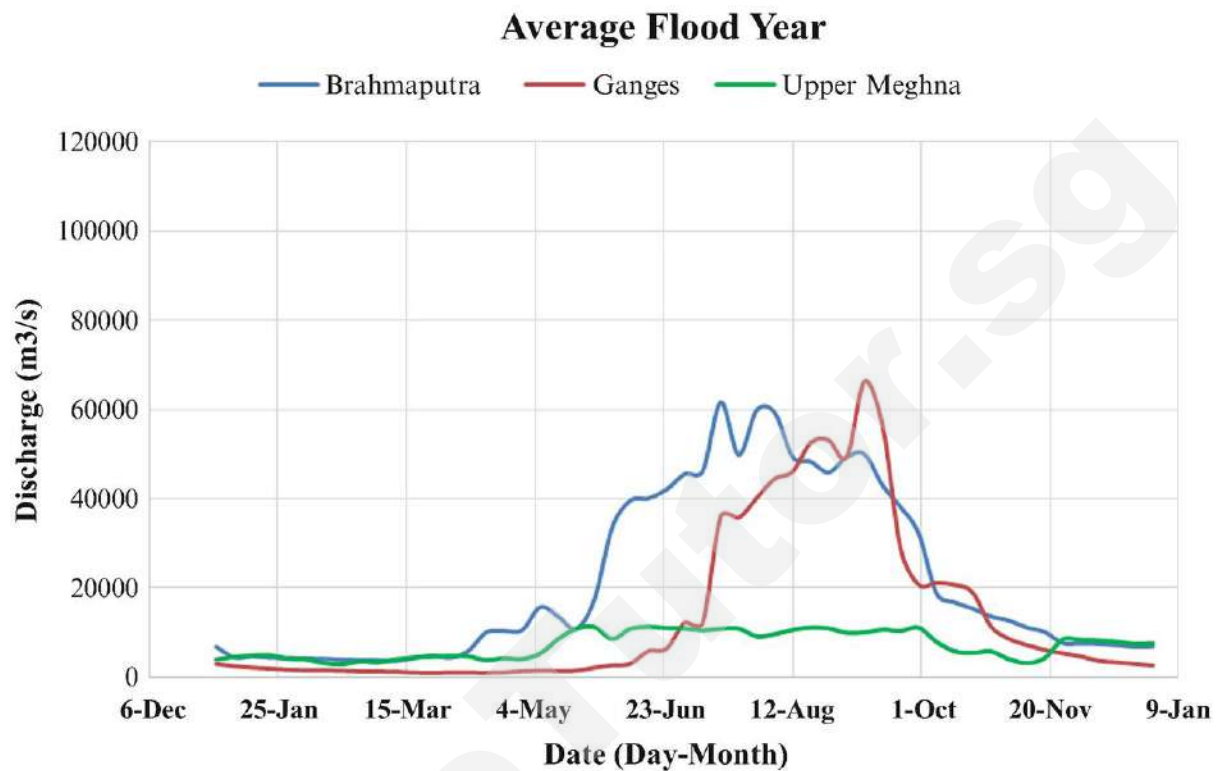
### Excerpt of an article on impact of climate change on Bangladesh

**National Geographic:** Bangladesh has always survived its share of tropical storms, flooding, and other natural disasters. But today, climate change is accelerating old forces of destruction, creating new patterns of displacement, and fueling an explosion of rapid, chaotic urbanization. While the country is keenly aware of its vulnerability to climate change, not enough has been done to match the pace and scale of the resultant displacement and urbanization, toppling any prospect of a humane life for one of the world's largest populations of climate migrants. Bangladesh holds 165 million people in an area smaller than Illinois. One-third of them live along the southern coast, a lush honeycomb of island villages linked by protective embankments. Most of the country's land area is no higher above sea level than New York City, and during the rainy season more than one-fifth of the country can be flooded at once.



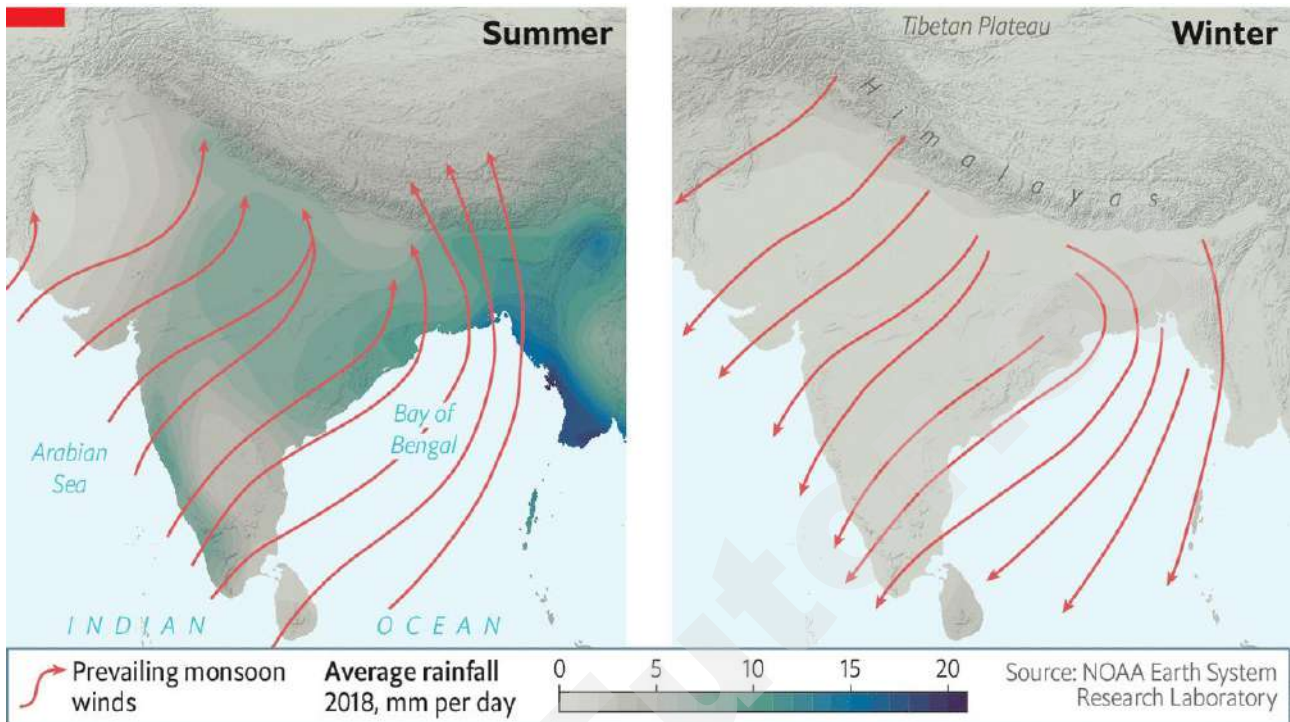
### Resource 5 for Question 2

#### River Regimes of Brahmaputra, Ganges and Upper Meghna (Average Flood year and Extreme Flood year)



## Resource 6 for Question 2

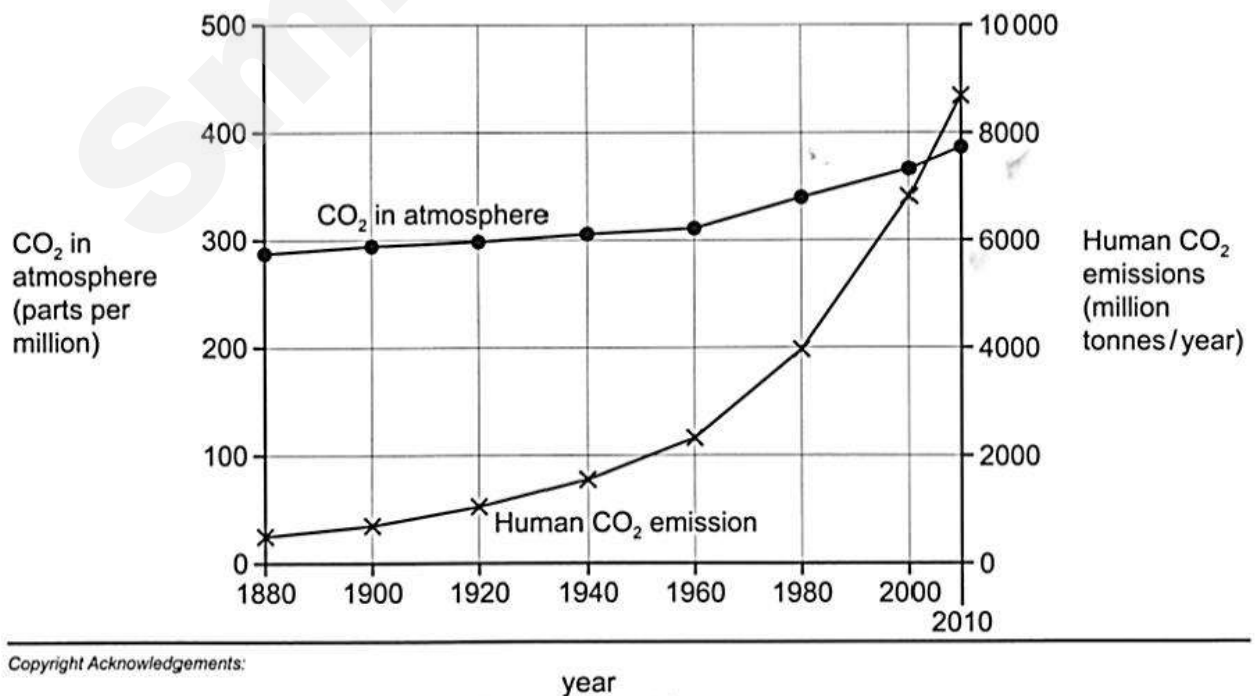
### Summer and winter monsoons over India



The Economist

## Resource 7 for Question 2

### Relationship between carbon dioxide in the atmosphere and human emissions of carbon dioxide from 1880-2010



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## GEOGRAPHY

Paper 1

8813/01

16 September 2019

3 hours

# Mark Scheme

Additional Materials: Answer Paper  
1 Insert  
World outline map

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Answer Question 1.

#### Section B

Answer Question 2.

#### Section C

Answer **two** questions, each from a different theme.

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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 3: Geographical Investigation

- 1 A class of 16 geography students from a secondary school in Singapore wanted to compare the liveability for elderly residents of 2 housing towns. They selected Toa Payoh, the second oldest housing town and Punggol a new housing town in Singapore.

The students did some secondary research on the background of the towns which include the population, the percentage of the elderly population and the number of facilities. They collected primary data from the elderly residents (65 and above) through a questionnaire survey. A total of 20 residents were surveyed at each town. They situated themselves at MRT stations of both towns on a weekday afternoon after school to do their survey. They use random sampling in their selection of interviewees.

Elderly residents were asked to rate the convenience to get to the facilities and their satisfaction with the facilities. The facilities covered were food mall, mrt station, clinic, and shopping centre.

Resource 1 shows the location of the 2 housing towns. Resource 2 shows the secondary data on population and number of facilities for the 2 towns. Resource 3A and Resource 3B show data on the satisfaction level of facilities by the elderly residents.

- (a) Using Resource 1, suggest a research question for the group to guide them in their investigation, and briefly explain why it is of a suitable scale. [3]

*To what extent is Toa Payoh more liveable than Punggol for the elderly residents? (1m)*

- *Small scale – able to research within the time frame given (1m)*
- *Choice of two housing estates – could be managed given the no of students (1m)*

*Accept any plausible RQ. – must have a comparative element.*

- (b) Give a reason for the choice of the two housing towns by the group for their comparative study. [2]

- *Since they are doing a comparable study, the choice of an old and new housing towns is appropriate. (1m)*
- *Both towns show different proportion of elderly and so it would be interesting to see the difference in the liveability for the elderly. (1m)*

- (c) Explain two possible challenges the students will face in the collection of data and suggest how they can overcome them. [5]

- *Getting the number of elderly for their survey may be a problem due to the timing of collection*
- *Or The place of data collection may not be ideal as elderly are unlikely to use MRT compared to buses or may not reach out to those less mobile elderly*
- *Communication with the elderly as most students may not be able to speak dialects or other languages ( Tamil, Malay) which will skew their study*

*Suggestions*

- *Have a variety of venues – elderly centres, neighbourhood coffee shops*

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- Ensure students can speak non-Chinese dialects, pre-recording of questionnaire in dialects. Record interview for translation.
  - Conduct during morning when elderly goes for exercise or market
- AT least 2 challenges and suggestions

(d) To what extent can the data from Resource 2, 3A and 3B help the students make a comparison of the liveability for the elderly residents in the 2 housing towns. [6]

- Resource 2 shows that Toa Payoh is more liveable for elderly residents as the no. of resident per facilities is much smaller compared to Punggol
- However the data did not specify the no. of elderly to the facilities unless they make reference to Resource 1.
- Resource 3 A and 3B shows the level of satisfaction of elderly residents of the facilities in both Toa Payoh and Punggol respectively
- Most of respondents from Toa Payoh rated their level of satisfaction at 10 compared to punggol where most of the facilities are rated at range of 7-8
- Hence to a large extent, one can conclude that Toa Payoh is more liveable
- If we corroborate the 3 sets of resources ,

*Limitations*

- Graphs could be placed together for easy comparison
- Resource 2 – did not give the elderly population
- Measuring satisfaction level – subjective and the ranking may not be accurate as different people have different expectation.

( 2m for Resource 2, 2 m for Resource 3A and 3B.)

(e) Evaluate this investigation about the liveability of the elderly and explain how it could be improved and extended. [8]

Indicative Content

*Critique the Methodology*

- Convenience sampling – may not be able to target a spread of elderly in term of age ( young-old, old-old, sex ratio, socio-economic group)
- Limited facilities investigated – could increase and choose facilities for elderly like day-care centres, recreation spaces for elderly, markets rather than shopping centres , transport
- No. of population sampled – could increase for more reliable data and to catch a wider spread of elderly demographics
- Timing – related to the above points – weekday. And weekend
- Survey questions – could improve to more questions – length of stay in housing town, profile of elderly, include qualitative data
- Extension could include more housing towns to see patterns between new and old towns

Level	Marks	Descriptors
3	7-8	Provides a logical and well-developed evaluation of the methodology, research design that reflects strong critical thinking skills and a good understanding of what makes a sound research. Appropriate suggestions and extension to the research are sound.
2	4-6	Provides an evaluation, which may be limited in depth and detail of the methodology and research design. Response reflects critical thinking skills but not consistent and some basic understanding.



		Weaker response – not all the suggestions and extension to research are appropriate
1	1-3	Provides a little or no evaluation of the methodology. May include material that is irrelevant to the question. Poor or absence of suggestions for improvement and extension for the research
0	0	No creditworthy response.

## Section B

### Theme 1: Climate Change and Flooding

#### Flooding in Bangladesh

- 2 The Ganges and Brahmaputra Rivers are trans-boundary rivers of Asia which flows through India and Bangladesh. The two rivers rise in the western Himalayas and flows south and east through North India into Bangladesh, where it empties into the Bay of Bengal.

The discharge of the Ganges and Brahmaputra basin is influenced by the Southwest Monsoon. About 84% of the total rainfall occurs in the monsoon from June to September. Bangladesh, in particular, frequently experiences drought during the dry season and regularly suffers extreme floods during the monsoon.

In the Ganges Brahmaputra delta in Bangladesh and India, home to 170 million people, the surviving wetlands are up to 1.5 metres above the embanked and reclaimed land. When the wetlands are disconnected from the rivers the land no longer naturally builds up with rising sea level due to climate change.

Resource 4 shows the location of the Ganges and Brahmaputra in Bangladesh. Resource 4 shows the river regimes of Ganges, Brahmaputra and Upper Meghna during average flood and extreme flood year. Resource 6 shows the summer and winter monsoon over India. Resource 7 relationship between carbon dioxide in the atmosphere and human emission of carbon dioxide 1880 – 2010.

- (a) With reference to Resource 5, compare the variation in discharge of river Ganges and Brahmaputra in average flood and extreme flood year. [3]

*Similarities [1m]*

- similar periods of peak discharge for both average flood and extreme flood year
- quote data

*Differences [2m]*

- Discharge for extreme flood year is much higher than average flood year
- quote data
- Ganges peak is also for a longer period of time
- Brahmaputra greater discharge and more fluctuations

*Accept plausible comparison. Must have one similarity or difference.*

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- (b) Using Resource 4, 6 and your own knowledge, explain how the changes in monsoon winds affect the rainfall distribution in Bangladesh. [5]

*Summer Monsoon – during July due to differential heating of landmasses between Central Asia and Australia*

*SW/SE Monsoon blows over the Bay of Bengal pick up moisture and deposit them on coastal and SE of Bangladesh ( relief rain*

*Winter Monsoon – during Jan – wind blows out from Central Asia towards Bangladesh as NE monsoons*

*Since it is from the cold land – it is dry – giving rise to dry season over Bangladesh*

*Description of monsoon ( 2-3 m)*

*Relate to the rainfall distribution shown on the resource*

- (c) Using Resource 7, explain how the data support humans' role in climate change. [3]

*Rising CO<sub>2</sub> in the atmosphere correlate with rise trends in human's emission of CO<sub>2</sub> {1m}*

*Rising emission due to emission of greenhouse gasses which traps heat in the atmosphere leading to rising global temperature – climate change [1m]*

*Quote data [1m]*

- (d) With reference to resource 4, 5, 6 and your own knowledge, explain how rising sea level will impact Bangladesh. [6]

*Impacts could include any of the following with elaboration and/or specific data*

- *Salt water intrusion*
- *Destruction of croplands – flooding*
- *Storm surge – flooding*
- *Climate refugees*
- *Coastal erosion – loss of land*

*At least 3 impacts with elaboration and specific data. Each impact award 2 marks*

- (e) To what extent are countries with low level development like Bangladesh most vulnerable to climate change? [8]

*Indicative Content*

*Identify the vulnerability of low level development countries which could include:*

- *Dependence on weather/climatic conditions economy like agriculture*
- *Less equipped to deal with the impacts of climate change*
- *Small island state – danger of disappearance with rising sea level*
- *Coastal locations – floodplains and delta with high population density*
- *Subjected to extreme weather events like cyclones , droughts, floods*

*Resilience of some of these countries in coping with climate change*

- *Maldives -*
- *Bangladesh – salt-resistant crops, switch to prawn farming*
- *Tuvalu – seek new lands*

Level	Marks	Descriptors
3	7-8	<p>Response demonstrates accurate knowledge and understanding of the challenges relevant to the given context.</p> <p>Provides a logical and well-developed evaluation that reflects strong critical thinking skills and a good understanding of the requirements of the question.</p> <p><i>A high level response will establish a clear stand with regards to the assertion and provide supporting evidence to support its claim. Response should evaluate by establishing the extent low level development countries are vulnerable to climate change.</i></p>
2	4-6	<p>Response demonstrates good knowledge and understanding of challenges relevant to the given context. Provides an evaluation, which may be limited in depth and detail. Response reflects critical thinking skills but not consistent and some parts may not always be relevant to the question.</p> <p><i>At this level, response attempts to show the factors affecting the vulnerability to climate change of low level development countries but may not be able to provide relevant examples or show consistency in evaluation.</i></p>
1	1-3	<p>Response shows inadequate knowledge and understanding of challenges relevant to the given context. Provides a little or no evaluation. May include material that is irrelevant to the question.</p> <p><i>A fragmented or incomplete response that show little or no evidence of understanding the issue of the question.</i></p>
0	0	No creditworthy response.

### 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 how human activities cause floods in the humid tropics?

[9]

Indicative Content

*Human Causes of Floods ( at least 3 human activities)*

*Deforestation*

*Urbanisation*

*Agricultural practices*

*Flood management scheme*

Level	Marks	Descriptors
3	7-9	<p>Response is consistently explanatory rather than descriptive.</p> <p>There is a clear focus on the question. Depth of relevant</p>

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		<p>knowledge and understanding exemplified throughout. The response is coherent and the use of terminology is accurate.</p> <p><i>There are many approaches to address this question. One approach could demonstrate the relationship between climatic characteristics of humid tropics (mainly Af and Am) and human activities in causing floods and show how most of the human activities disrupts the pathways of the drainage basin to reduce the channel capacity to contain excessive inputs (floods).</i></p> <p><i>Another approach could explain how floods are natural phenomenon that occurs as a result of the climatic characteristics in the humid tropics and that the human activities only intensify the floods.</i></p> <p><i>Reference to specific named examples should be credited at level 3</i></p>
2	4-6	<p>Response made attempt to explain the variation but is generally dominated by description for weaker responses. Response reflects some relevant knowledge and understanding of the question. Response is structured and organised satisfactorily but may be unclear in parts.</p> <p>Use of terminology is generally accurate.</p> <p><i>The response is largely descriptive, and lack specific named examples and weaker response may not identify the underlying actions of humans on floods.</i></p>
1	1-3	<p>Response does not address the requirements of the question fully. Depth of knowledge and understanding shown is limited. 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.</p> <p><i>Disparate facts on human cause that are not connected and does not address the question</i></p>
0	0	No creditworthy response.

- (b) To what extent is the shifting of the Inter-Convergence Zone (ITCZ) responsible for the rainfall patterns in the tropics.

[16]

Indicative Content

*Rainfall patterns in the tropics varies across the humid to arid tropics in term of amount of rainfall*

*Rainfall patterns also vary within regions like Africa and S and SE Asia temporally*  
*Rainfall patterns vary within a country in term of distribution*

*Global /Latitudinal scale— shifting of ITCZ is largely responsible distribution of rainfall*

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As it dictates the position of the rising and descending arm of the Hadley cell  
 Regional scale- shifting of ITCZ also influence the seasonal monsoons esp in the direction of the winds  
 But not at a local scale – topography can affect the distribution of rainfall due to relief effect.

Level	Marks	Descriptors
4	13-16	<p>Response shows strong evaluative elements. Evaluation is relevant and comprehensive. Response fully addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and well-supported by relevant material. Use of terminology is accurate.</p> <p><i>There are different approaches to this question. A high level of response could frame the evaluation of ITCZ in influencing the rainfall patterns across spatial and temporal scale. The evaluation is comprehensive to cover global, regional and local scale. The depth of understanding should be evident in demonstrating the role of ITCZ at different scales. Diagrams and examples should be credited at this level.</i></p>
3	9-12	<p>Response displays a sound evaluative element. Response addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and supported by relevant material. Use of terminology is relevant and mostly accurate.</p> <p><i>The difference between level 3 and 4 should be the quality of evaluation especially on the role of ITCZ in influencing rainfall patterns in the tropics. The depth of understanding and the details of supporting relevant materials may not be consistent across the points. Diagrams and examples are given but may not be well illustrated</i></p>
2	5-8	<p>Response has some elements of evaluation but is broadly descriptive. Response exemplifies knowledge and understanding of the question and is generally relevant. The weakest responses may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Use of terminology is inconsistent though generally accurate.</p> <p><i>At this level, most of the responses basically describe or explain the rainfall patterns and ITCZ with minimum evaluation of the part played by ITCZ. The response is generally informative but lacking in depth of understanding. Weaker response are not clear and may not use appropriate terminology.</i></p>

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1	1-4	Response shows little or no evaluation. 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 terminology.  <i>Response shows little knowledge and it is either incomplete or comprises of disparate facts that are not coherent</i>
0	0	No creditworthy response.

- 4 (a) Explain how the evidence prove there is climate change since the last ice age. [9]

Indicative Content

Define the Ice Age

Define Climate Change - Characterised by frequent oscillations between warming and cooling of the Earth atmosphere and the advance and retreat of major ice sheets.

Evidence includes

Desiccation of Pluvial Lakes

Ice cores-

Pollen Grains

Diatoms

Level	Marks	Descriptors
3	7-9	Response is consistently explanatory rather than descriptive. There is a clear focus on the question. Depth of relevant knowledge and understanding exemplified throughout. The response is coherent and the use of terminology is accurate.  <i>A high response explains at least 3 evidence as proof of climate change since last ice age. Response is detailed and focus on showing how the evidence inform us of past climatic changes.</i>
2	4-6	Response made attempt to explain the variation but is generally dominated by description for weaker responses. Response reflects some relevant knowledge and understanding of the question. Response is structured and organised satisfactorily but may be unclear in parts. Use of terminology is generally accurate.  <i>At this level, response provide evidence of climate change. But the depth for each evidence may vary and the weaker ones may focus on description rather than explanation.</i>

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1	1-3	Response does not address the requirements of the question fully. Depth of knowledge and understanding shown is limited. 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.  <i>A fragmented and/or incomplete response that shows lack of understanding of the issue of the question. Likely responses are short and incomplete.</i>
0	0	No creditworthy response.

- (b) “We can mitigate effects of climate change and adapt to its consequences.” How far to you agree to this statement? [16]

Indicative Content

Understanding that effects refer to :

- Global warming (rising global temperatures)
- Extreme weather events – heavy precipitation, droughts

While consequences include:

- Rising sea level
- Coastal Flooding
- Saltwater intrusion
- Food insecurity
- 

Mitigation addresses the root causes, by reducing greenhouse gas emissions, while adaptation seeks to lower the risks posed by the consequences of climatic changes.

Mitigation measures include:

- Power: ensuring access to low and zero carbon energy solutions, such as solar, wind, small hydro, biopower and geothermal energy.
- Cities and Transport: investing in sustainable transport, as well as clean energy solutions for buildings and consumers
- Forests: targeting the sources of deforestation to ensure forests continue to provide environmental, social and economic benefits.
- Agriculture: promoting practices that reduce land degradation issues and enhance soil quality, while reducing greenhouse gas (GHG) emissions from the sector.
- Manufacturing: improving energy efficiency and reducing emissions
- Waste: reducing GHG emissions from landfills coupled with reduction in release of chemical pollutants and contamination.

Adaptation measures can help reduce vulnerability – for example by lowering sensitivity or building adaptive capacity – as well as allowing populations to benefit from opportunities of climatic changes, such as growing new crops in areas that were previously unsuitable.

Level	Marks	Descriptors
4	13-16	<p>Response shows strong evaluative elements. Evaluation is relevant and comprehensive. Response fully addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and well-supported by relevant material. Use of terminology is accurate.</p> <p><i>A high level response displays a clear stand with regards to the claim. Responses should evaluate both the mitigation and adaptation measures of climate change with supporting evidence. There should be a balance of both measures discussed.</i></p>
3	9-12	<p>Response displays a sound evaluative element. Response addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and supported by relevant material. Use of terminology is relevant and mostly accurate.</p> <p><i>At this level, some evaluation of the mitigation and adaptation measures should be made. Response should argue adequately based on the stand made with regards to the claim. However, the quality of evaluation may not be of the same depth as level 4 and likewise for the data and exemplification.</i></p>
2	5-8	<p>Response has some elements of evaluation but is broadly descriptive. Response exemplifies knowledge and understanding of the question and is generally relevant. The weakest responses may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Use of terminology is inconsistent though generally accurate.</p> <p><i>At this level, the quality of evaluation is not consistent and the weaker responses may lack balance and definitely depth in discussing the two measures. Clarity and coherence are affected by the use of inaccurate terminology.</i></p>
1	1-4	<p>Response shows little or no evaluation. 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 terminology.</p> <p><i>At this level, responses are brief showing little reference to the statement. Responses may focus on description of measures and are often not complete or without supporting details or data.</i></p>
0	0	No creditworthy response.



## Theme 2: Urban Change

- 5 (a) Explain how urban reimagining may affect different urban dwellers in cities at high levels of development. [9]

### Indicative Content

#### *Employment and wealth distribution*

- i. *Displacement of existing businesses that are incompatible with the new image*
- ii. *Lack of re-employment- minimal benefits to the poorer populations, at the most offering them low-paid, unskilled, insecure, part-time employment*

#### *Social polarisation*

- i. *The result is a 'dual city' where there is increasing social division within cities and the apparent emergence of an urban 'underclass' consisting of the poor, ethnic minorities and groups such as sick, elderly or disabled people and single parents.*
- ii. *Physical displacement of poorer resident populations.*
  - *poorer residents have been evicted in the short term and have suffered a drastic reduction in the supply of affordable accommodation available to them in the longer term..*

#### *Cultural exclusion*

- i. *The promotion of prestigious cultural facilities and activities of international appeal as part of programmes of urban regeneration has been met with oppositions from groups representing minority and community-based cultures.*
- ii. *Issues of lack of local participation*

Level	Marks	Descriptors
3	7-9	<p>Response is consistently explanatory rather than descriptive. There is a clear focus on the question. Depth of relevant knowledge and understanding exemplified throughout. The response is coherent and the use of terminology is accurate.</p> <p><i>A high level response requires the explanation of breadth and depth of the impacts on urban dwellers. Impacts are explained with reference to the changes that result from urban reimagining. Appropriate examples help to enhance the clarity of the explanation.</i></p>
2	4-6	<p>Response made attempt to explain the variation but is generally dominated by description for weaker responses. Response reflects some relevant knowledge and understanding of the question. Response is structured and organised satisfactorily but may be unclear in parts. Use of terminology is generally accurate.</p>

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		<i>At this level, response attempt to explain the impacts but be mainly descriptive especially for the weaker ones. Some understanding is demonstrated but may lack clarity and depth.</i>
1	1-3	Response does not address the requirements of the question fully. Depth of knowledge and understanding shown is limited. 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.  <i>Response are this level is fragmented and largely incoherent. Disparate information are given that may not be relevant and there is little or no evidence of understanding.</i>
0	0	No creditworthy response.

- (b) 'Strategies to manage traffic congestion in cities vary in success due to the level of development.' How far do you agree with this statement? [16]

Indicative Content

Suggested Strategies

1. More efficient road management
  - (a) Investment in additional road capacity-
  - (b) Road pricing
2. Discourage use of private transport
  - (a) Increasing cost of car ownership
  - (b) Restrictions on car movement
3. Encourage use of public transport
  - (a) Provision of attractive public transport options
4. Non-transport initiatives

Evaluation of strategies could vary in approach

- Evaluate Impacts - Evidence of the problem of traffic congestion alleviated
- Target the root cause of the problem – car ownership, inadequate road infrastructure, poor public transportation system
- Using the lens of temporal scale – short and long term sustainability

Level	Marks	Descriptors
4	13-16	Response shows strong evaluative elements. Evaluation is relevant and comprehensive. Response fully addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and well-supported by relevant material. Use of terminology is accurate.  <i>A high level response should evaluate the success of the strategies from high and low level of development cities. The response can either highlight the differences and/or similarities of the strategies in traffic congestion. Reasons for the difference should also be included. Examples and data should be used to support the claims made.</i>

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3	9-12	<p>Response displays a sound evaluative element. Response addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and supported by relevant material. Use of terminology is relevant and mostly accurate.</p> <p><i>At this level, strategies from high and low level of development are expected and evaluated. Response may not differentiate from the two especially for weaker response. Quality of examples and data are brief and may not show depth.</i></p>
2	5-8	<p>Response has some elements of evaluation but is broadly descriptive. Response exemplifies knowledge and understanding of the question and is generally relevant. The weakest responses may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Use of terminology is inconsistent though generally accurate.</p> <p><i>Response at this level will be description of the strategies with either superficial evaluation. Some indication of knowledge of strategies and very little reference to success of strategies in one level of development.</i></p>
1	1-4	<p>Response shows little or no evaluation. 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 terminology.</p> <p><i>Response at this level are either incomplete or show very little understanding of the focus of question. Strategies may lack details and clarity with little or no evaluation.</i></p>
0	0	No creditworthy response.

- 6 (a) Explain how sources of fear in cities can affect the liveability of cities in high levels of development.

[9]

Indicative Content

Sources of fear should include crimes and terrorism. Responses should discuss real and perceived fear

- a) Environmental factors ( that affect liveability)
  - Derelict Inner city /slums
  - Poor maintenance neighbourhood – poor lightings, graffiti, littering
- b) Social Factors
  - Social disorders – drunkenness, undesirable characters and behaviours
  - Insiders and outsiders

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- Social media
- c) Political Factors
  - Political instability
  - Internal strife/civil wars
  - Terrorism threats

Level	Marks	Descriptors
3	7-9	<p>Response is consistently explanatory rather than descriptive. There is a clear focus on the question. Depth of relevant knowledge and understanding exemplified throughout. The response is coherent and the use of terminology is accurate.</p> <p><i>A high level response should demonstrate at least 2 sources of fear in the city. Response should explain the factors inducing both real and perceived fears with supporting evidence to show depth of understanding of the issue.</i></p>
2	4-6	<p>Response made attempt to explain the variation but is generally dominated by description for weaker responses. Response reflects some relevant knowledge and understanding of the question. Response is structured and organised satisfactorily but may be unclear in parts. Use of terminology is generally accurate.</p> <p><i>Response at this level may explain the 2 sources of fear in the city but weaker ones may focus on one source and tends to be descriptive rather than explanatory. Some understanding is demonstrated but it is not consistent and quality varies.</i></p>
1	1-3	<p>Response does not address the requirements of the question fully. Depth of knowledge and understanding shown is limited. 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.</p> <p><i>At this level, the response is fragmented with facts that may not be relevant or not coherently put across for understanding. It could also lack supporting evidence and the weaker ones may be incomplete.</i></p>
0	0	No creditworthy response.

- (b) Evaluate the success of strategies used to address fear in the cities to improve liveability [16]

#### Indicative Content

Strategies could include :

##### a) Crime prevention by govt

- the first step towards addressing fear of crimes in the city. The presence of security systems, enforced laws and physical presence of police allay perceived and real fears.

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- Policing
- 'fixing broken windows'
- Urban reimaging
- Gated communities
- Intelligence to identify potential threats

b) Community crime prevention

- Monitoring social environment through CCTVs
- Neighbourhood crime watch/surveillance

c) Crime /Terrorism Prevention Through Environmental Design

- Improve Lightings
- Bollards
- aesthetics design of urban spaces and preventive barriers

d) Using Technology to combat terrorism

- Intelligence surveillance
- Biometric data for identification

- These strategies are not exhaustive. Strategies can also address terrorism
- Responses can classified strategies in other ways.
- Responses could discuss 3 – 4 big classification of strategies

Level	Marks	Descriptors
4	13-16	<p>Response shows strong evaluative elements. Evaluation is relevant and comprehensive. Response fully addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and well-supported by relevant material. Use of terminology is accurate.</p> <p><i>A high level response should demonstrate deep understanding of the issue of fear in the city; in term of real and perceived fear and how the strategies are meant to address these fears. A strong evaluation should explore the strengths and limitations of the strategies supported by relevant and named examples. Response could examine in depth one source of fear or choose to do two sources of fear.</i></p>
3	9-12	<p>Response displays a sound evaluative element. Response addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and supported by relevant material. Use of terminology is relevant and mostly accurate.</p> <p><i>At this level of response, the strategies should also be very evaluated with supporting relevant and named examples except that the quality of evaluation may not be balanced for all the strategies discussed.</i></p>
2	5-8	<p>Response has some elements of evaluation but is broadly descriptive. Response exemplifies knowledge and understanding of the question and is generally relevant. The</p>

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		<p>weakest responses may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Use of terminology is inconsistent though generally accurate.</p> <p><i>At this level, strategies are described rather than evaluated. Some degree of understanding how fear is addressed but the choice of strategies may be brief and examples are not elaborated to provide the evidence of understanding.</i></p>
1	1-4	<p>Response shows little or no evaluation. 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 terminology.</p> <p><i>Response at this level are usually incomplete answer or showing little evidence of understanding. Disparate facts and information is given with little reference to the demand of the question.</i></p>



# NANYANG JUNIOR COLLEGE

## Year 2 Preliminary Examination

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### H1 GEOGRAPHY

**8813/01**

Paper 1

3 Sept 2019

**3 hours**

### INSERT

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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 **7** printed pages.

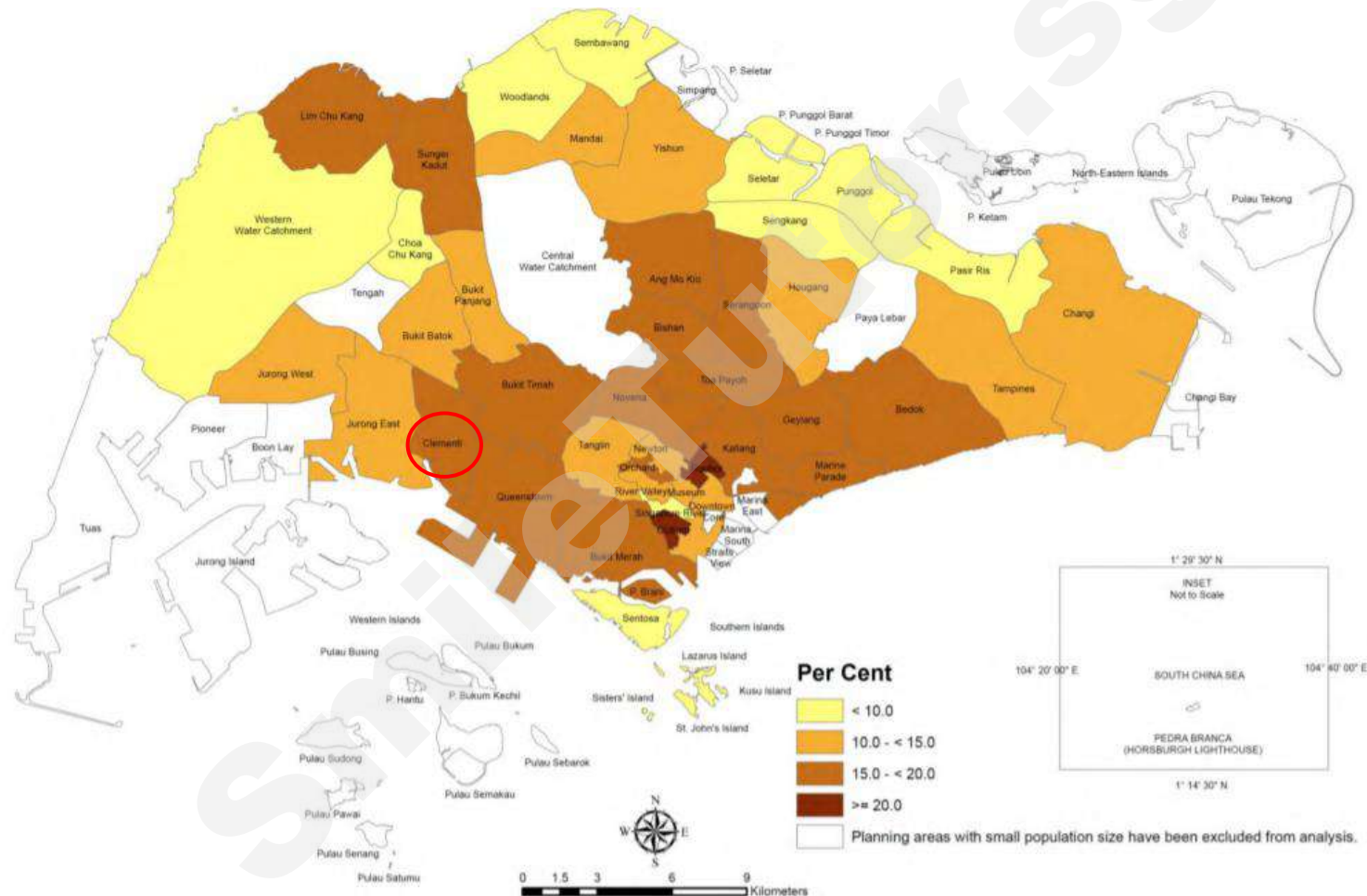
**[Turn over**

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### Resource 1 for Question 1

### Proportion of Resident Population Aged 65 Years and Over by Planning Area, June 2017



Note: Published map is based on the Urban Redevelopment Authority's Master Plan 2014 planning area boundaries and the Singapore Land Authority's 2017 Singapore island profile. The Master Plan 2014 is a forward looking guiding plan for Singapore's development in the medium term over the next 10 to 15 years and the planning boundaries may not coincide with existing developments for some areas.

<https://www.singstat.gov.sg/-/media/files/publications/population/population2017.pdf>



## Resource 2 for Question 1

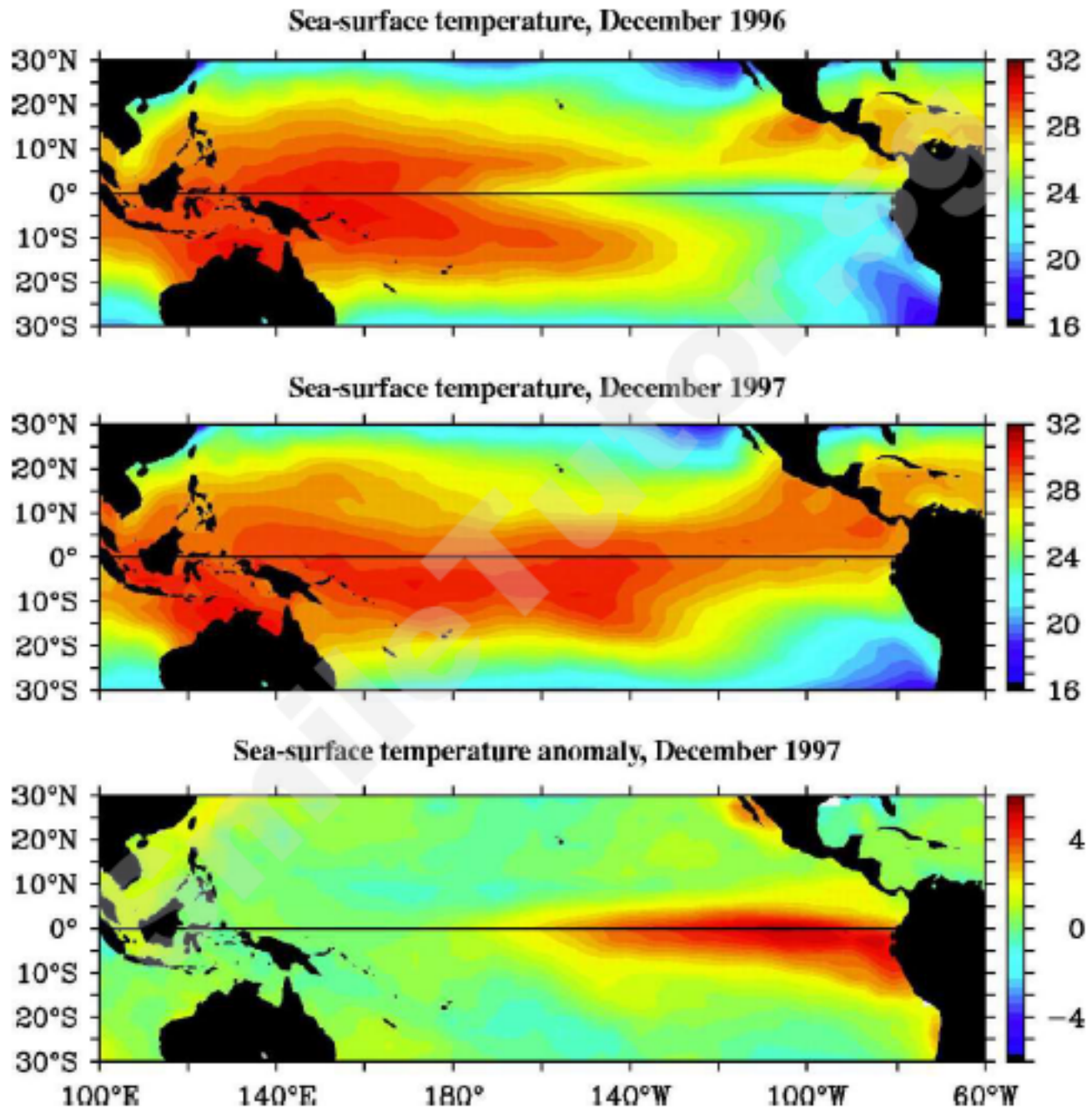
**Projected increase in number of Singapore residents aged 65 and above and the sex ratio of elderly residents (male per thousand females).**

<b>Projected increase in number of Singapore Residents</b>	<b>1990</b>	<b>2008</b>	<b>2020</b>	<b>2030</b>
65 – 74 years old	104	200	390	530
75 – 84 years old	50	90	140	280
85 years and above	10	30	50	70
Sex ratio of elderly residents (65 years and over) (males per thousand females)	818	792	No data	No data

<http://www.gs.org.sg/sg50conference/pdf/s4-1.pdf>  
and <https://www.tablebuilder.singstat.gov.sg/publicfacing/createDataTable.action?refId=14914>

## Resource 3 for Question 2

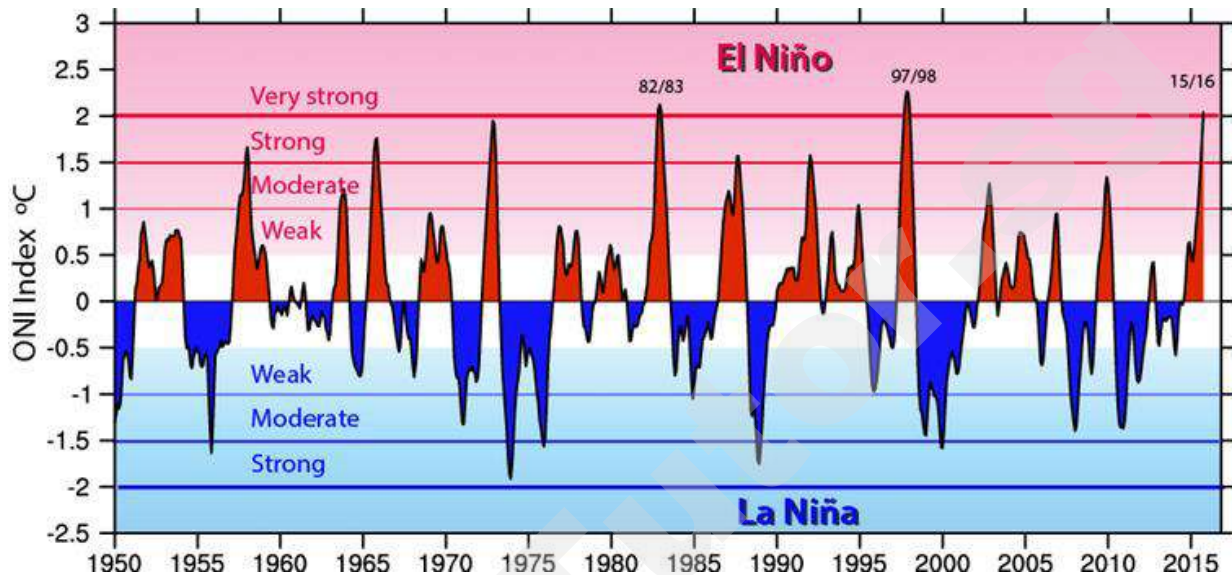
Monthly average sea-surface temperature (in °C) for Dec 1996 and Dec 1997 and also the monthly average SST anomaly for Dec 1997



<https://science.sciencemag.org/content/283/5404/950/tab-figures-data>

### Resource 4 for Question 2

#### Variations in rainfall patterns in the region from 1950-2015



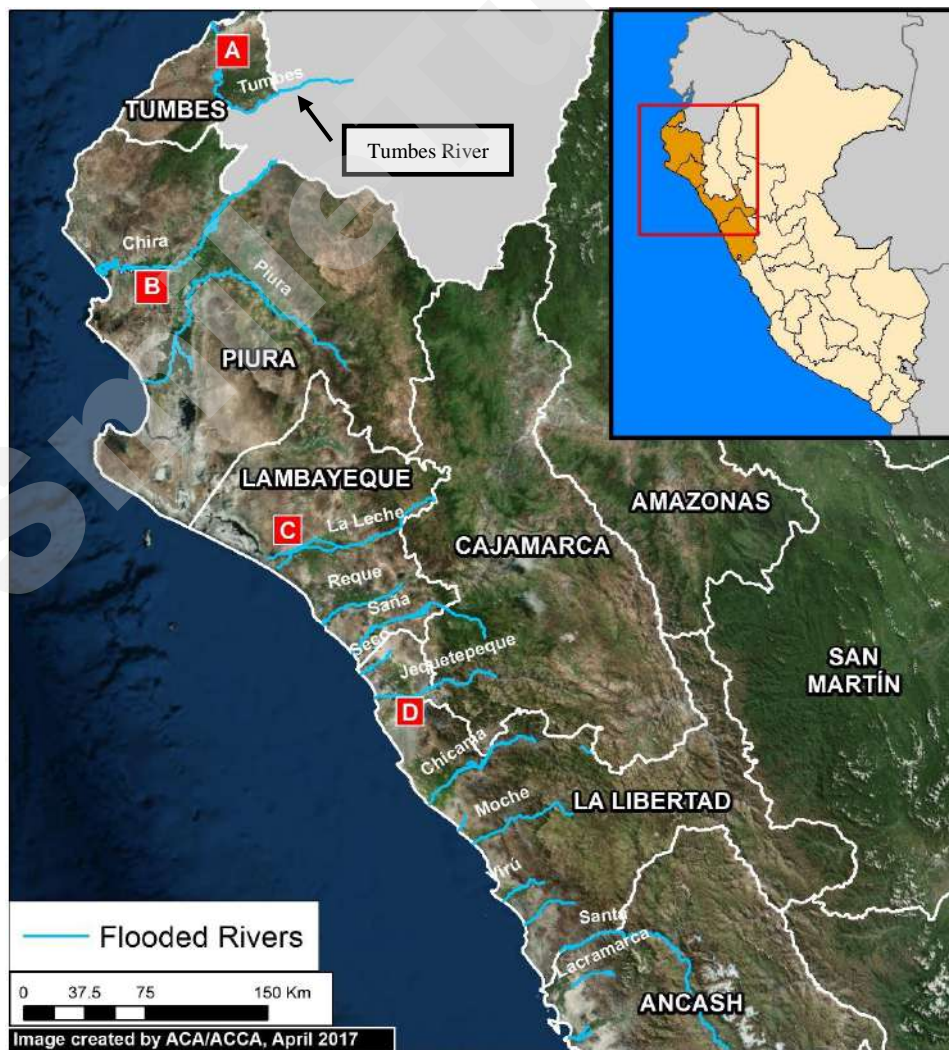
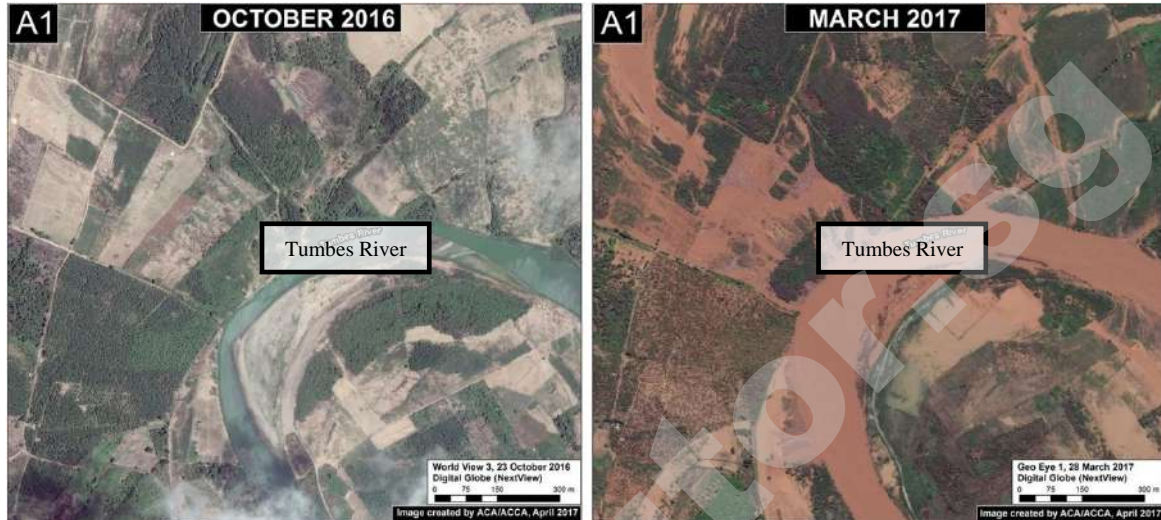
The Oceanic Niño Index (ONI) shows warm (red) and cold (blue) phases of abnormal sea surface temperatures in the tropical Pacific Ocean.

<http://theconversation.com/what-north-america-can-expect-from-el-nino-51959>)



### Resource 5 for Question 2

#### Flooding along a stretch of the Tumbes River, Northern Peru (South America) between October 2016 and March 2017

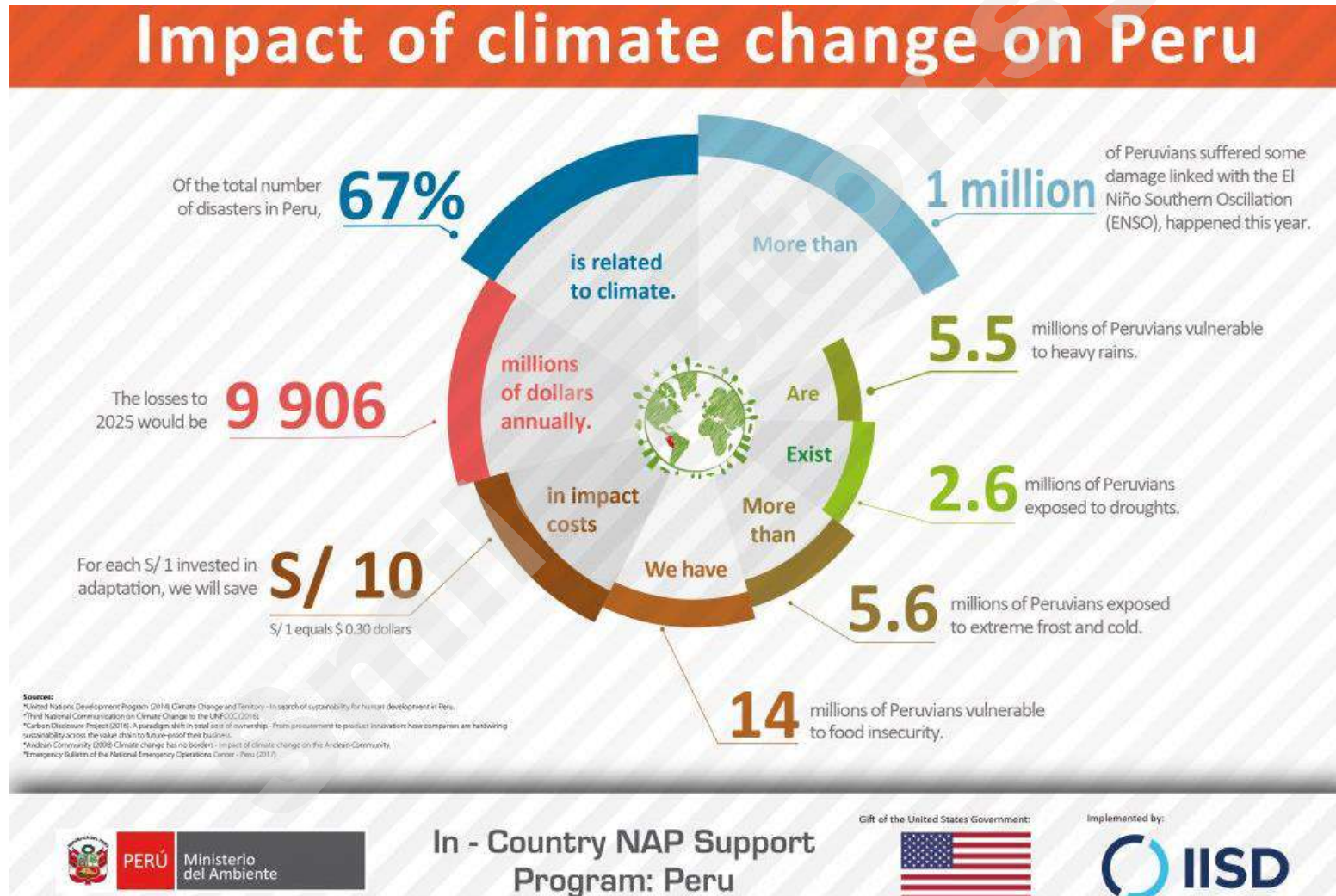


<https://maaproject.org/2017/flood2/>

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Higher 1 Geography / 8813 / 01

## Resource 6 for Question 2

## Changes in climate and its impact on Peru





# NANYANG JUNIOR COLLEGE

## Year 2 Preliminary Examination

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### H1 GEOGRAPHY

8813/01

Paper 1

3 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.

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 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.



## Section A

### Theme 3 – Geographical Investigation

1. Rapid ageing is a key demographic challenge impacting Singapore. A group of 15 undergraduates wanted to find out how much a senior citizen aged 65 and above and living alone will need to meet the basic standards of living.

The team divided themselves into five groups and conducted door to door interviews with residents living in Clementi over two weekends. A total of 50 households from various ethnic groups and educational levels were interviewed. Almost nine in 10 were aged 55 and above with two-thirds being males. Respondents were asked on their monthly expenses for food, transportation and accommodation. Hand phone bills, cost of an annual holiday and occasional gifts for family members were also asked from the respondents.

Resource 1 shows the proportion of resident population aged 65 years and over by Planning Area, June 2017. Resource 2 shows the projected increase in number of Singapore residents aged 65 and above and the sex ratio of elderly residents (males per thousand females).

- (a) Provide a suitable hypothesis for the investigation. [1]
- (b) With reference to Resource 2, use an alternative method to represent the information for the three age groups over time and explain why it is more useful than using a table. [5]
- (c) Identify **two** potential difficulties that students may encounter during their door-to-door interviews and propose suitable ways to overcome them. [4]
- (d) Using Resources 1 and 2, explain the strengths and limitations of the data collection process. [7]
- (e) Evaluate the usefulness of the investigation and explain how it could be extended to help the group further understand the needs of the elderly in Singapore. [8]

**Section B****Theme 2: Urban Change****Impacts of climate change on Peru**

2. Resource 3 shows the monthly average sea-surface temperature (in degrees Celsius) for December 1996 and December 1997 and also the monthly average *SST anomaly* for December 1997. Resource 4 shows variations in rainfall patterns in the region from 1950-2015. Resource 5 shows the flooding along a stretch of the Tumbes River, Northern Peru (South America) between October 2016 and March 2017. Resource 6 shows how changes in climate can impact Peru.
- (a) Describe the temperature anomalies between December 1996 and December 1997 as shown in Resource 3. [2]
  - (b) Compare the trends in El Nino and La Nina occurrence between 1950 and 2015 as shown in Resource 4. [4]
  - (c) With the aid of a sketch diagram, explain the impact of the anomaly on the rainfall pattern for the west Pacific region as shown in Resource 3. [6]
  - (d) Using Resource 5, suggest how channel processes may change between October 2016 and March 2017. [7]
  - (e) With reference to Resource 6 and your own knowledge, discuss the socio-economic impacts of climate change on Peru. [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 the effects of climate change on human activity in countries at low levels of development. [9]
- 3 (b)** To what extent is latitude the major factor influencing temperature patterns in the tropics? [16]
- 4 (a)** Explain how inputs and outputs influence the flows within the drainage basin water balance of tropical regions. [9]
- 4 (b)** The nature of floods in the tropics makes hard-engineering strategies the most viable solution in its management.” To what extent do you agree with this statement? [16]

**Theme 2: Urban Change**

- 5 (a)** Explain how urban metabolism affects the sustainable development of cities. [9]
- 5 (b)** Successful management of non-hazardous solid waste requires a more integrated approach. Discuss. [16]
- 6 (a)** Explain how urban liveability in cities can be measured. [9]
- 6 (b)** Assess the success of strategies used to mitigate the issue of either crowding or fear in the city. [16]

## NYJC 2019 H1 Geog 8813 P1 answers

### Theme 3 – Geographical Investigation

1. Rapid ageing is a key demographic challenge impacting Singapore. A group of 15 undergraduates wanted to find out how much a senior citizen aged 65 and above and living alone will need to meet the basic standards of living.

The team divided themselves into five groups and conducted door to door interviews with residents living in Clementi over two weekends. A total of 50 households from various ethnic groups and educational levels were interviewed. Almost nine in 10 were aged 55 and above with two-thirds being males. Respondents were asked on their monthly expenses for food, transportation and accommodation. Hand phone bills, cost of an annual holiday and occasional gifts for family members were also asked from the respondents.

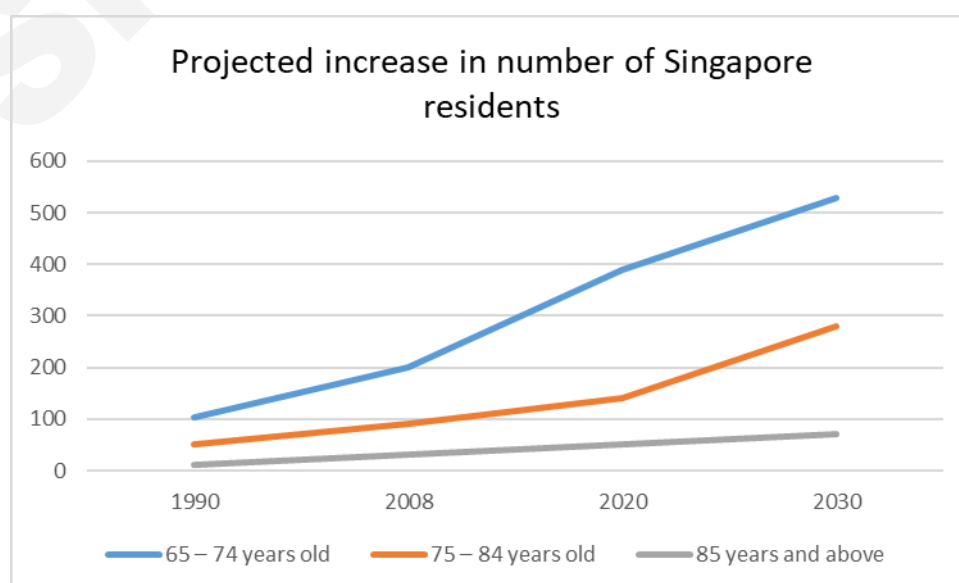
Resource 1 shows the proportion of resident population aged 65 years and over by Planning Area, June 2017. Resource 2 shows the projected increase in number of Singapore residents aged 65 and above and the sex ratio of elderly residents (males per thousand females).

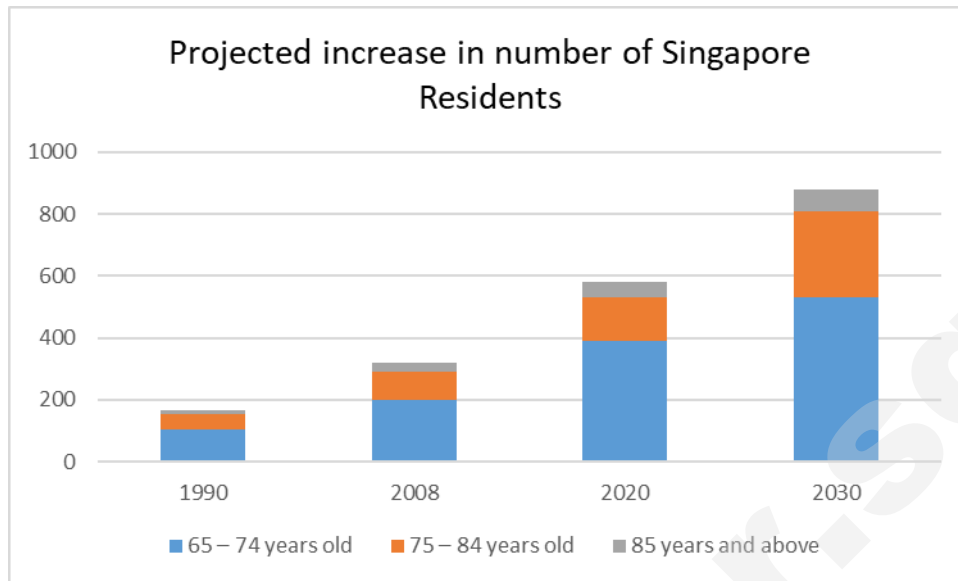
- (a) Provide a suitable hypothesis for the investigation. [1]

- A senior citizen aged 65 and above and living alone will need \$2000 to meet the basic standards of living

- (b) With reference to Resource 2, use an alternative method to represent the information for the three age groups over time and explain why it is more useful than using a table. [5]

- Use a multiple line graph or stacked bar graph – 3 marks (Title, Axis and Accuracy in data representation)





- Reasons why it is more useful than using a table - 2 marks
  - better clarify trends than do tables; estimate key values at a glance.
  - allows for consecutive observation of more than one variable over time as seen in the rise or fall of data points

Point marked

- (c) Identify **two** potential difficulties that students may encounter during their door-to-door interviews and propose suitable ways to overcome them. [4]

1 mark to identify difficulty and 1 mark for solution

- Difficulty
  - Elderly may not be able to converse in English
- Solution
  - Have at least a member who is able to converse in the mother tongues such as Mandarin/Malay/Tamil or even dialects.
- Difficulty
  - Elderly may be hard of hearing
- Solution
  - Interviewer may have to speak slower and louder without appearing to be rude
- Difficulty
  - Elderly may not want to be interviewed as they are afraid of falling prey to scams. This is especially true for female elderly living alone.
- Solution
  - Have a mix-gender group of interviewers so that female interviewers can approach elderly females.
  - Have a formal letter from the organisation explaining the intent of the research accompanied with a contact number which they can call to verify the authenticity of the research.

Point marked

- (d)** Using Resources 1 and 2, explain the strengths and limitations of the data collection process. [7]

#### Strengths

- Area of research (Clementi town) is representative as it has a moderately high percentage of elderly (Resource 1)
- Door to door interview allows interviewers to reach out to the older elderly (Fourth age) who may be too frail to leave their homes
- Data collected is highly representative of the needs of the elderly as nine in 10 were aged 55 and above i.e. near retirement
- Expenditure data is comprehensive as it covers the basic daily needs of the elderly such as food, transportation and accommodation as well as adhoc expenditures such as holidays and gifts

#### Limitations

- Data collected only from one estate is non-representative of all the needs of the elderly in Singapore as the elderly living in this estate may be more well-off than other estates particularly the older ones. It is good to include one or two older estates comprising of rental flats or one-room flats so as to obtain a more accurate sensing.
- Medical needs not captured as many elderly may be on long term treatment for diabetes, hypertension or dialysis.
- As two-thirds of the respondents are males, there is hence an under-representation of female respondents as after all, females live longer than males (Resource 2)

#### Level marked

- (e)** Evaluate the usefulness of the investigation and explain how it could be extended to help the group further understand the needs of the elderly in Singapore. [8]

#### Indicative content:

##### Usefulness

Include giving us a sense of the physiological needs of the elderly. Food, drink, shelter, sleep and treatment of illness and injury that are fundamental for survival. By knowing the monthly expenses, the group can recommend to the government on the financial challenges faced by the lowest rung of the community so that social workers and self-help groups will be able to reach out to them. This is particularly so as some of the elderly who are living alone may not have the necessary financial support from their children. Some may not have children or are singles.

The data in finding out the minimum amount of monies required to live a decent life upon retirement will help the current working population plan for their retirement plans. The figure will allow them to re-evaluate their current expenditure vis-à-vis their savings plan including the intention to purchase a second property or financing a car.

##### Not so useful

Although essential, meeting physiological needs is more about survival and does not necessarily ensure quality of life for the aged. Hence, the investigation could be

extended to find out the other needs of the elderly such as security, social, self-esteem and even self-actualisation needs.

Responses will explain how these other needs are important to the elderly living alone or otherwise. The questionnaire may include additional items to find out these needs so that recommendations can be made to the government or self-help groups to design policies or initiatives to better meet the needs of the elderly.

Apart from conducting interviews, the group can also form focus-group discussions at various platforms or scale to have a more holistic understanding of the various needs category in terms of the level of adequacy.

Level marked using H1 Generic Level Descriptors for Open-ended 8m DRQ on Theme 3

## Section B

### Theme 2: Urban Change

#### Impacts of climate change on Peru

2. Resource 3 shows the monthly average sea-surface temperature (in degrees Celsius) for December 1996 and December 1997 and also the monthly average *SST anomaly* for December 1997. Resource 4 shows variations in rainfall patterns in the region from 1950-2015. Resource 5 shows the flooding along a stretch of the Tumbes River, Northern Peru (South America) between October 2016 and March 2017. Resource 6 shows how changes in climate can impact Peru.

(a) Describe the temperature anomalies between December 1996 and December 1997 as shown in Resource 3. [2]

#### Over time:

- In December 1996, the SST was warm (about 27-32°C) over the western Pacific and cool (about 19-23°C) over the eastern Pacific. This was typical of a Walker circulation in the Pacific Ocean.
- In December 1997, the SST was less warm (about 27-31°C) over the western Pacific as compared to Dec 1996 and warmer (about 28-29°C) over the eastern Pacific as compared to Dec 1996. This was typical of an El Nino event in the Pacific ocean.

#### Over space:

- The anomaly for Dec 1997 was more (about 3-4°C) over the eastern Pacific as compared to the western Pacific (about 1°C anomaly).

Point marked

(b) Compare the trends in El Nino and La Nina occurrence between 1950 and 2015 as shown in Resource 4. [4]

From Resource 4, it can be seen that between 1950 and 2015,

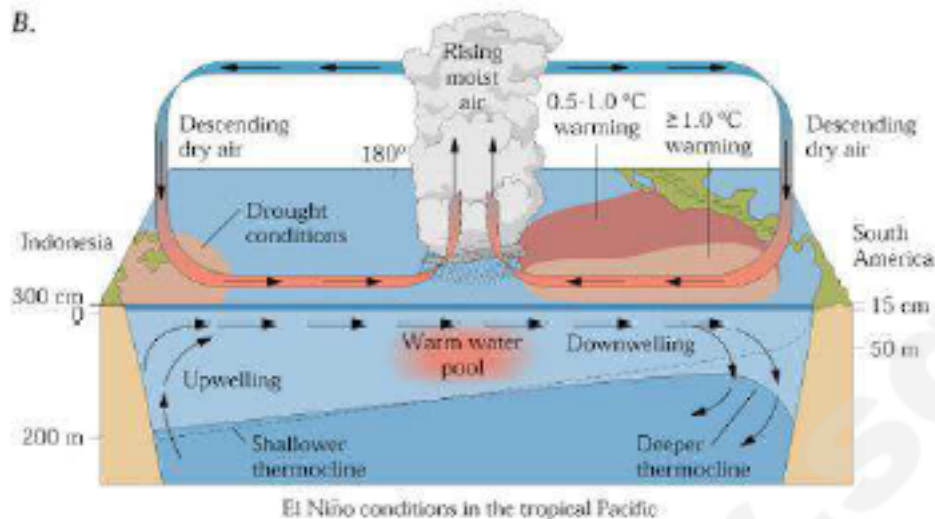
- El Nino occurrences are slightly more intense than La Nina occurrences → 4 El Nino (1973, 82/82, 97/98, 2015/16) at 2ONI° or more and only 1 La Nina (1974) nearly reaching -2ONI°C.
- La Nina occurrences are usually longer (3-4 years in 1954-57, 1973-76, 1984-87, 1999-2003) than El Nino occurrences (2-3 years in 1958-60) although 2003 seems like 3 years (1+2) and 1990-1995 seems like 5 years (with a small non-event in 1993)

Point marked

(c) With the aid of a sketch diagram, explain the impact of the anomaly on the rainfall pattern for the west Pacific region as shown in Resource 3. [6]

- Draw the El Nino diagram that shows rainfall pattern over Australia. (2m → draw and label accurately)

B.



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- major change in barometric pressures occurs across the entire stretch of the equatorial zone as far west as Southeast Asia.
- the low-pressure system at West Pacific being replaced by weak high pressure.
- the trade winds weaken or even die in the Western Pacific
- restricts convergent and convective uplift over west pacific
- dry weather ensues that can lead to drought over west Pacific

(d) Using Resource 5, suggest how channel processes may change between October 2016 and March 2017. [7]

- Tumbes river is at bankfull discharge and at some places has overflowed its banks onto adjacent areas (middle foreground and right middleground in A1).
- Flood will increase discharge → increase velocity → strengthen channel processes → increase load
- There will be increased channel processes like erosion and transportation (visible suspended load as seen in the brown turbid waters of the river in March 2017 satellite photo).
- If the channel is made up of clay, the increase in velocity may overcome its cohesive nature during this time of flood as critical erosional velocity increases (ref: Hjulstrom curve). Large particles such as boulders may also be eroded.
- Similar for transportation, greater energy may enable bigger load to be moved via traction and saltation which may not be possible during normal flow when velocity was slower.
- With more load within the channel, there will also be an increase in deposition for the part where the river overflows its banks onto the adjacent floodplains (evidence: floodplain covered in brown suspended load in left middleground and left background).
- Greater erosion may cause changes to channel morphology i.e. shape and size of the channel due to channel widening (lateral erosion) and deepening (vertical erosion).

Level marked



**(e) With reference to Resource 6 and your own knowledge, discuss the socio-economic impacts of climate change on Peru. [6]**

- Social impacts:
  - Heavy rain in Peru due to climate change can affect 5.5mil Peruvians due to excessive precipitation. Floods that result claim lives and disrupt the daily commute and livelihood of Peruvians. Floods can also inundate cities and infrastructure resulting in cost in repairs or measures to mitigate.
  - Droughts to 2.6 million Peruvians can result in famine as they depend on rain-fed agriculture. There are 14mil vulnerable to food insecurity in Peru that can worsen due to droughts. \*\*\*However, La Nina that brings droughts might bring more fish due to the upwelling of cold waters along the Peruvian coastline.
- Economic impacts:
  - The \$9906 mil losses speculated for 2025 would include economic impacts of climate change in Peru. Since the Peruvian economy is dependent on the primary fishing industry, El Nino that can increase in frequency due to climate change can affect the economy drastically. The persistence of the warm surface current at the East Pacific that accompanies an El Nino event will reduce fish stock along the Peruvian coast (due to lesser upwelling of the cold Humboldt current). This will negatively impact the income of fishermen.

### 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 the effects of climate change on human activity in countries at low levels of development. [9]**

#### Indicative content

Reponses will demonstrate an understanding of the effects of climate change as advocated in the various IPCC assessment reports (e.g. changes in sea level, greater storminess (hurricane intensity), floods and droughts) on human activities in terms of economic, social and environmental aspects. Economic aspects can include effects on livelihoods such as agriculture and fishing. Social aspects can include damages to property, loss of lives, increased prevalence of diseases like malaria etc. Environmental aspects can include quality of living environment which may be affected by heatwaves/droughts/floods etc.

A higher level response will acknowledge *spatial variations* in these effects, where people living in lower income countries are likely to be more susceptible to the effects of climate change due to increased vulnerability and risk. *Case studies* will help illustrate the effects more clearly.

Levels marked using H1 generic level descriptors for 9m SEQ sub-part (a)

**3 (b) To what extent is latitude the major factor influencing temperature patterns in the tropics? [16]**

Indicative Content

Responses will explain how latitude as a factor affects temperature patterns in the tropics for both A and B type of climates. Apart from latitude, responses should include other long term, short term as well as local factors such as cloud cover as part of a whole list of physical factors affecting temperature patterns. The impacts of human activities affecting temperature on both the local (urban heat islands causing higher ambient temperature) and regional/global scale (enhanced greenhouse effect) should also be included.

A higher level response will show how long term natural cycles (Orbital forcing), short term natural cycles (Younger Dryas, sunspot activities) and natural events such as large volcanic eruptions too have an impact on temperature patterns in the tropics on both the longer and shorter time scales.

Levels marked using H1 generic level descriptors for 16m SEQ sub-part (b)

**4 (a) Explain how inputs and outputs influence the flows within the drainage basin water balance of tropical regions. [9]**

Indicative content

Inputs relates to rainfall amount, type and intensity and solar radiation. Outputs relate to channel flow, and evapotranspiration. Difference in input and output will influence flows within the drainage basin water balance of the tropical regions (Af, Am, Aw, Bsh, Bwh). On a spatial scale, variations in inputs owing to climatic conditions of a place have an impact on surface and sub-surface flows. Responses will explain that the type of flow is dependent on the relationship b/w infiltration and surface runoff. In Af and Am climates, sub-surface flows are more common as the presence of a protective vegetation cover owing to high mean annual rainfall and temperature promotes infiltration. In contrast, surface flows are more common in Aw and B climates. In these places of lower rainfall, surface runoff is often generated b/c of high rainfall intensity over dry baked ground promoting HOF. In terms of how outputs affect flows within the system, responses will make reference to variations in interception losses and transpiration from the vegetation as well as evaporation from water bodies like lakes, rivers, streams etc. across space and time in relation to the A and B climates. Higher outputs will occur in the humid tropics where vegetation cover is thicker and water bodies are larger as compared to B climates. In terms of channel flow across space, contributions by baseflow in Af climates will maintain perennial channels whilst the fluctuating or lack of base flow will result in intermittent channels in Aw and BSh and ephemeral ones in B climates. Across time, flows will be lower during summer just before the arrival of the monsoons due to more output.

A higher response will include explanations relating to variations in space and time via the use contextualised examples from tropical regions. The influence of local factors such as geology and slope as well as human activities may also be briefly mentioned to show a holistic understanding of the factors affecting flows within a drainage basin via the alteration of the infiltration and surface runoff relationship.

**4 (b) The nature of floods in the tropics makes hard-engineering strategies the most viable solution in its management.” To what extent do you agree with this statement? [16]**

Indicative content:

Understanding the nature of floods in the tropics in terms of its frequency and magnitude is important in determining the success of flood management strategies. Responses will explain that flooding in the tropics may be due to high intense rainfall within a short time period. Such storms tend to generate HOF resulting in high peak Q and short lag time. Flooding of this nature is likely to be frequent but lower in magnitude as floodwater will recede as quickly as it rises. A second cause of flood is due to prolonged rainfall i.e. wet monsoons leading to the generation of SOF and hence flooding. Flooding of this nature though lower in frequency are usually of a higher magnitude. The scale of such floods is usually larger in areal extent hence resulting in regional flooding. Responses may argue that hard engineering methods may be a viable solution for high frequency but low magnitude floods via modifying or installing flood protection measures which include channelization, dams construction, realignment/diversion or wing dykes as flooding tend to be more localised and hence easier to manage. Moreover, such measures can be quite easily implemented within a shorter period of time particularly those relating to channel modifications.

However, it should be recognised that hard engineering strategies may not work for floods that are of low frequency but high magnitude as the area affected is often much larger and hence relying on hard engineering methods alone will be insufficient. Responses will advocate that hard engineering methods should also be employed in conjunction with soft engineering methods which include flood plain zonation as well as afforestation program. A more holistic approach would include flood prediction working in tandem with flood mitigation (both hard and soft) as the former has a design impact on the latter. Good response measures are also essential in any flood management.

A higher level response will show an understanding of the various determinants in affecting the level of success in flood management such as the pros and cons in terms of hard-engineering and other strategies in the argument. Areas of discussion could include economic, social and environmental feasibility. Examples/case studies should be included to support arguments.

## **Theme 2: Urban Change**

**5 (a) Explain how urban metabolism affects the sustainable development of cities. [9]**

Indicative content

Responses should explain and apply the concept of urban metabolism to sustainable urban development, pointing out the intra- and inter-generational equity in relation to resource availability.

The current linear flow of resources in cities will threaten their ability to ensure intergenerational equity in the future in relation to resource availability. The outputs are usually not circulated back into the urban system through recycling or reuse. Most of the outputs either end up as rubbish piling on landfills, or discharged into the atmosphere via incineration or river and coastal systems. This linear nature of urban metabolism

undermines the goals of sustainable development as resources extracted are not returned as inputs. Responses could also explain urban metabolism with reference to a specific resource. For instance, fossil fuels are extracted, refined and burned and their fumes discharged into the atmosphere. Their use reduces the stock available for future generations as they are considered as a non-renewable resource.

A higher level response will explain how urban metabolism can help cities understand how far they are from achieving sustainable development and how they can work towards achieving sustainability. For instance, the incorporation of recycling and the interconnection of flows within the urban environment will help cities to aim for a more circular urban metabolism and move towards a more sustainable and self-regulating system.

*Levels marked using H1 generic level descriptors for 9m SEQ sub-part (a).*

**5 (b) Successful management of non-hazardous solid waste requires a more integrated approach. Discuss. [16]**

Indicative content

Having addressed how urban metabolism affects SD in part (a), responses will now focus on what it takes to be able to effectively manage non-hazardous waste. Key word in this essay is the merits of having a more “integrated” approach as opposed to an adhoc and uncoordinated approach. Responses will explain the advantages of employing an integrated management system. These include facilitating better decision making by providing a more complete view of the whole management system from waste collection to disposal and waste reduction. An integrated system will also reduce overlapping responsibilities or duplication of efforts as well as better planning and allocation of available resources leading to synergy and improved operational efficiencies.

Responses should show examples of successful waste management when countries employ a more integrated approach via a seamless system of waste collection and disposal as often seen in developed countries e.g. Singapore, Netherlands. For developing countries, the goal in achieving an integrated approach fails at the very first step of waste collection as slum areas are often not served due to their inability to pay. For landfills, though it supports an informal economy i.e. scavengers looking for recyclable waste are often poorly managed that not only threaten the environment via leachates into the ground but also the lives of the people working on it e.g. mass movement hazards. Other issues include the emission of greenhouse gases into the atmosphere and heated water discharged into the waterways.

As part of the whole integrated approach, responses should also advocate for waste reduction strategies as they promote the circular urban metabolism and are hence more sustainable. Responses could include reuse, recycling as well as taxation.

A higher response will argue for the scope of integration to also include collaboration between various stakeholders instead of just relying on the efforts of the government in promoting the circular economy. For businesses, they could recycle their materials or embark on the product take back program. Civil societies and individuals could also play their role in promoting zero waste in helping to cut down on our waste generation and ecological footprint.

Levels marked using H1 generic level descriptors for 16m SEQ sub-part (b).

**6 (a) Explain how urban liveability in cities can be measured.**

**[9]**

Indicative content

Responses should make reference to a number of attributes and key performance indicators for measuring urban liveability as it is a multi-dimensional concept comprising of different aspects of urban life. These attributes and indicators could be qualitative or quantitative in nature, personal to the city residents and public, official indicators used by the city authorities.

Responses could explain two or three indices such as EIU's/Mercer's Quality of Living (for employee compensation), Monocle's Most Liveable Cities Index (wealthy, mobile and cosmopolitan individuals), as well as LKY SPP's Global Liveable Cities Index (perspective of an average resident in stretching his/her budget).

Higher level responses would explain how urban liveability can be measured in the context of cities. A possible approach is to identify the needs of the people residing in cities and make explicit links to show how urban liveability is determined by the extent to which these needs are met.

*Levels marked using H1 generic level descriptors for 9m SEQ sub-part (a).*

**6 (b) Assess the success of strategies used to mitigate the issue of either crowding or fear in the city.**

**[16]**

Indicative content

Responses should include a discussion of both successes and failures in mitigating the chosen issue (crowding or fear). Responses should address more than one strategy to mitigate crowding/fear. For crowding mitigation, the answer could include enhancing legal powers of law enforcers. For fear mitigation, they could discuss the role of various agencies. On the part of the government, it could be enhancing urban design improvements, intensifying controls, building systems and structures to defend the city, building resilience in the city. On the part of communities it may include getting communities to work together with the planners to draw up plans for the urban space and building resilience through social media. The role of individuals in fear mitigation should also be included.

A higher level response could look at the effectiveness of strategies with reference to a specific case study. Another possible approach could be to analyse the application of selected strategies in different cities and account for the success (es) and failure(s) by including statistical evidence.

Levels marked using H1 generic level descriptors for 16m SEQ sub-part (b).



**ST ANDREW'S JUNIOR COLLEGE**  
**Preliminary Exam**  
**Higher 1**

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**Geography**

**8813/01**

**Paper 1**

**16 September 2019**

**3 hours**

**INSERT**

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**READ THESE INSTRUCTIONS FIRST**

This insert contains all the Resources referred to in the questions.

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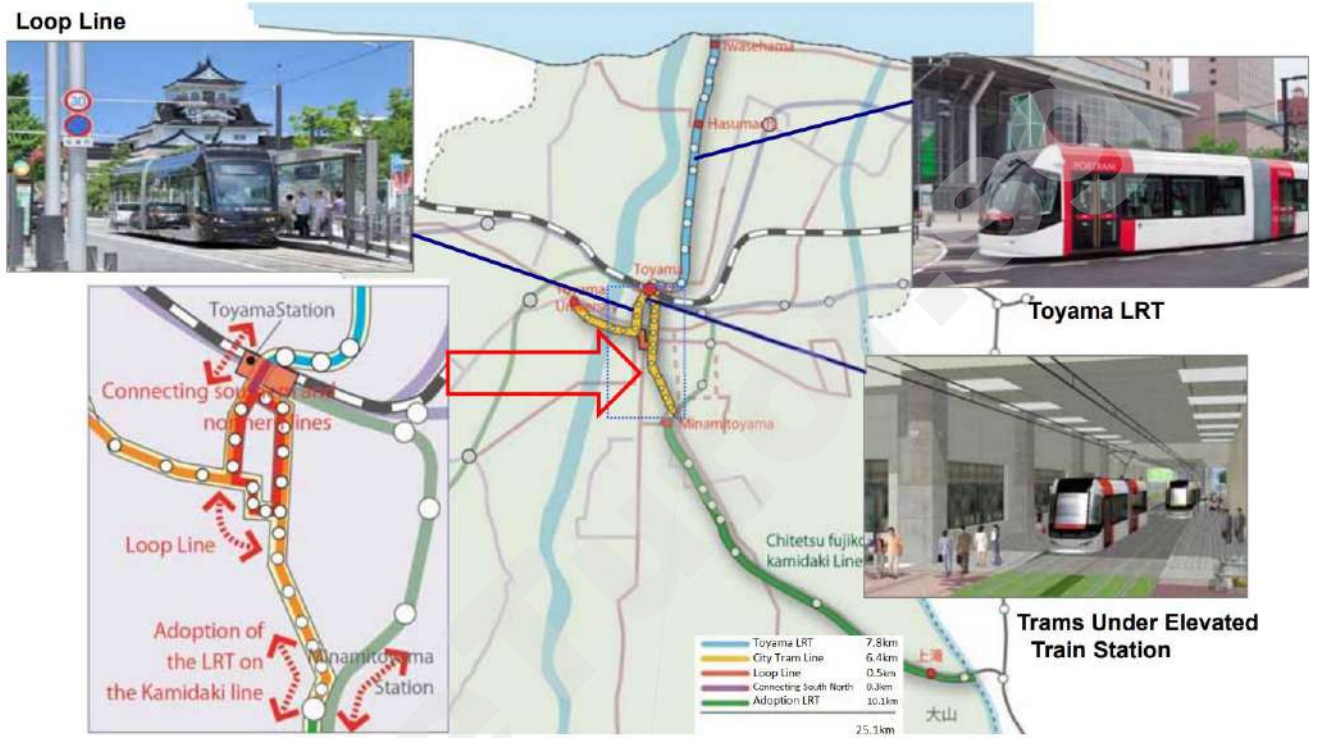
This document consists of **5** printed pages.

**[Turn over**

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## Resource 1 for Question 1

## Toyama City LRT Network





## Resource 2 for Question 1

### Programs to encourage the elderly to utilise public transport

Senior Citizens' Smart Pass and Grandchildren Programs	
<ul style="list-style-type: none"> <li>Citizens over 65 years receive a special public transportation discount fare of ¥100 (about S\$1.30) to any destination within the city for journeys originating from the city centre.</li> <li>About 30% of senior citizens have this special pass.</li> <li>About 2,500 people use it each day.</li> </ul> 	<ul style="list-style-type: none"> <li>Grandparents accompanied by grandchildren are admitted free to city cultural facilities, outdoor facilities and the zoo.</li> <li>Began in 2011.</li> <li>13% increase in city facility use between 2011 and 2013.</li> <li>50,000 more admissions to city facilities between 2011 and 2013.</li> </ul> 

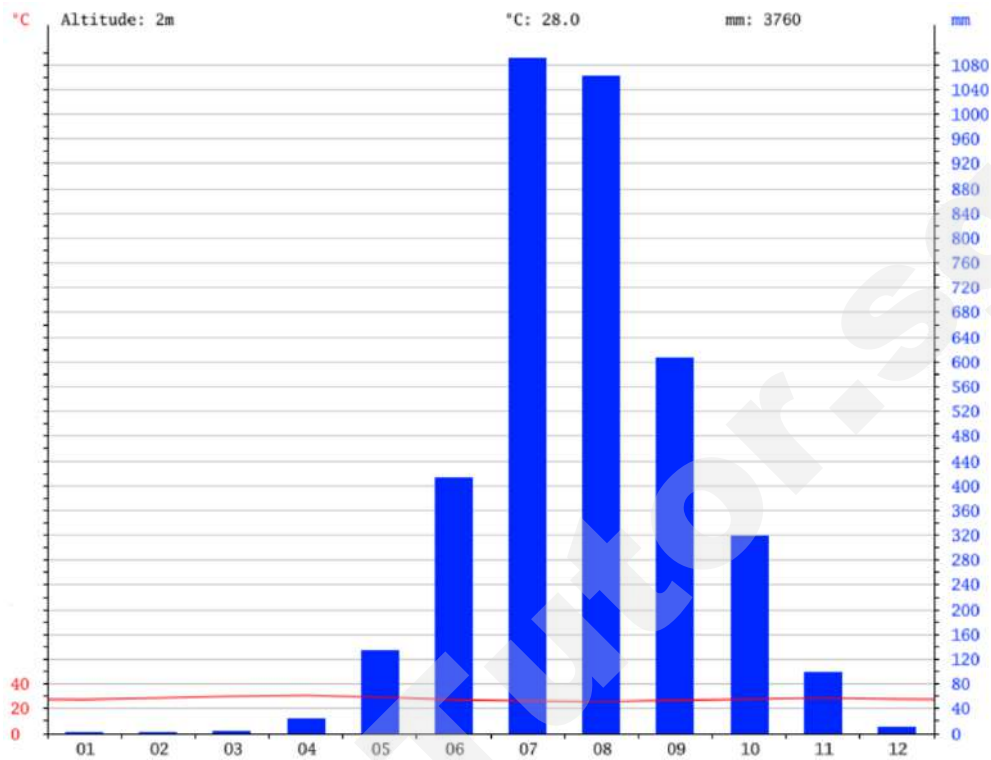
## Resource 3 for Question 1

### Selected results of the survey

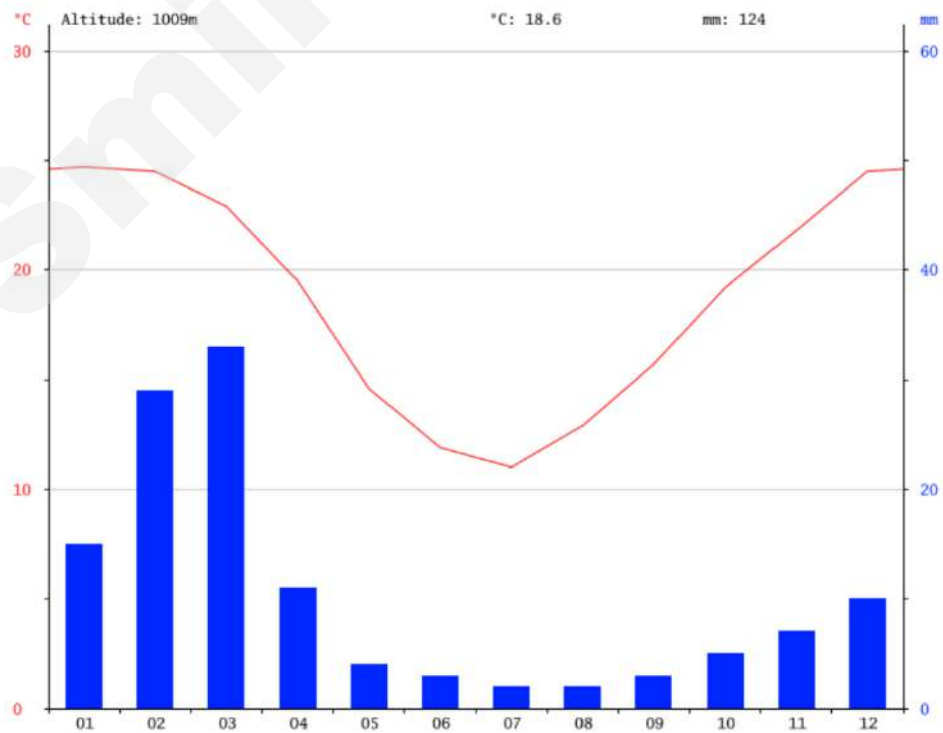
Problems with Public Transportation	Agree	Disagree
Takes too much time	9%	91%
Difficult to access	16%	84%
Difficult to board	23%	77%
Too expensive	13%	87%
Difficult to get a seat	71%	29%

## Resource 4 for Question 2

## Climate graph of Conakry, Guinea

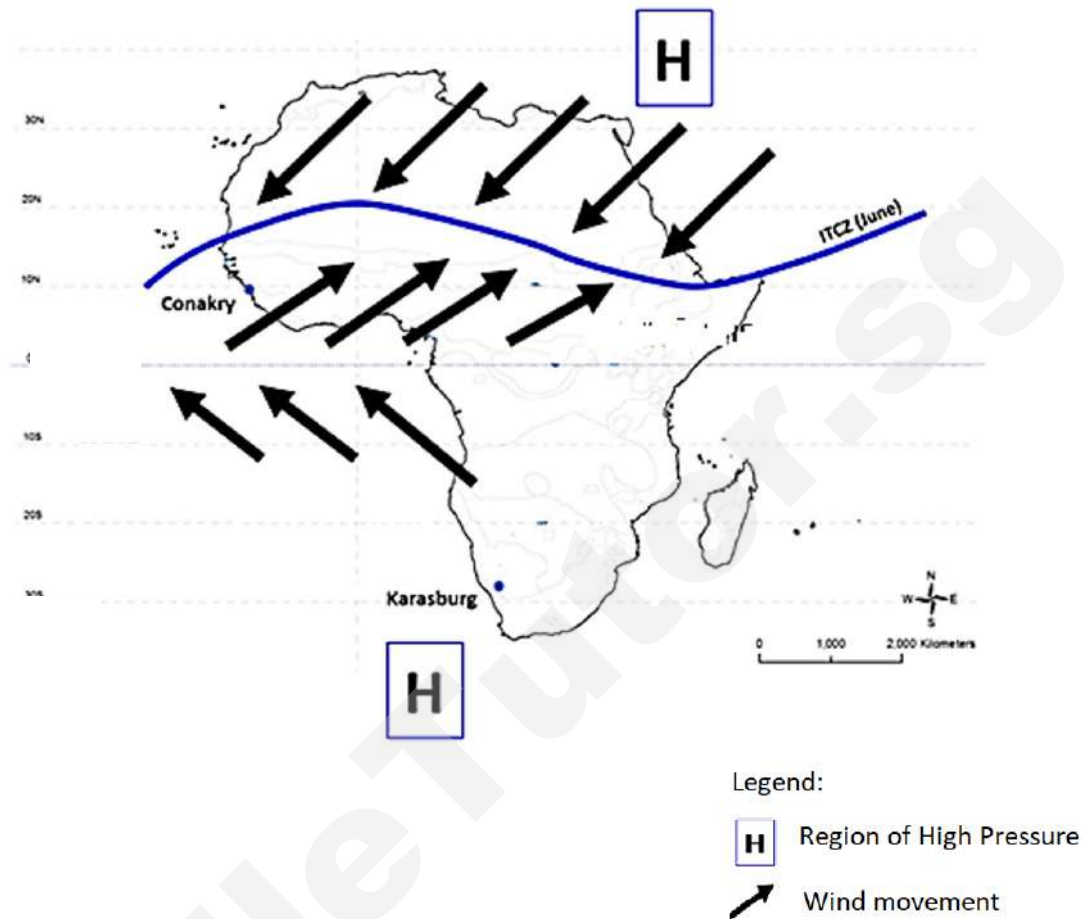


## Climate graph of Karasburg, Namibia



## Resource 5 for Question 2

## Monsoon Wind System over Africa in June



## Resource 6 for Question 2

## Flooding in Conakry, Guinea July 2016





**ST ANDREW'S JUNIOR COLLEGE**  
**Preliminary Exam**  
**Higher 1**

**GEOGRAPHY**  
**Paper 1**

**8813/01**

**16 September 2019**

**3 hours**

Additional Materials:    Answer Paper  
                                     1 Insert  
                                     World outline map

**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 a soft pencil for any diagrams, graphs or rough working.  
Do not use paper clips, highlighters, glue or correction fluid.  
Begin each question on a fresh page.

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 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 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 and **1** Insert with **5** pages.

**[Turn Over**

## Section A

### Theme 3: Geographical Investigation

- 1** A team of four students from Singapore decided to conduct four days' fieldwork in Toyama City, Japan to investigate whether the needs of the elderly population were met in the city. The elderly (65 years and above) in Toyama City make up 30% of the local population.

Before departing from Singapore, the students completed background research on Toyama City and decided to focus their investigation on the public transportation in the city and how it affects the elderly's mobility. They decided to carry out a survey to assess the views of the elderly.

The students carried out the survey on four days (Thursday to Sunday) from 4 to 6 pm each day.

When they returned to Singapore, the students analysed the data they had collected and produced a report.

Resource 1 shows a map of Toyama City's LRT (Light Rail Transit) Network and some of its features. Resource 2 shows information on programmes that encourage the elderly to utilise public transportation and evidence of their success. Resource 3 shows selected results of the survey.

- (a)** With the help of Resources 1 and 2 and your own knowledge, explain the ways liveability for the elderly can be improved through transport. [5]
- (b)** Suggest a suitable hypothesis for the students' investigation with reference to Resources 1 and 2. State **one** reason why this hypothesis is at a suitable scale. [2]
- (c)** Suggest a plan the students might have used to obtain the data on the elderly's experience of using the public transport in Toyama City shown in Resource 3. [7]
- (d)** Sketch a graph to represent the data in Resource 3. Justify why this is an effective method to represent the data. [5]
- (e)** Explain the strengths and limitations of Resource 3 in helping the students come to a conclusion whether the transportation needs of the elderly are met. [6]

## Section B

### Theme 1: Climate Change and Flooding

#### Climate and Flooding in Conakry and Karasburg

- 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. [7]
- (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. [8]

## 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 the environmental effects of climate change on human activity. [9]
- (b) 'There are more advantages than disadvantages in using alternative energy sources to mitigate climate change.'
- How far do you agree with this statement? [16]
- 4** (a) With the aid of a diagram, differentiate and explain the function of the flows in the basin hydrological cycle. [9]
- (b) Assess the success of strategies to manage flooding in the humid tropics. [16]

### Theme 2: Urban Change

- 5** (a) Explain how sustainable urban development vary between countries at high and low levels of development. [9]
- (b) 'Urban development should, and can, be made more sustainable.'
- With reference to one or more issues related to sustainable urban development, discuss the extent to which you agree with this statement. [16]
- 6** (a) With reference to examples, explain how reimaging improves urban living space. [9]
- (b) 'It is not easy to resolve the issues affecting liveability.'
- With reference to **either** crowding **or** fear, discuss the extent to which you agree with this statement. [16]





## Section A

### Theme 3: Geographical Investigation

- 1 (a) With the help of Resources 1 and 2 and your own knowledge, explain the ways liveability for the elderly can be improved through transport. [5]

#### **Level Marked**

#### ***Indicative content:***

Students have to explain how transport improves the liveability of the elderly. The different needs of the elderly (social, economic and environmental needs) needs to be met.

**Social needs:** Allowing elderly to go different places to meet their family and friends. Transport should encourage elderly to interact with the society, across generation (the Program in Resource 2) which will improve their social inclusion.

**Economic needs:** Some elderly still need to travel to work places to earn a living. Having affordable transportation will allow them to get to their work places.

**Environmental needs:** Physical spaces/infrastructure – Infrastructure that will provide a positive experience when taking public transport.

- Inter-connectedness – Reference from Resource 1, the LRT networks and stations, linking Toyama City to many different locations.
- Affordability – Resource 2 – looking at the various transport programs to make it affordable for the elderly. Elderly might not be earning an income or they could be retirees, hence cheaper transport cost will cut their cost of living and improve their liveability.
- Comfort level –looking at % of elderly getting a seat in public transportation.
- Accessibility –Looking at % of elderly having difficulty in accessing public transportation.
- Frequency, specialised transport services and information – Own knowledge.

Note: Both resources and students own knowledge need to be referred to and well explained for maximum 5 marks to be awarded.

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of how quality transport provided in Toyoma City can improve the liveability for the elderly. Explanation is detailed, thorough and relevant to the different aspects of transport that can improve the liveability of the elderly. References made to both resources and own knowledge for substantiation.
2	3-4	Response demonstrates some knowledge of how quality transport provided in Toyoma City can improve the liveability for the elderly. Explanation is clear and mostly relevant to the the different aspects of transport that can improve the liveability of the elderly. Limited use made of both resources and own knowledge.
1	1-2	Response shows limited or no knowledge of how quality transport can improve the liveability for the elderly. Explanation is weak and at times irrelevant. Little or no reference to resources in response.
0	0	No creditworthy response.

- (a) Suggest a suitable hypothesis for the students' investigation with reference to Resources 1 and 2. State **one** reason why this hypothesis is at a suitable scale. [2]

**Point marked**

1 mark for a suitable hypothesis –

e.g.

- Toyama City LRT Network improves the elderly's mobility.
- Good public transportation increases the liveability of the elderly in Toyama City in Japan.
- Efficient public transportation in Toyama City increases the mobility of the elderly.

Any 1 reason (1m) to suggest why it is suitable -

- Scale of area to be covered (the longest transport line is via adoption line is 10.1km)
- The duration of the investigation – total of 4 days
- The resource available – (four students in total to share the investigation, the aerial map of the LRT network, the information of the programs available)

- (b) Suggest a plan the students might have used to obtain the data on the elderly's experience of using the public transport in Toyama City shown in Resource 3. [7]

### **Level marked**

#### ***Indicative content:***

Main elements to be expected -

- What – Reference to the set of data relevant for “quality of public transport” – frequency, comfort level, affordability, connections etc. Can refer to resource 3.
- Where – valid locations for the collection of the data. Along transportation lines. For instance, to investigate each different line each day, the adoption LRT (green line), City Tram Line (yellow line), Toyama LRT (Blue line) and Loop line (red line). Possible stops at the LRT network. Entry and exit points.
- When – reference to a specific length of time. Windows of time during the investigation period. Within the time period of 4-6pm, to identify breaks in between the 2 hours, have intervals, have window period etc.
- Who – Elderly as the sample population. Which age group? Age intervals to be determined i.e. 65-69 years, 70-79 years and 80 and above. How many? 30 per day so that a total of 120 respondents can be issued with survey questions.
- How – reference to research approach (details of the quantitative approach), division of labour – group of four can be split into 2 so as to ensure safety in numbers. With two groups students can increase coverage. Sampling method – stratified (based on gender, age group) and systematic (for every 3 elderly that walked pass). These will help to reduce biasness.

### **Level descriptors**

Level	Marks	Descriptors
3	6-7	Response demonstrates accurate knowledge of how quality geographical investigation methods. Outlines a relevant and coherent plan with reference to data collection, methods, investigation limitations and risk mitigation strategies. Response is relevant to the context throughout.
2	3-5	Response demonstrates some knowledge of geographical investigation methods. Outlines a clear plan with some reference to data collection, methods, investigation limitations and risk mitigation strategies. Response is mostly relevant to context of question but may lack clarity and coherence.
1	1-2	Response demonstrates limited or no knowledge of geographical investigation methods. Outline of plan is limited and may not refer

		to one or more of the facets of an investigation in their outline plan. Much of the response may not be relevant to context of question.
0	0	No creditworthy response.

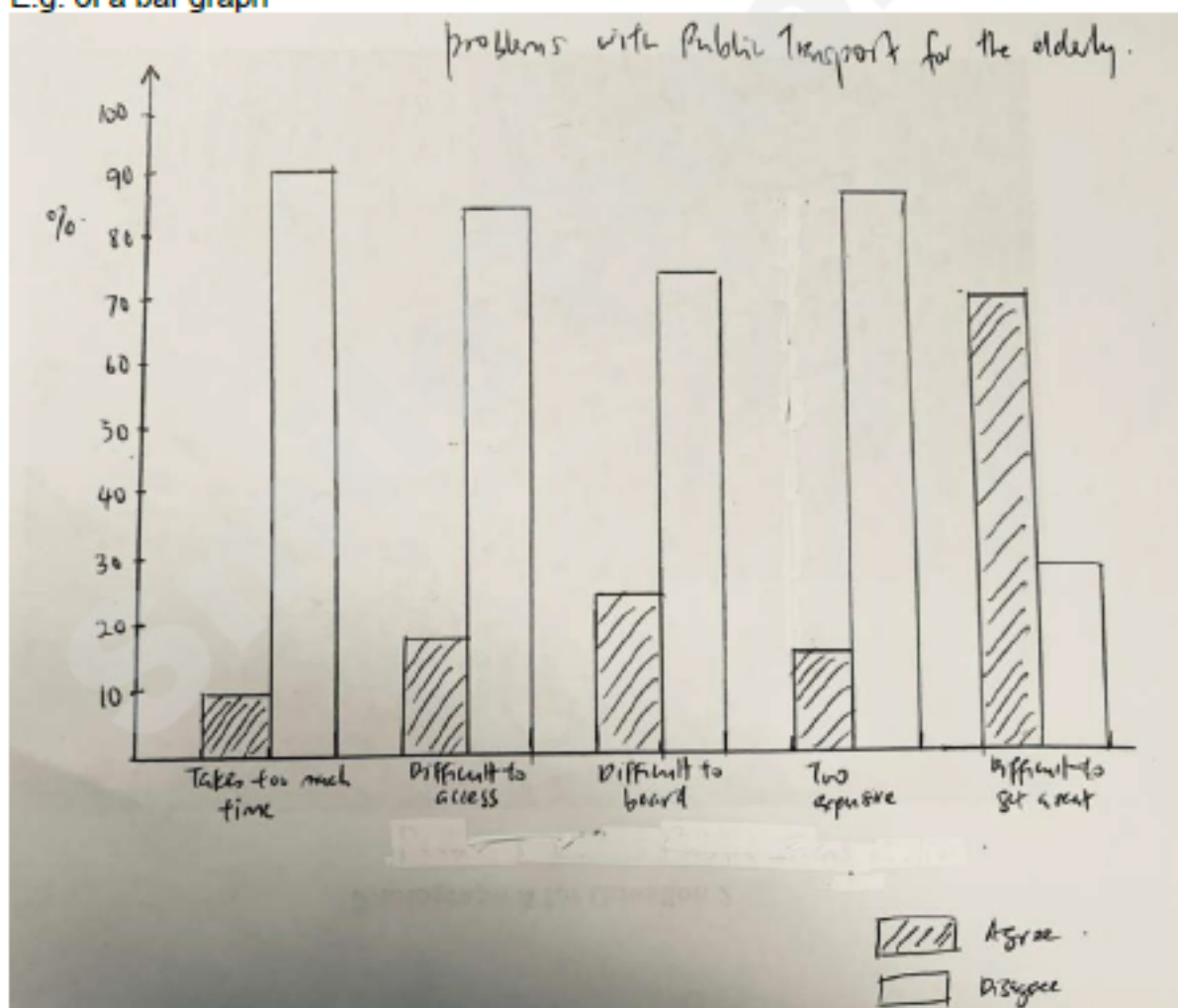
(c) Sketch a graph to represent the data in Resource 3. Justify why this is an effective method to represent the data. [5]

Point marked.

Award up to 3 marks for selected graph drawn. Bar graph –

- 1 mark for title.
- 1 mark for labelling on the axes.
- 1 mark for accurate drawing of the bars.

E.g. of a bar graph



2 marks for justifying choice of method: Note: Justify – to consider what's good about it and what's not)

- Good visual representation – easier to read
- Easy to compare variables – able to identify the least and most severe

- (d) Explain the strengths and limitations of Resource 3 in helping the students come to a conclusion whether the transportation needs of the elderly are met. [6]

**Point marked.**

At least 2 limitations - (maximum of 3 marks awarded when explained with reference to Resource 3)

Suggested points for limitations:

- The categories for the response are subjective. For example, different people might interpret “too large” and “too small” differently.
- There might be other problems that are not highlighted in the survey.
- Miscommunication might happen due to language barrier (in case they do not speak and understand English) during investigation and hence the answers might not be accurate.

At least 2 strengths - (maximum of 3 marks awarded when explained with reference to Resource 3)

Suggested points for strengths:

- A variety of problems related to public transportation was highlighted in Resource 3. This provides a better understanding.
- The answers gathered were easy to tabulate and read as there were only 2 options (note that this can also be a limitation).
- It is a primary data

## **Section B**

### **Theme 1: Climate Change and Flooding**

#### **Climate and Flooding in Conakry and Karasburg**

- 1 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]

Identify:

- Conakry – Am (1 mark)
- Karasburg – BWh (1 mark) \*\*\*Remember rainfall below 250mm will be in BWh

Describe differences:

- Temperature: (2 marks)
  - ATR, temperature pattern (uniform, fluctuates), average annual tempt (any 2 points supported with examples).

For e.g., ATR in Conakry is low at about 2°C whereas ATR in Karasburg is higher at 13°C.

- Rainfall: (2 marks)
  - Total annual rf, pattern (seasonal vs uniformly low), highest and lowest rainfall (any 2 points supported with examples).

For e.g., total annual rainfall in Conakry is high being 3760mm while total annual rainfall for Karasburg is low being 124mm.

**Point marked.**

- (b)** With reference to Resource 5, suggest reasons for the variations in rainfall pattern in June between Conakry, Guinea and Karasburg, Namibia. [6]

**Indicative content:**

Students to provide at least 2 reasons.

- Students should be able to understand that there are three possible reasons for the **rainfall pattern to be different in June** like,
  - (i) position of overhead sun resulting in convection
  - (ii) position of ITCZ resulting in convergence
  - (iii) position of STH or HP resulting in sinking air or subsidence
- Other reasons can be coastal location, offshore winds etc.
- Students should be specific about the location of the ITCZ because rainfall pattern will be different if the ITCZ is close to or near or north or south of Conakry.

**Level marked**

Level	Marks	Descriptors
3	6-7	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. The idea of monsoon winds should be highlighted in

		the response. Explanation is detailed, thorough and relevant Reference made to resource-to substantiate response.
2	3-5	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.

(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
- late to work, reduce productivity and efficiency due to traffic disruptions caused by flooding

**Social effects – (2 marks)**

- deterioration of health conditions owing to waterborne diseases like diarrhea, cholera etc.
- loss of human lives or death
- trauma by flood victims
- late to work, school increases mental stress

**Point marked**

(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]



<b>Factors affecting flood occurrences.</b>	
Actual Volume of rf (Resource 4)	High rf from June to October
Duration of rainfall	Long duration rf can contribute to high volume rf
Factors contributing to high rainfall that leads to flood – <ul style="list-style-type: none"> <li>• Wind Patterns (Resource 5)</li> </ul>	Monsoon winds - Onshore winds. Depends on how much moisture it is picking up when it passes the ocean body.
Urbanisation (Resource 5) – mention of hydrological processes (especially HOF and SOF) contributing to flood occurrences to be made clearly in response.	Concrete road surfaces can encourage HOF.
Coastal location (Resource 6)	Conakry near coastal location. High tide might not allow rain water to drain out to the ocean.
Topography (Resource 1)	Low elevation of 2m, gets easily submerged.
Failure of human intervention (own knowledge)	i.e. flood mitigation methods, poor drainage systems that cannot support the discharge

**Note:**

- To reach level 3, students must consider volume of rainfall and more than one other factor.
- To reach level 2, students must at least consider volume of rf and one other factor.

Level	Marks	Descriptors
3	7–8	<p>Response demonstrates 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. 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 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 relevant 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 insufficient evidence and support used</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 or exemplified.</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, are simple and may be flawed and contains no reference to views of stakeholders</li> </ul>
0	0	No creditworthy response.

## 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

- 2 (a) Explain the environmental effects of climate change on human activity. [9]

Indicative content:

Explain how climate change produce an environmental impact →

The various environmental impacts can be considered:

- Loss of ecosystems
  - ↑ temperature → ↑ heat stress in livestock & wildlife
  - Arctic sea ice – unique frozen wilderness is under threat. E.g. Central Spain, 16 butterfly species displayed an upward shift of 200m.
  - Polar bears who rely on ice to reach main hunting grounds to feed on seals are affected.
- Desertification
  - Species extinction
  - Due to the ↑ temperature, certain species are not able to remain
  - E.g. Tibetan antelope, gazelles & snow leopards are affected with desertification
- ↑ forest fires
  - Haze gone beyond national boundaries
- ↑ methane contribution
  - ↑ temperature → melting of glaciers & ice
  - Tonnes of methane released from melting of permafrost. These methane are locked in frozen peaty sediments beneath the sea bed.

Explain how these environmental impacts affect human activity →

The human activities could include economic and social activities.

### Examples of human activity

- Tourism -- Shift in tourist destinations
  - With global warming, we will experience climate change
  - Some places will experience higher temperatures especially during summer periods. Popular destination areas such as Spain in the Mediterranean might become less popular.
  - With SLR, some heritage sites may get inundated. E.g. in Venice, a popular tourist destination, St. Mark's Square, experiences flooding 6 times in a year.
- Agriculture --↑ damage to large number of crops and livestock
  - Effects of drought – some production is heavily dependent on irrigation. When there is drought, it will affect water supply. E.g. cereal production in Spain is totally dependent on irrigation
  - If climate zone shifts, new areas of droughts will occur. ↓ crop yields for mid latitude areas especially the continental interiors when there's ↑ in temperature leading to summer drying → perennial drought in Western USA.
  - With increase in temperature, places dependent on rivers for agricultural production will be affected. E.g. Colorado River ↑ in 2°C temperature will lead to 50% drop in river flow
  - While it will affect the growth of some places, other places will experience longer growing seasons. E.g. those places in higher latitudes. Eastern Europe can become more productive.
- Migration (positive & negative)

- (b) 'There are more advantages than disadvantages in using alternative energy sources to mitigate climate change.'

How far do you agree with this statement?

[16]

Indicative content:

Students to discuss the statement and compare different types of alternative energy sources with the traditional fossil fuel burning sources of energy, highlighting their strengths and weaknesses. Better answers will challenge the idea that alternative energy sources can solve climate change. Students can question whether alternative energy sources alone could halt climate change and suggest other actions that should also be taken such as creating carbon sinks, (reforestation). Students can also discuss on whether it is possible at all to halt climate change. Explanations can be given on how alternative energy could mitigate climate change but how it is not possible to make climate change come to a standstill due to the interplay of different naturally occurring processes, anthropogenic activities etc. Responses to be supported with examples.

- 3 (a) With the aid of a diagram, differentiate and explain the function of the flows in the basin hydrological cycle. [9]

**Indicative content:**

Students to pull together all the various flows in the basin hydrological cycle. They can differentiate clearly by explaining the various pairs of flows.

- SOF and HOF
- Infiltration and percolation
- Throughflow and base flow

Better responses would demonstrate clear appreciation of the differences between the various flows through the use of criteria for comparison and conjunctions such as 'while', 'whereas', 'on the other hand', 'but' and 'however'. To hit the highest level, responses need to be consistently analytical and explanatory rather than descriptive. Hence, the differences between the various flows need to be explained in great detail.

Weaker responses are dominated by description of the different flows, rather than explanation. These responses may also describe each flow individually, instead of contrasting the flows using clear criteria.

- (b) Assess the success of strategies to manage flooding in the humid tropics.

[16]

**Indicative content:**

It is important to define floods and briefly explain why they occur, as this sets the scene and indicates that students have provided a context for the answer. Floods occurs when river discharge exceed bankfull discharge. They are the result of an excess of input into the drainage system such that normal channel cannot cope with the water leading to an overbankfull condition. The context of the essay needs to be mentioned clearly, i.e. humid tropics. The climatic characteristics of the humid tropics (Af, Am and Aw) to be clearly highlighted as it does contribute to occurrences of flooding.

Strategies to manage flooding in the humid tropics can be by prediction (e.g. recurrence interval), hard (dams, artificial levees) and soft engineering methods (managed flooding, floodplain zoning, reforestation) and response strategies. The best answers will discuss and evaluate in detail some examples of flood events and flood strategy methods.

	Predictions (e.g. recurrence interval)	Hard engineering (e.g. dams, channelization,	Soft engineering (e.g. reforestation,	Immediate responses (e.g. 'search and rescue',
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		levees and dykes)	flood plain zoning)	medical and food aid)
Effective				
Limited in effectiveness				
Examples or case-studies	You can refer to “small” examples for every measure, or use a “bigger” case study such as Pakistani/Bangladeshi actual flood events to show whether these strategies have worked. Details will always impress, but do not only describe, please EVALUATE.			

## Theme 2: Urban Change

- 4 (a) Explain how sustainable urban development vary between countries at high and low levels of development. [9]

### **Indicative content:**

Students to understand the concept of sustainable development (according to the Brundtland report) and how its applied to the urban areas.

How it will vary –

*Countries at high level of development:*

- SUD more focused on the environmental dimension. Saving the environment is crucial. This is to ensure that resources can be enjoyed by future generations.

*Countries at low levels of development:*

- SUD more focused on the social and economic dimension. Ensuring the urban dwellers have employment opportunities to earn an income and have proper shelter is crucial.

Variation largely will depend on:

- The priorities set by different government with different levels of development. The issues under sustainable development is rather broad and countries are given a long period of time to manage these issues. Hence different countries will have different approaches and different priorities.
- The various needs of the urban dwellers (consider perceived vs essential needs)
- The various support in terms of funds, expertise available which will vary in high and low levels of development countries.

- (b) 'Urban development should, and can, be made more sustainable.'

With reference to one or more issues related to sustainable urban development, discuss the extent to which you agree with this statement.

[16]

### Indicative content:

This question allows a wide range of approaches, letting you use your materials flexibly. The 'issues related to urban development' would include traffic congestion, waste management and housing problems. When discussing these issues students to ensure that the three dimensions of SUD are covered (i.e. economic, social and environmental dimensions). While it is possible to approach this question considering only one of the 'consequence', for variety, consider two (e.g. slums and waste) and select associated attempts for assessment. Use examples to help illustrate and deepen your assessment.

- 6 (a) With reference to examples, explain how reimagining improves urban living space. [9]

'Urban living space' is used explicitly in the syllabus, and can be interpreted broadly to include the immediate living environment around residential areas, or larger in scale such as the neighbourhood, and even beyond that to include a town or a part of the city. The term refers to the natural environment (e.g. greenery), physical environment (e.g. architectural artefacts such as buildings), and human environment (e.g. the social fabric, the community's demographics). Reference to examples required.

### Indicative content:

Improvement on the human environment:

Cultural led reimagining – when planned well, can promote sustainability. It helps to improve the visual attractiveness of an area. Allows residents to increase 'activity hours' in the space provided improving the social fabric of the city area. In Singapore, the reimagining of Chinatown involved conserving shophouses to make it compatible to modern Singapore at the same time remaining attractive to both locals and tourists.

Improvement on the physical environment (via artefacts):

Property-led reimagining (produce or improve buildings) in Liverpool developed the Museum of Liverpool. The museum contributed to the 'European Capital of Culture Effect' making it a place of interest for visitors all over UK. In another example, Canary Wharf in London's Docklands – attracts many investors and created ample employment opportunities).

Improvement on the natural environment – creation of open and green spaces.

In London, spectacular events such as London Olympics created open and green spaces that were stipulated to be converted into permanent parks e.g. Queen Elizabeth II Olympic Park. In another example, flagship development on Cheong Gye

Stream in South Korea where an old stream was recovered, cultural relics such as the Gwanggyo were restored. Today, the Cheong Gye is a green artery running through downtown Seoul attracting the locals to utilize it for various social needs

(b) 'It is not easy to resolve the issues affecting liveability.'

With reference to **either** crowding **or** fear, discuss the extent to which you agree with this statement. [16]

**Indicative content:**

Answers should include a discussion on the varying levels of ease in resolving the issues tied to fear which affects liveability. Resolving the issues tied to fear will include discussion on the various strategies. Strategies could include target hardening, policies reducing incivility and disorder and gated community.

A higher level response could look at how the different strategies are being used to resolve the issues with reference to specific case study / example. Another possible approach would be to analyse the application of the selected strategies in different cities and check whether the issues of fear have been resolved to improve the liveability of the urban population.

Level	Marks	Descriptors
3	7–9	Response is consistently analytical and explanatory rather than descriptive. There is a clear focus on the question. Depth of relevant knowledge and understanding exemplified throughout. The response is coherent and the use of terminology is accurate.
2	4–6	Response includes analysis and explanation but is generally dominated by description for weaker responses. Response reflects relevant knowledge and understanding of the question. Response is structured and organised satisfactorily but may be unclear in parts. Use of terminology is generally accurate.
1	1–3	Response does not address the requirements of the question fully. Depth of knowledge and understanding shown is limited. 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.

Level	Marks	Descriptors
4	13–16	Response shows strong evaluative elements. Evaluation is relevant and comprehensive. Response fully addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and well-supported by relevant material. Use of terminology is accurate.
3	9–12	Response displays a sound evaluative element. Response addresses the question and features accurate knowledge, reflecting depth of understanding. The argument or discussion is coherent and supported by relevant material. Use of terminology is relevant and mostly accurate.
2	5–8	Response has some elements of evaluation but is broadly descriptive. Response exemplifies knowledge and understanding of the question and is generally relevant. The weakest responses may lack balance and/or depth. Response structure is broadly coherent but may lack clarity. Use of terminology is inconsistent though generally accurate.
1	1–4	Response shows little or no evaluation. 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 terminology.
0	0	No creditworthy response.