

2018

JC2 H1 Geography

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ANDERSON JUNIOR COLLEGE

JC2 H1 Geography Preliminary Examinations (2018)

H1 GEOGRAPHY

8813/01

Paper 1

12 September 2018

3 hrs

Additional Materials: Writing Paper
1 Insert
1 World map outline

READ THESE INSTRUCTIONS FIRST

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

Answer **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.

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.

Name: _____ PDG: _____

Section A	Section B	Section C (Please <u>circle</u> the number of the attempted question)		Total Marks
1	2	3 / 4	5 / 6	
25	25	25	25	100

This question paper consists of 5 printed pages.

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Section A

Theme 3: Geographical Investigation

- 1 A class of 25 18-year old students were tasked to investigate the influence of land use on infiltration rates in Singapore. After splitting into groups of 5, one of the groups selected Labrador Nature Reserve as their study area, and decided to carry out their primary fieldwork at two sites – Sites A and B – in the nature reserve.

The group crafted the following hypothesis for their investigation:

“The higher the level of urbanisation of the site, the lower the infiltration rate in the site.”

The following equipment were provided to measure infiltration rate at the two different land use sites:

- A tin can, about 30cm in height and a diameter of 10cm, with both ends removed
- A 1.5-litre bottle of water
- A ruler
- Hammer
- Wooden plank
- Stopwatch

The investigation was conducted on a weekday afternoon in June. They were given 3 hours to complete their investigation, from 2 pm to 5 pm. At the respective sites, the tin can was driven into the soil to about 10cm deep by using a hammer onto a wooden plank placed on the rim of the can. A ruler was placed vertically inside the tin can to record the fall in water level. Water was poured to a depth of 20 cm. Measurements of the remaining depth of water was taken every 1 minute to compute the infiltration rate. At the same time, constant top-ups of water were carried out to maintain a regular head of water above soil.

Resource 1 shows a map of Labrador Nature Reserve, which indicates the locations of Sites A and B. Resource 2 shows data collected on infiltration rates at Sites A and B.

- (a) Explain why the hypothesis crafted by the group is not suitable for the investigation at Labrador Nature Reserve. [2]
- (b) Explain how the impacts of the investigation could be minimised. [5]
- (c) With reference to Resource 2, sketch a line graph to represent the infiltration rates for Site A and Site B over time respectively. Suggest **one** reason why this method may be better than the one depicted in Resource 2. [6]
- (d) With reference to Resources 1 and 2, account for the differences in infiltration rates between Sites A and B. [5]
- (e) Evaluate the usefulness of the investigation in understanding the influence of land use on infiltration rates, and suggest how the investigation could be improved. [7]

Section B**Theme 2: Urban Change****Urban Liveability in Ahmedabad, India**

- 2** Ahmedabad, the formal capital of the Indian state of Gujarat, is one of the most populous cities in the country as of 2011. It also houses a key urban reimagining project implemented along the Sabarmati River, an important source of water for the city.

Resource 3 shows the trends in slum population in various states in India from 2001 to 2011. Resource 4 shows the distribution of informal settlements in Ahmedabad. Resource 5 shows the main features of urban reimagining of the Sabarmati River in Ahmedabad. Resource 6 is an extract on impacts of urban reimagining of the Sabarmati Riverfront in Ahmedabad.

- (a) Compare the trends in slum population between Gujarat and Delhi from 2001 to 2011 with reference to Resource 3. [4]
- (b) Describe the distribution of the range of informal settlements in Ahmedabad in 2001 using Resource 4. [4]
- (c) With reference to Resource 4, suggest reasons for the distribution of the range of informal settlements in Ahmedabad in 2001. [5]
- (d) With reference to Resource 5, explain **two** ways in which urban reimagining of the Sabarmati Riverfront might have helped enhance urban liveability in the area. [4]
- (e) Using Resources 5 and 6 and your own knowledge, evaluate the extent to which urban reimagining along Sabarmati Riverfront has improved the lives of slum dwellers in Ahmedabad. [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 processes underlying contemporary climate change. [9]
- (b) To what extent do you agree that there are economic, environmental and social dilemmas in mitigating and adapting to contemporary climate change? [16]
- 4 (a) Explain how flood hydrographs vary in the tropics. [9]
- (b) "Flooding hazards are largely due to forces beyond the control of men."
To what extent do you agree with this view? [16]

Theme 2: Urban Change

- 5 (a) Explain why traffic congestion occurs in cities of countries at varying levels of development. [9]
- (b) Assess the success of strategies to manage traffic congestion in cities of countries at varying levels of development. [16]
- 6 (a) Explain why urban trends in cities at different levels of development vary. [9]
- (b) "Cities should be planned for people, not places."
To what extent do you agree with this view in relation to the effectiveness of strategies to improve liveability in cities? [16]



ANDERSON JUNIOR COLLEGE

JC2 H1 Geography Preliminary Examinations (2018)

H1 GEOGRAPHY

8813/01

Paper 1

INSERT

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This question paper consists of 6 printed pages.

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Resource 1 for Question 1

Map of Labrador Nature Reserve, including the locations of Sites A and B



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Resource 2 for Question 1**Data collected on infiltration rates from Site A**

Time	Infiltration rate (mm/min)
1 min	10
2 mins	9
3 mins	7
4 mins	4
5 mins	1

Data collected on infiltration rates from Site B

Time	Infiltration rate (mm/min)
1 min	15
2 mins	12
3 mins	10
4 mins	8
5 mins	7

Resource 3 for Question 2

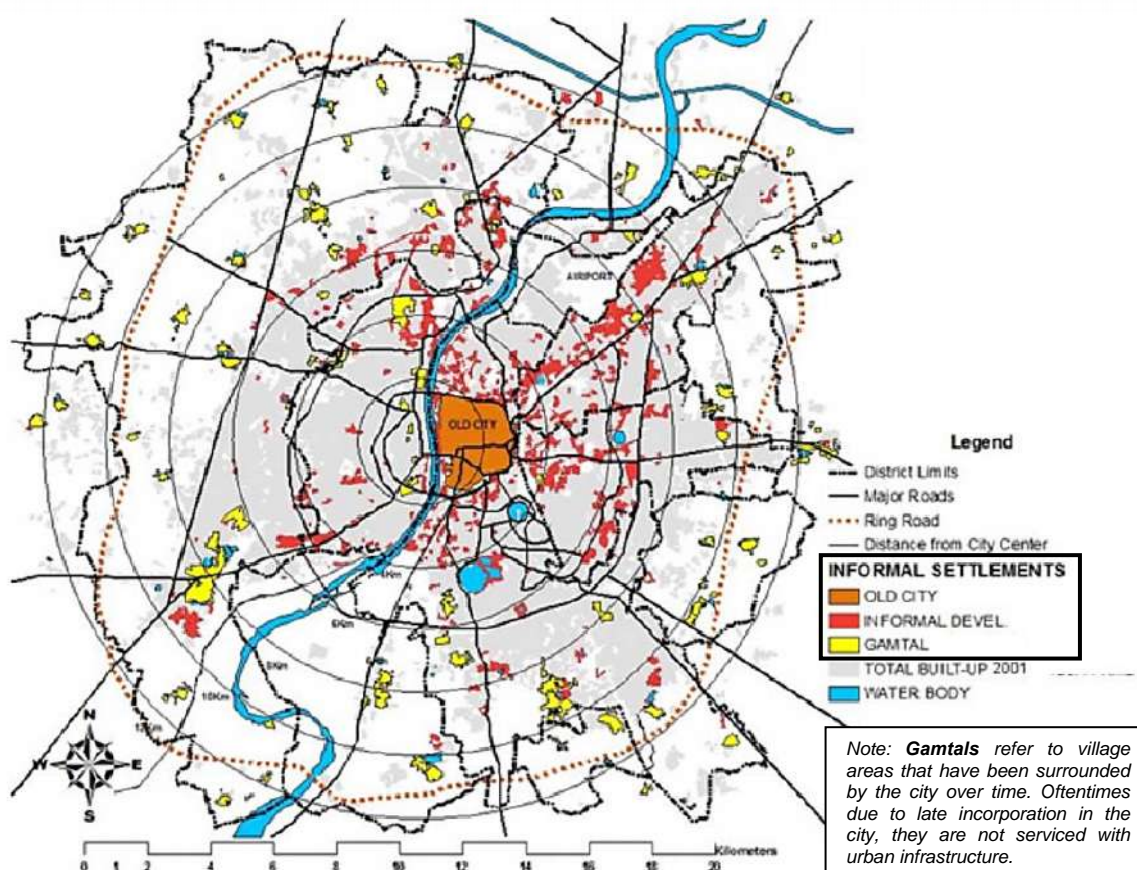
Slum Population in Selected States in India

State	Slum Population		Total Population	
	2001	2011	2001	2011
Andhra Pradesh	5,149,272	10,186,934	15,752,946	84,580,777
Delhi	2,025,890	1,785,390	10,979,341	16,787,941
Gujarat	1,346,709	1,680,095	11,427,259	60,439,692
Jharkhand	309,557	372,999	2,418,755	32,988,134
Maharashtra	10,644,605	11,848,423	33,624,960	112,374,333

Statistics from: <https://web.archive.org/web/20061206212031/http://www.censusindia.net:80/results/slum1.html>;
<https://www.census2011.co.in/>

Resource 4 for Question 2

Distribution of informal settlements in Ahmedabad, India



Source: <https://openknowledge.worldbank.org/bitstream/handle/10986/16384/wps6267.pdf?sequence=1>

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Resource 5 for Question 2

Reimaging of the Sabarmati Riverfront in Ahmedabad, India



Source:

http://epaperbeta.timesofindia.com/NasData/Publications/TheTimesOfIndia/Mumbai/2017/09/22/Photographs/018/22_09_2017_018_026_011.jpg

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Resource 6 for Question 2**Article on impacts of urban reimagining of the Sabarmati Riverfront in Ahmedabad**

Once a bleak riverbed that was dry most of the year, the Sabarmati that winds through central Ahmedabad is now a swelling and much cleaner waterway, fed by canals and barrages from an upstream river. Previously, the old river was clogged with sewage and the tin-roofed shanties clustered along the banks blocked access for the general public. Now, an interceptor sewer system, part of the \$200-million Sabarmati project, has been constructed on both the banks of the river to intercept the sewer running into the river and divert it to treatment plants.

Backers of the project boast that the rejuvenation of the Sabarmati riverfront has made it a center of civic life, just as it was a century ago. A key feature of this project is a two-level, continuous promenade on both sides of the river, built just above the water level to serve only pedestrians and cyclists and to provide access to the water. The whole stretch of river banks is public, open to every citizen.

But overhauling the Sabarmati required one of the largest urban resettlement programs undertaken in India. Tens of thousands of poor riverfront families were given space in government-built apartment blocks, but most were located on the outer reaches of the city, all but disconnected from transit networks, utilities and people's former livelihoods, the families said. Some of the buildings were unfinished or lacked potable water.

Also, not all slum dwellers were resettled. For thousands other impoverished slum dwellers, they and their families are stuck in a temporary housing site, living in tumbledown shacks made of plywood and plastic sheets that fall apart during the heavy summer rains, miles from city services or decent jobs.

Adapted from:

- <http://sabarmatiriverfront.com/UserFiles/File/INCLUSIVE%20GROWTH.pdf>
- <https://economictimes.indiatimes.com/news/politics-and-nation/poor-excluded-in-ahmedabads-urban-development-model-study/articleshow/47582007.cms>
- <http://www.latimes.com/world/asia/la-fg-india-river-20140803-story.html>

Section A

Theme 3: Geographical Investigation

- 1 A class of 25 18-year old students were tasked to investigate the influence of land use on infiltration rates in Singapore. After splitting into groups of 5, one of the groups selected Labrador Nature Reserve as their study area, and decided to carry out their primary fieldwork at two sites – Sites A and B – in the nature reserve.

The group crafted the following hypothesis for their investigation:

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The following equipment were provided to measure infiltration rate at the two different land use sites:

- A tin can, about 30cm in height and a diameter of 10cm, with both ends removed
- A 1.5-litre bottle of water
- A ruler
- Hammer
- Wooden plank
- Stopwatch

The investigation was conducted on a weekday afternoon in June. They were given 3 hours to complete their investigation, from 2 pm to 5 pm. At the respective sites, the tin can was driven into the soil to about 10cm deep by using a hammer onto a wooden plank placed on the rim of the can. A ruler was placed vertically inside the tin can to record the fall in water level. Water was poured to a depth of 20 cm. Measurements of the remaining depth of water was taken every 1 minute to compute the infiltration rate. At the same time, constant top-ups of water were carried out to maintain a regular head of water above soil.

Resource 1 shows a map of Labrador Nature Reserve, which indicates the locations of Sites A and B. Resource 2 shows data collected on infiltration rates at Sites A and B.

- (a) Explain why the hypothesis crafted by the group is not suitable for the investigation at Labrador Nature Reserve. [2]

Answer Guide:

- Not **specific** – does not specify the sites delineated for investigation and/or the different land uses required
- Not **measurable** – variations in **land use** cannot be measured by level of urbanisation

Point-marked – 1m for identification of reason, and 1m for explanation of reason.

- (b) Explain how the impacts of the investigation could be minimised. [5]

Answer Guide:

- **Minimisation of impacts on the ecosystem in the area**, through measures such as:
 - Minimising the removal of vegetation when hammering the tin can into the soil to measure infiltration rates, especially at Site B
 - Avoiding littering at the park
- **Minimisation of social impacts in the nature park**, given that it is a weekday afternoon in June where there might be members of the public in the

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area, through measures such as:

- Conducting investigation away from pathways, especially at Site A given that Site A is a road / next to a carpark
- Reduce noise levels when conducting investigation, as the nature park is an area of leisure and recreation for members of the public.
- Any other impacts & corresponding suggestions – list is non-exhaustive

Levels-marked – see descriptors below

Level	Marks	Descriptors
3	4-5	<ul style="list-style-type: none"> • Response identifies at least 2 impacts in the area that might result from the investigation, and identifies concrete suggestions on how these impacts might be minimized. • Response provides a detailed explanation of how impacts might be minimized. • Use of preamble and Resource 1 to support identified impacts consistently.
2	2 – 3	<ul style="list-style-type: none"> • Response identifies suggestions on how these impacts might be minimized, but these suggestions may not be concrete (e.g. reduce noise pollution – question is, <i>how?</i>). How these suggestions are related to possible impacts of the investigation may be unclear. • Response provides appropriate explanations of how impacts might be minimized, but explanations might be lacking in detail. • Use of preamble and Resource 1 to support identified impacts might be present, but not consistent in explanation.
1	1	<ul style="list-style-type: none"> • Response only identifies 1 suggestion to minimize impacts of investigation with explanation, OR may identify at least 2 suggestions without corresponding explanations at all. How these suggestions are related to possible impacts of the investigation may be unclear. • Minimal reference to Resource 1 and preamble, if at all.
0	0	No creditworthy response

- (c) With reference to Resource 2, sketch a line graph to represent the infiltration rates for Site A and Site B over time respectively. Suggest **one** reason why this method may be better than the one depicted in Resource 2. [6]

Answer Guide:

- Sketch of line graph:
 - 2 marks for Site A and B respectively. Marks are allocated based on:
 - Accuracy of data points
 - Use of appropriate x- and y- axes
- Possible reasons for line graph being an improvement over the table (1m for identified reason, 1m for explanation):
 - Easier **visualization** of change of infiltration rates over time at each site
 - Easier **comparison** of difference in infiltration rates between

- Sites A and B
- Any other appropriate reason accepted.

Point marked.

- (d)** With reference to Resources 1 and 2, account for the differences in infiltration rates between Sites A and B. [5]

Answer Guide:

- Infiltration rates at Site A are lower than at Site B.
 - Site A: Being located at a car park / road, the ground is therefore likely to be concretised and largely impermeable. This hence reduces infiltration rates at the area.
 - Site B: Being located directly within the gazetted nature reserve area in Labrador Nature Reserve, it is likely that vegetative cover is high. This means that soil will be more permeable owing to the presence of plant roots that provide fissures, thus enhancing infiltration rates.

Point marked.

- (e)** Evaluate the usefulness of the investigation in understanding the influence of land use on infiltration rates, and suggest how the investigation could be improved. [7]

Answer Guide:

Possible points for evaluation of usefulness of the investigation:

- Arguments supporting the view that the investigation has been useful:
 - Does allow for a conclusion to be drawn that variations in land use do impact infiltration rates in the area.
 - Sites selected for investigation are very clearly of two different types of land use, contributing to the validity of the investigation in meeting its aims
- Arguments against the view that the investigation has been useful:
 - Accuracy of the investigation is unclear, given:
 - The use of a single-ring infiltrometer rather than a double-ring infiltrometer, which means that the lateral flow of water is not controlled in the investigation
 - Investigation was not repeated in the same session
 - Reliability of the investigation is unclear, given that:
 - Only one session of the investigation was conducted, and on only one day

Possible suggestions on how to improve the investigation:

- Improve reliability and accuracy of the investigation through:
 - Using a double-ring infiltrometer to control lateral flow of water during the investigation
 - Choice of more sites of different land uses to corroborate findings further
 - Repetition of investigation on the same day, near to Sites A and B respectively, and taking the average result
 - Having multiple sessions across several days and taking the average result.

Level	Marks	Descriptors	Need a home tutor? Visit smiletutor.sg
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3	6 - 7	<ul style="list-style-type: none">• Response is largely evaluative, with a clear stand on the issue supported by reasons for evaluation. A higher-level response might provide evaluative criteria to analyse the view.• Response is balanced (i.e. provides multiple perspectives on the issue). Reasons for evaluation are well-developed.• Suggestions for improvement are clearly explained.• Detailed and accurate use of all relevant Resources and/or own knowledge to support points for evaluation of usefulness of investigation and suggestions for improvement.
2	3 - 5	<ul style="list-style-type: none">• Response is broadly evaluative – i.e. provides a stand and some reasons for evaluation.• Response might lack balance (i.e. provides multiple perspectives on the issue) and/or depth of explanation.• Suggestions for improvement are provided, but may not be consistently well-developed throughout.• Use of all relevant Resources and/or own knowledge to support points for evaluation of usefulness of investigation and suggestions for improvement is present, but not consistent.
1	1 - 2	<ul style="list-style-type: none">• Response is largely descriptive – i.e. states points for and/or against the view without a stand/ evaluation.• Response lacks balance (i.e. provides multiple perspectives on the issue) and/or detailed explanations.• Suggestions for improvement are provided, but may not be elaborated on (e.g. why the suggestion, how it improves over the current investigation, etc.)• Use of Resources and/or own knowledge to support points for evaluation is minimal and/or completely lacking.
0	0	No creditworthy response

Section B

Theme 2: Urban Change

Urban liveability in Ahmedabad, India

- 2 Ahmedabad, the formal capital of the Indian state of Gujarat, is one of the most populous cities in the country as of 2011. It also houses a key urban reimagining project implemented along the Sabarmati River, an important source of water for the city.

Resource 3 shows the trends in slum population in various states in India from 2001 to 2011. Resource 4 shows the distribution of informal settlements in Ahmedabad. Resource 5 shows the main features of urban reimagining of the Sabarmati River in Ahmedabad. Resource 6 is an extract on impacts of urban reimagining of the Sabarmati Riverfront in Ahmedabad.

- (a) Compare the trends in slum population between Gujarat and Delhi from 2001 to 2011 with reference to Resource 3.

[4]

Answer Guide:

Gujarat	Basis of comparison	Delhi
Gujarat experienced an increase in total slum population of 333,386 people.	<i>Change in total slum population from 2001 to 2011</i>	Delhi experienced a decrease in total slum population of 240,500 people.
Both states experienced a decrease in slum population as a proportion of total population: <ul style="list-style-type: none"> Proportion of slum population in Gujarat experienced a drop from 11.7% to 2.8%. 	<i>Change in slum population as a proportion of total population</i>	Both states experienced a decrease in slum population as a proportion of total population: <ul style="list-style-type: none"> Proportion of slum population in Delhi experienced a drop from 18.5% to 10.6%.

- (b) Describe the distribution of the range of informal settlements in Ahmedabad in 2001 using Resource 4.

[4]

Answer Guide:

- The **old city** is located in the **centre of the city**, **directly next to the eastern bank of the major water body** running through Ahmedabad.
- Informal developments** are located **within a 10km radius of the city centre**. These are mainly in the **eastern region** of the city, radiating outwards from the Old City.
- Gamtals** are distributed further afield, within a **6 – 12km radius from the city centre**.
- A number of **informal developments and gamtals** follow the major roads that radiate from the city centre.

Point marked – 2 marks awarded for each accurate observation-evidence pairing.

- (c) With reference to Resource 4, suggest reasons for the distribution of the range of informal settlements in Ahmedabad in 2001.

[5]

Answer Guide:

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Possible points that might be raised:

Distribution	Reasons
Location in centre of city	<ul style="list-style-type: none"> • Increased mobility and accessibility around the city, especially to jobs which are located in the city centre • Affordability of location, as slum dwellers are likely not to be able to commute to and from distant locations each day for formal employment
Location near major transport networks	
Location near major water body	<ul style="list-style-type: none"> • Acts as a source of (clean) water for the slum dwellers for daily activities such as cleaning, cooking and drinking, as the slum dwellers may not have infrastructure for potable water within their dwellings.
Gamtals' location further away from city centre	<ul style="list-style-type: none"> • Urban sprawl / expansion of urban areas over time as the size of the city and the number of urban dwellers grow, such that even village areas have been incorporated into the city, as seen from Resource 4.

Levels marked (see level descriptors below):

Level	Marks	Descriptors
3	4-5	<ul style="list-style-type: none"> • Response identifies <u>at least 2 reasons</u> for distribution of informal settlements in Ahmedabad. • Response provides a detailed and appropriate explanation of the reasons for the distribution of informal settlements in Ahmedabad. In addition, reasons are clearly linked to specific described trend(s), rather than generic reasons. • Use of Resource 4 [specific trends identified in part (b) especially] to support identification of reasons throughout the response. Demonstrates understanding of reasons for distribution of informal settlements from own knowledge.
2	2 – 3	<ul style="list-style-type: none"> • Response identifies <u>at least 2 reasons</u> for distribution of informal settlements in Ahmedabad. • Response provides appropriate explanations of suggested reasons for the distribution of informal settlements in Ahmedabad. However, explanations may not be detailed. Reasons provided may be generic, instead of being referenced to a specific trend. • Use of Resource 4 to support identification of reasons in response is present, but not consistently. Demonstrates some understanding of reasons for distribution of informal settlements from own knowledge, but may not be fully accurate.
1	1	<ul style="list-style-type: none"> • Response only identifies 1 reason for distribution of informal

		settlements, OR may identify at least 2 reasons which are inappropriate. Reasons suggested are not elaborated on. <ul style="list-style-type: none"> Reasons provided may be generic, instead of being referenced to a specific trend. Minimal reference to Resource 4, if at all.
0	0	No creditworthy response

- (d) With reference to Resource 5, explain **two** ways in which urban reimaging of the Sabarmati Riverfront might have helped enhance urban liveability in the area. [4]

Answer Guide:

- Environmental liveability:
 - Improves sanitation and waste management in the area with the incorporation of industrial sewerage outlets, the Pirana landfill site, and the Pirana sewage treatment plant along the Sabarmati River.
- Social liveability:
 - Provides public spaces for interaction and community gatherings to improve conviviality, as seen from upper level of Promenade which acts as a space to host various activities, and various parks and plazas along the Sabarmati Riverfront
 - Conservation and promotion of cultural heritage through conservation of traditional market (Ravivari, a 606-year old traditional flea market)
- Economic liveability:
 - Public spaces for gatherings to host events & activities (e.g. Ravivari – vendors are able to earn an income through the formal incorporation of the flea market into the riverfront)

Point marked – 2 marks awarded for each well-developed explanation, with clear identification of the aspect of liveability that is improved.

- (e) Using Resources 5 and 6 and your own knowledge, evaluate the extent to which urban reimaging along Sabarmati Riverfront has improved the lives of slum dwellers in Ahmedabad. [8]

Answer Guide:

Possible points for evaluation:

- Arguments supporting the view that the lives of slum dwellers have improved can point to any of the reasons seen in Resource 5 - especially the improvement of **environment liveability** through improved sanitation and waste management, and improvement of **economic liveability** through the conservation of the traditional flea market which some slum dwellers are likely to be engaged in. Some of these points are corroborated in Resource 6 – e.g. “cleaner waterway” and the incorporation of the “interceptor sewerage system” which enhances environmental liveability.
- Arguments against the view that the lives of slum dwellers have improved can point to the following that are evident in Resource 6:
 - Displacement of slum dwellers, which separates them from their homes, livelihoods and way of life (thus negatively affecting social and economic liveability)
 - Resettlement projects do not meet the need of slum dwellers, negatively affecting social and economic liveability as well (similar

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points to displacement of slum dwellers).

Levels marked using H1 Generic Level Descriptors for 8m DRQ on Theme 3.

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 processes underlying contemporary climate change. [9]

Indicative content:

- Responses focuses on accounting for contemporary climate change – i.e. global warming due to the enhanced greenhouse effect, as well as changes to precipitation.
- Response acknowledged the role of increasing concentrations of greenhouse gases (GHGs) in the atmosphere through human activities, resulting in the absorption of absorb re-radiated long-wave solar radiation from the earth, hence leading to the warming up of the atmosphere.
- Response would also explain the factors/ trends that have led to the increasing concentrations of GHGs: burning of fossil fuels; industrialization; deforestation.
- Direct human changes to regional and local hydrological cycles may also induce changes to seasonality of precipitation and droughts.
- A higher level response will offer detailed explanations of both changes in temperature and precipitation patterns.

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

- (b) To what extent do you agree that there are economic, environmental and social dilemmas in mitigating and adapting to contemporary climate change? [16]

Indicative content:

- “Dilemmas” – refers to as situation where there is desire to pursue seemingly competing/ opposing goals.
 - Economic dilemmas: countries perceive that mitigating/ adapting to climate change might imply a slowing of economic growth (particularly problematic for countries at low levels of development), yet, recognizing that the effects of climate change might eventually also lead to hindrances in economic development.
 - Environmental dilemmas: while attempting to tap alternative energy sources in order to mitigate climate change, these may sometimes generate other environmental impacts – e.g. hydro power and resultant hydrological impacts; nuclear energy and fears of nuclear fallout. Adaptation strategies such as the use of drought-resistant crops may also pose ecological problems, for e.g. due to the need for more fertilisers.
 - Social dilemmas: In implementing certain strategies/ policies to mitigate climate change, the needs of certain social groups may be neglected relative to others/ some social groups may be impacted more than others – e.g. use of hydropower usually involves the construction of dams and resultant flooding of upstream areas. This leads to possible displacement of certain groups of people. E.g. implementation of green taxes on certain products may indirectly also limit the consumption choices for certain households which may have lower income; i.e. the tax impacts the lower income groups more.

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- A higher level response will have a clear statement of degree of agreement with the perspective offered. Responses should provide justification for their stand.
- One approach might be to consider if there are indeed dilemmas in all 3 areas. Another approach might be to suggest that dilemmas might indeed occur in the short term, however, in the long run, these dilemmas might be resolved as there are changes in mindsets and priorities in the future in relation to climate changes (either because of worsening effects of climate change or the success of mitigation/ adaptation strategies become more evident).

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

4 (a) Explain how flood hydrographs vary in the tropics. [9]

Indicative content:

- In essence, students are required to discuss how variations in the components of flood hydrographs are a result of variations within the tropics. Therefore, in order to address the question, students are required to do the following:
 - Identify variations within the tropics that would result in differences in flood hydrographs – in this case, differences in **climatic characteristics** (particularly **precipitation intensity and duration**) between the humid and arid tropics
 - Explain why such differences in climatic characteristics would result in precipitation would therefore account for differences in the components in hydrographs. In particular, the components that definitely need to be highlighted include:
 - Lag time
 - Peak discharge
 - Steepness of the ascending limb
- Responses should be accompanied with well-labelled diagrams that show differences in components of flood hydrographs.
- A higher level response will offer detailed explanations of variations in the tropics, and how that affects the various components of flood hydrographs.

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

(b) “Flooding hazards are largely due to forces beyond the control of men.”

To what extent do you agree with this view? [16]

Indicative content:

- Students should discuss both natural and anthropogenic causes of flooding, and provide a comparison of the **relative** importance of nature in causing flooding hazards in the world today.
 - In the case of natural causes of flooding, students may particularly want to discuss the role of heavy rainfall in causing flooding hazards.
 - In the case of human causes of flooding, students could discuss the roles of deforestation and urbanisation in causing flooding hazards. The role of climate change in intensifying rainfall events, leading to greater frequency and/or magnitude of flooding hazards could also be raised.
- Some possible arguments that students could raise might include:
 - Agreeing with the statement: i.e. While human activities do have a part to play in causing floods, natural causes are still more important.
 - Disagreeing with the statement: i.e. While natural causes do have a part to play, human factors contribute more greatly to flooding hazards. Students could possibly use current urbanization trends and the trend of global warming to elaborate on their arguments.
 - Arguments for natural or anthropogenic factors **alone** are not recommended, as such arguments do not reflect an awareness of the complexity of factors that could possibly cause flooding hazards.

- Students should, where possible, make **reference to case studies** in their responses.

demonstrate the relative importance of human activities / natural factors in causing flooding hazards.

- A higher level response will have a clear statement of degree of agreement with the perspective offered. Responses should provide justification for their stand.

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

Theme 2: Urban Change

- 5 (a) Explain why traffic congestion occurs in cities of countries at varying levels of development. [9]

Indicative content:

- As traffic congestion occurs when the volume of traffic generates a demand for space that is greater than the available road capacity, responses should include a discussion of why volume of traffic has increased over time and/or why road capacity is unable to cope with the demand for space. Students could explain the direct and indirect factors that would result in traffic congestion – e.g. the increase in number of vehicles on the road could be due to changing car ownership patterns and changing landuse patterns (which are indirect factors).
- A higher level response might include the following:
 - Reasons given for why volume of traffic might exceed road capacity should be **contextualised** to cities in developed countries (DCs) and developing countries (LDCs). E.g. High levels of car ownership might be seen in DC cities owing to a larger proportion of middle- and high-income earners in the population.

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

- (b) Assess the success of strategies to manage traffic congestion in cities of countries at varying levels of development. [16]

Indicative content:

- Responses should discuss the extent to which strategies used to manage traffic congestion are successful (i.e. effective in meeting its intended purpose), using a criterion/ a set of weighing criteria. More than one strategy needs to be discussed.
- Case studies of strategies used to manage traffic congestion from DC and LDC cities should be utilised in the essay.
- A higher level response might include the following:
 - *Consistent* application of a set of criteria or criterion to evaluate the success of different strategies.
 - **Comparison** of the relative success of strategies between cities in DCs and LDCs respectively.

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

- 6 (a) Explain why urban trends in cities at different levels of development vary. [9]

Indicative content:

- Responses focuses on accounting for the difference in levels of urbanization and rate of urbanization between cities of countries at different levels of development.
- Reasons would consider the different stage of urbanization of these cities; the differing role of natural increase; rural-urban migration and decentralization.
- Responses may also consider the role of recent efforts in urban reimagining.
- A higher level response will offer detailed explanations in relation to the differing contexts of the cities.

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

- (b) “Cities should be planned for people, not places.”

To what extent do you agree with this view in relation to the effectiveness of strategies to improve liveability in cities? [16]

Indicative content:

- The quote suggests that urban plans and/ or proposed changes/ improvements to cities should seek to cater to the needs of people, and not merely for the sake of improving the city (either aesthetically or economically). In other words, effective strategies that improve liveability are those that meet the needs of people.
- Responses would need to consider how current strategies to improve liveability – urban reimagining; strategies to meet needs of different social groups; strategies to mitigate crowding or fear; strategies to mitigate issues of urban development – do indeed meet the needs of people, and/or the extent to which they do so.
- Responses might also counter-propose that it is not necessary nor practical to distinguish between “people” and “place” as even strategies that seem to focus on aesthetical improvements do serve to meet the needs of people too – e.g. improved quality of physical environment which may enhance aspects of safety, comfort, etc.
- A higher level response will have a clear statement of degree of agreement with the perspective offered. Responses should provide justification for their stand.

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



ANGLO-CHINESE JUNIOR COLLEGE

JC 2 Preliminary Examinations 2018

GEOGRAPHY

Paper 1

8813/01
Higher 1

Time: 3 hours

24 August 2018
(Friday)

READ THESE INSTRUCTIONS FIRST

Write your Centre number, index number and name on all the work you hand in.

Start every question on a fresh piece of writing paper

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

The Insert contains all Resources referred to in the questions.

Answer **four** questions.

Section A – Answer Question 1.

Section B – Answer Question 2.

Section C – Answer **two** questions, each from a different theme.

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

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

The world outline map may be annotated and handed in with relevant answers.

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

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

On the **cover sheet** provided, include:

- Your name and index no.
- The question numbers of the question you have attempted in the boxes provided, and place the cover sheet as the top page over your answers to Section A.

Start each question on a fresh piece of paper. At the end of the examination, **fasten your answers to each question separately**; with the cover page fastened as the top page for Section A.

This Question Paper consists of 4 printed pages, including this cover page.

The Insert consists of 8 printed pages.



Department of Geography
Anglo-Chinese Junior College
25 Dover Close East Singapore 139745

[Turn Over

Section A

Theme 3: Geographical Investigation

- 1 A group of twenty 17 year-old students from Clementi, a residential neighbourhood in Singapore (a DC city) wanted to explore whether their neighbourhood is considered a 'healthy one'.

A 'healthy city' is an element of urban liveability. According to the World Health Organization (WHO), a 'healthy city' as one that improves its physical and social environments in order for its residents to perform all the functions of life and develop to their maximum potential. It includes promoting walking and cycling for short-distance travel, encouraging green practices within the city and its residents and creating a more inclusive community.

The students' key research question was "Does neighbourhood design that encourages physical activities play a crucial role in supporting healthy communities?" To explore this, they embarked upon a survey various locations within one residential neighbourhood in Clementi. These urban design features were found to have promoted healthy living in several Australian neighbourhoods based on their secondary research.

Resource 1 shows the list of selected urban design features researched upon and Resource 2 is a sample of the recording sheet the students used while Resource 3 shows selected results of their investigation.

- (a) Using Resource 1, suggest how these urban design features enhances liveability of an urban neighbourhood. [6]
- (b) Using evidence from Resource 1, describe **three** potential risks associated with undertaking this fieldwork and explain how each risk can be minimised. [6]
- (c) Using Resources 1 and 2, evaluate how the students conducted this investigation and explain how it could be improved to better understand the 'health' of the neighbourhood. [8]
- (d) Explain how the data in Resource 3 can be better represented. [5]

[Turn over

Section B

Theme 1: Climate Change and Flooding

Climate and Climate Change in Southeast Asia

- 2** Resource 4 shows the climograph of Vientiane, Laos.
Resource 5 shows the Mekong river basin, its mean daily discharge and the changes to Mekong's river regime after dam construction.
Resource 6 shows precipitation anomalies over Southeast Asia during El Nino and La Nina occurrences between June – October.
Resource 7 show climate change impacts on different atmospheric and geomorphic processes, and the pattern of climate change vulnerability in Southeast Asia.

- (a) Explain the rainfall pattern of Vientiane as shown in Resource 4. [5]
- (b) With the help of Resources 4 and 5, account for nature of Mekong's river regime before and after dam construction as shown in Resource 5. [4]
- (c) With the aid of Resource 6, explain the changes to atmospheric and oceanic processes during El Nino and La Nina, and suggest how these warm and cold ENSO events may impact the river discharge of the Mekong Basin shown in Resource 5. [6]
- (d) Describe the pattern of climate change vulnerability as shown in Resource 7. [2]
- (e) With reference to Resource 7 and your own knowledge, suggest reasons for the patterns of climate change vulnerability shown in Resource 7. [8]

[Turn Over

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 evidence that support climate change since the last ice age. [9]
- (b) How far do you agree that the use of alternative energy sources is the most effective strategy in managing the problem of climate change? [16]
- 4 (a) Explain the hydrological cycles of the humid and arid tropical drainage basins. [9]
- (b) 'Hard engineering strategies are most effective in managing the problem of flooding.' Assess the validity of this statement. [16]

Theme 2: Urban Change

- 5 (a) Explain why ecological footprints may vary for cities in countries at low levels of development. [9]
- (b) Discuss the sustainability of strategies in the effective management of non-hazardous solid waste in cities. [16]
- 6 (a) Explain the challenges in measuring urban liveability in countries at high levels of development. [9]
- (b) 'Reducing the urban population is the best solution to lessen crowding **OR** fear in urban areas.'
- With reference to **EITHER** crowding **OR** fear, how far do you agree with the above statement? [16]

[End]



ANGLO-CHINESE JUNIOR COLLEGE

JC 2 Preliminary Examinations 2018

GEOGRAPHY
Higher 1

8813/01

INSERT

Time: 3 hours

24 August 2018
(Friday)

READ THESE INSTRUCTIONS FIRST

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

This Insert consists of 8 printed pages.



Department of Geography
Anglo-Chinese Junior College
25 Dover Close East Singapore 139745

[Turn Over

Resource 1 for Question 1

Urban design features (in no particular order) found to have promoted healthy living within Australian cities that were researched upon by students

- 1. Mixed land uses**
- 2. Dedicated pedestrian infrastructure; e.g. walkways**
- 3. Cycling infrastructure; e.g. bike lanes, bike boulevards for bike parking**
- 4. Public parks and other green spaces**
- 5. Public plazas and community facilities**
- 6. Presence of key nodes of public transport (e.g. bus interchanges, train stops)**

[Turn Over

Resource 2 for Question 1

Recording sheet

Researcher: _____

Date: _____

Location: _____

Time (start): _____

Time (end): _____

	Observation	Observed? Yes/No	If yes, details
<i>Promoting walking within the neighborhood</i>			
1.	Presence of dedicated pedestrian walkways from blocks to central shopping area		- Width? - Without obstructions? - Sheltered?
2.	Presence of dedicated pedestrian walkways from blocks to other recreational facilities		- Width? - Without obstructions? - Sheltered?
3.	Presence of dedicated pedestrian walkways from blocks to public transportation (to pre-identified bus stops)		- Width? - Without obstructions? - Sheltered?
4.	Presence of dedicated pedestrian walkways from blocks to public transportation (to train station)		- Width? - Without obstructions? - Sheltered?
<i>Promoting cycling within the neighborhood</i>			
5.	Presence of dedicated cycling paths from blocks to central shopping area		- Width? - Without obstructions? - Sheltered?
6.	Presence of dedicated pedestrian walkways from blocks to other recreational facilities		- Width? - Without obstructions? - Sheltered?
7.	Presence of dedicated pedestrian walkways from blocks to public transportation (to pre-identified bus stops)		- Width? - Without obstructions? - Sheltered?
8.	Presence of dedicated pedestrian walkways from blocks to public transportation (to train station)		- Width? - Without obstructions? - Sheltered?
9.	Presence of dedicated cycling infrastructure (e.g. parking areas)		- What type of infrastructure?

[Turn Over

Resource 3 for Question 1

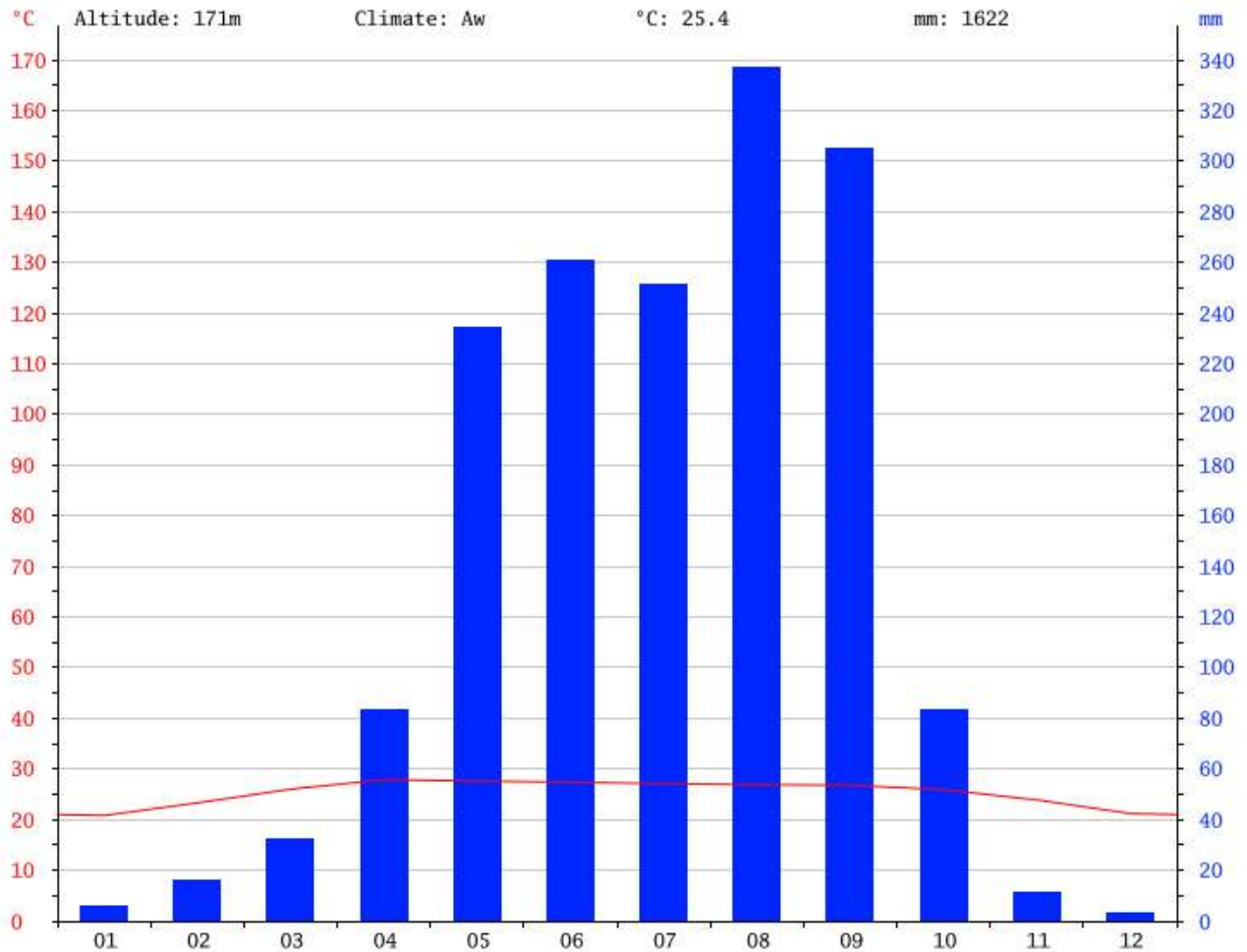
Selected results

Location	A	B	C	D	E	F	G
Presence of dedicated pedestrian walkways							
From blocks to central shopping area	YES	NO	YES	YES	NO	NO	NO
From blocks to other recreational facilities	NO	NO	NO	YES	YES	YES	YES
From blocks to public transportation (to pre-identified bus stops)	NO	YES	YES	YES	YES	NO	NO
From blocks to public transportation (to train station)	NO	NO	YES	YES	NO	NO	YES

[Turn Over

Resource 4 for Question 2

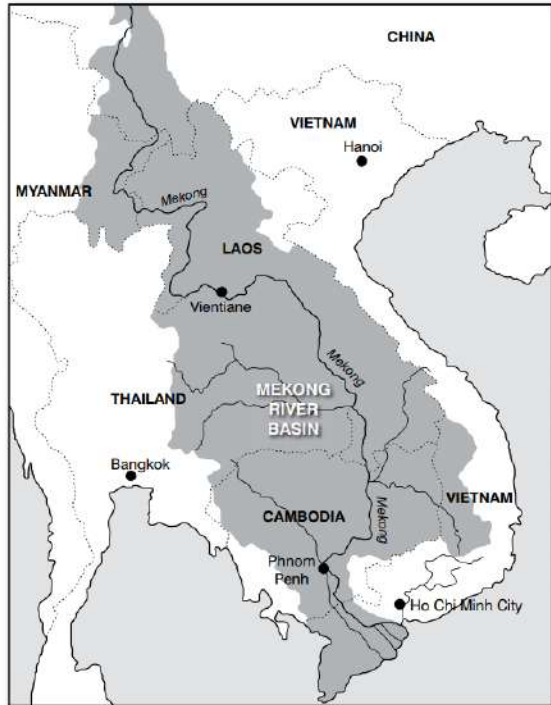
Climograph of Vientiane, Laos



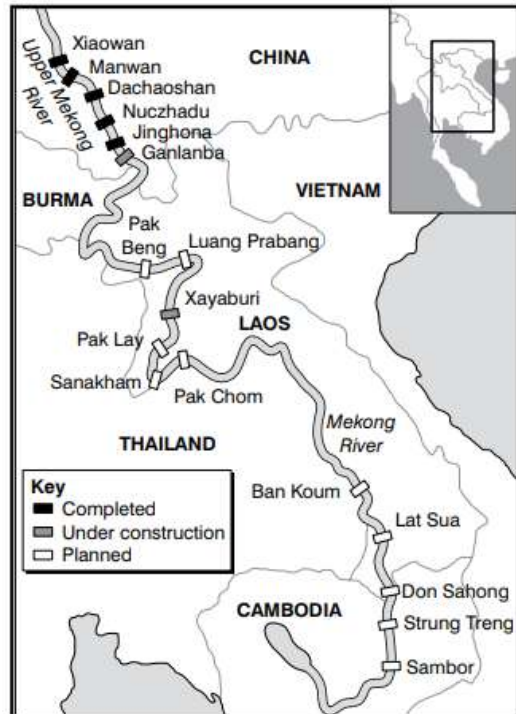
[Turn Over

Resource 5 for Question 2

Mekong river basin and the dams on the Mekong River

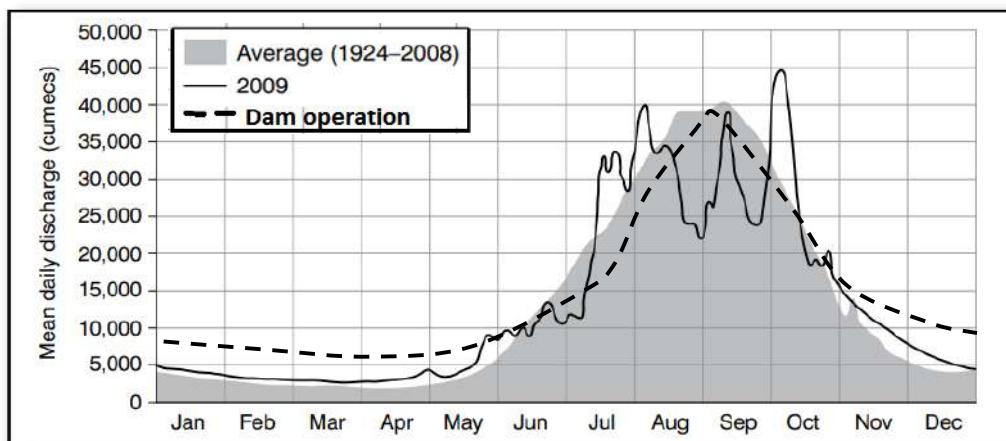


Source: Mekong River Commission



Source: International Rivers and others

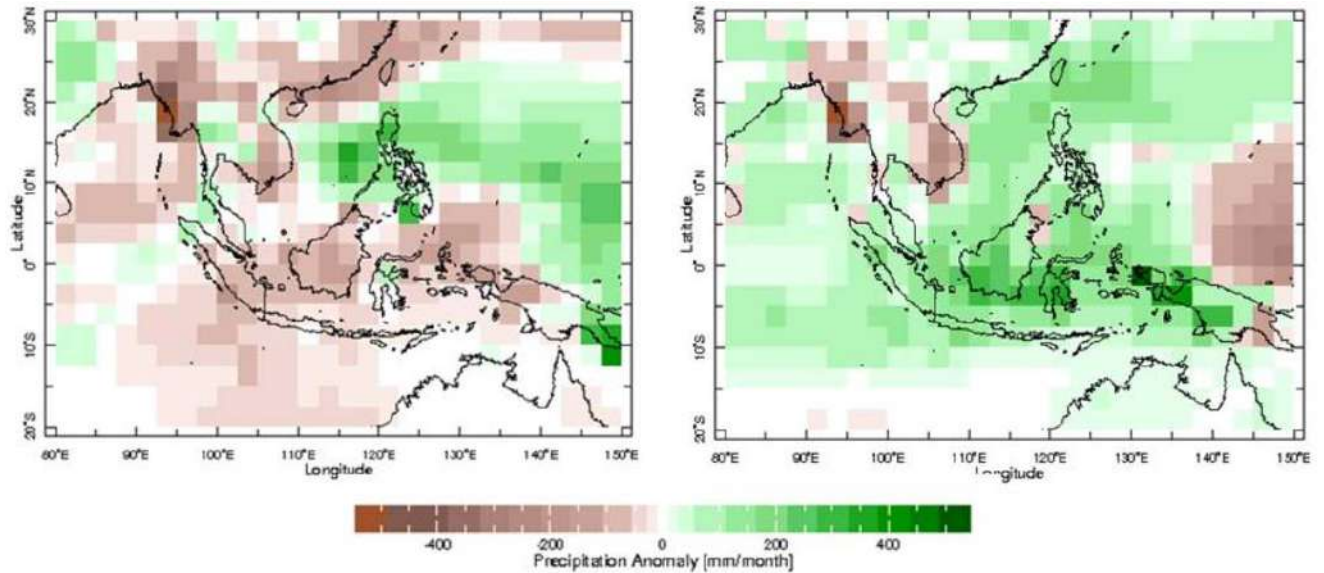
Mean daily discharge of Mekong River measured at Kratie, Cambodia



[Turn Over

Resource 6 for Question 2

Distribution of precipitation anomalies over Southeast Asia (Jun – Oct) for El Nino (left) and La Nina (right)



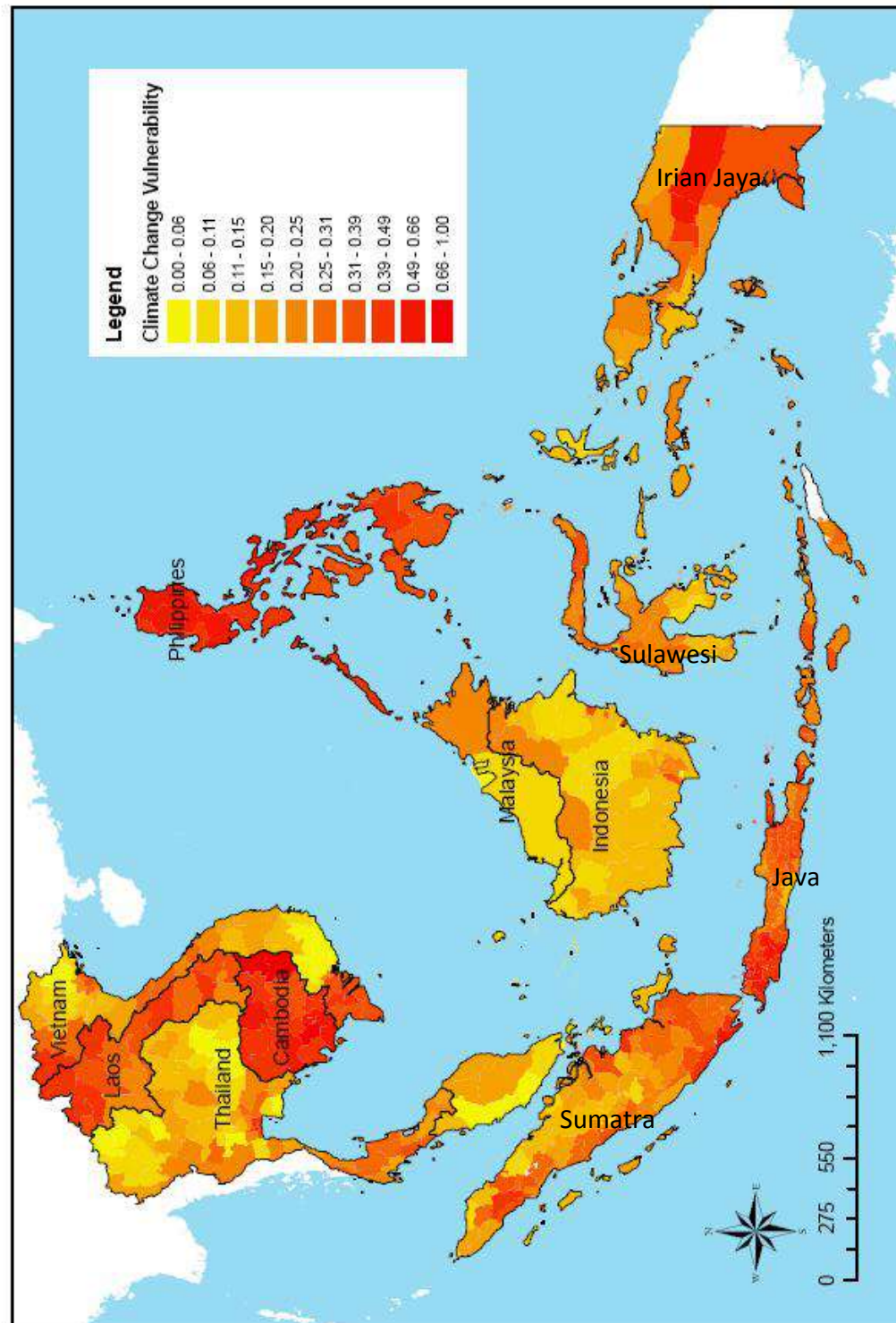
The image above shows the precipitation anomalies averaged over the El Niño and La Niña years. For instance, the impact of El Niño is typically stronger over the southern and eastern part of South East Asia during the months of Jun – Oct. (Image credit: IRI Climate)

Source: <http://asmc.asean.org/asmc-el-nino/>

[Turn Over

Resource 7 for Question 2

Climate Change Vulnerability in Southeast Asia



[End



Catholic Junior College

JC2 Preliminary Examinations

Higher 1

GEOGRAPHY

8813/01

Paper 1

27 August 2017

3 Hours

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.

This document consists of 4 printed pages and 1 blank page.

[Turn over]

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Section A

Theme 3: Geographical Investigations

- 1 You are part of a group of classmates that was tasked to investigate the influence of land use on infiltration rates in Singapore. The group was divided up into 2 teams of four to measure the infiltration rate at 2 locations simultaneously.

In planning the geographical investigation, the teams identified the land use areas by first looking at the land use map of Singapore. For practicality reasons, the teams chose to conduct their study at two sites of different land use - Site A which is a nature park land within Bukit Timah Nature Reserve and Site B, a built-up residential area in the Dairy Farm Estate.

The teams chose to collect data on infiltration within the different land use areas they had identified. The study was conducted at one accessible point within each survey site. The investigation was conducted on one Saturday morning on 30 June 2018.

The infiltration rate is measured by using a set of infiltration rings and by timing the speed at which the water level in the ring falls. The following equipment and materials were used to measure infiltration rate at the two different land use sites:

- Dual-ring infiltrometer comprising two tin cans, the first about 30 cm tall with a diameter of 15 cm and the second smaller tin can about 25 cm tall and with a smaller diameter of 9 cm. Both tin cans have both ends of it removed.
- Plentiful supply of water
- A ruler
- Hammer
- Wooden plank
- Stopwatch

At the respective sites, the smaller tin can (measuring 25 cm by 9 cm) was driven into the soil to about 10 cm deep by using a hammer onto a wooden plank placed on the rim of the can. The larger tin can (measuring 30 cm by 15 cm) was then placed over the smaller tin can and then driven into the soil to about 10 cm deep too. It was noted that at site B, the students had difficulty hammering the infiltration ring into the ground.

A ruler was placed vertically inside the inner ring to record the fall in water level. Water was poured into both the rings to a depth of 10 cm. The level of water in the outer ring was topped up to keep it at a constant level of 10 cm. As the water level decreased by every 1 cm, a recording of the time was taken. This is the fall rate. The data was recorded in the recording sheet.

Resource 1 shows a map of the nature park in Bukit Timah Nature Reserve and residential area in the Dairy Farm Estate. Resource 2 and 3 comprises

photographs of Sites A and B where the study was conducted. Resource 4 shows data collected on infiltration rates at Sites A and B.

- (a) With reference to Resource 1, 2 and 3, suggest a suitable research question for your group investigation and state 2 reasons why the research question is at a suitable scale. [3]
- (b) With reference to Resource 2 and 3, explain how you would minimise the impact of your investigation differently at the two sites. [5]
- (c) Explain the limitations of the data representation method in Resource 4 and how would you improve on it. [5]
- (d) Evaluate the reliability of the data collected as shown in Resource 4 in ascertaining the influence of land use on infiltration rates [8]
- (e) Suggest two ways to improve on your data collection method. [4]

Section B

Theme 2: Urban Change

- 2** Melbourne is a city in Australia. It has been ranked constantly for 7 consecutive years by The Economist as the world's most liveable city. It is shifting away from its manufacturing focus to be a more knowledge and service-based economy. Further advances in digital technology and automation are expected to cause the loss of even more manufacturing jobs in coming years

Resource 5 shows the changes in city's rankings by The Economist from 2007-2017. Resource 6 shows the spatial distribution of disadvantage across Melbourne. Resource 7 shows the trends in housing and homelessness.

- (a) Describe the variations in liveability score from 2007-2017 as shown in Resource 5. [4]
- (b) With reference to Resource 5 and your own knowledge, explain possible reasons why some cities experienced an increase in liveability score while others experienced a decrease. [4]
- (c) With reference to Resource 6, describe the spread of disadvantage across Melbourne. [4]
- (d) Explain the relationship between housing price and average age of first home buyers and homelessness as shown in Resource 7. [6]
- (e) Using Resource 6, 7 and your own knowledge, suggest reasons why some neighbourhoods has high levels of disadvantage. [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 role of interception and groundwater flow (baseflow) in the hydrological system at the drainage basin level. [9]
- (b) To what extent does the level of economic development influence the impact of fluvial floods. [16]
- 4(a) Explain how increased urbanisation can contribute to contemporary climate change. [9]
- (b) 'Utilizing alternative energy sources is the most promising measure to combat against climate change.' To what extent do you agree with this statement? [16]

Theme 2: Urban Change

- 5(a) Explain the causes of traffic congestion in cities of countries at high and low levels of development. [9]
- (b) 'The only way to solve traffic congestion problems in cities is through improving public transport systems.' How far do you agree with this statement? [16]
- 6(a) Explain the needs of the elderly in cities with a rapidly ageing population. [9]
- (b) With reference to specific cities, evaluate the extent in which the needs of the elderly are effectively catered to. [16]

**** END OF PAPER ****



Catholic Junior College
JC2 Preliminary Examinations
Higher 1

GEOGRAPHY

8813/01

Paper 1

27 August 2017

3 Hours

READ THESE INSTRUCTIONS FIRST

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

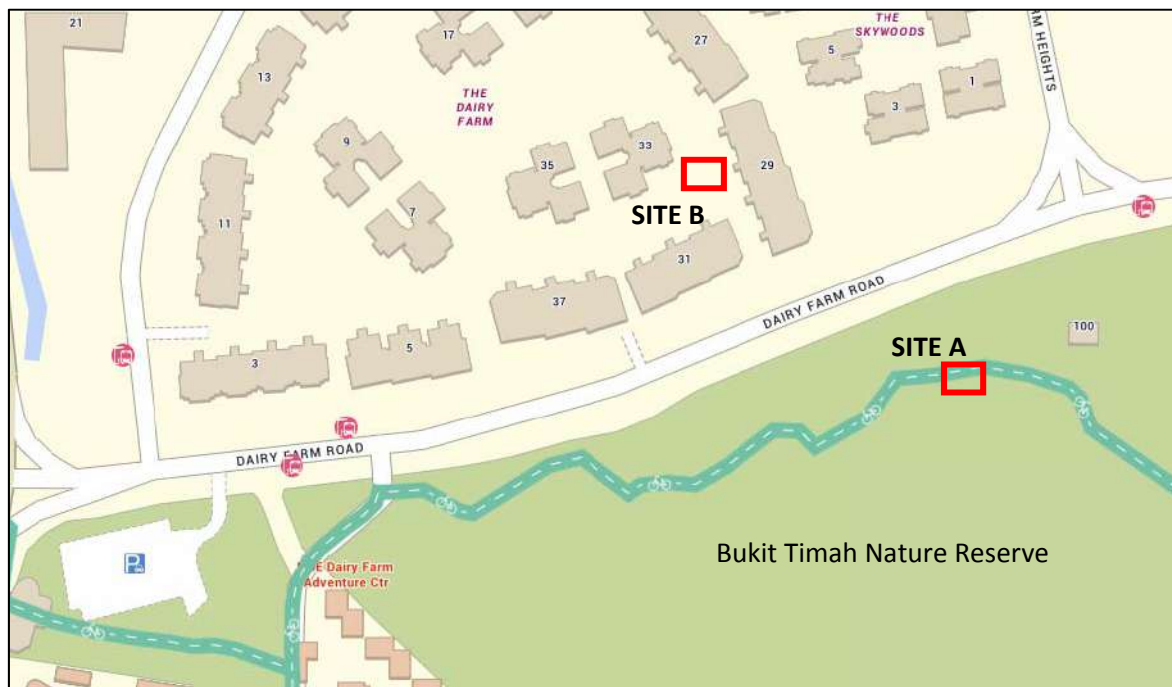
This document consists of 6 printed pages and 1 blank page.

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Resource 1 for Question 1



Legend:

Site for Geographical Investigation 

Resource 2 for Question 1 Site A (Nature Reserve)



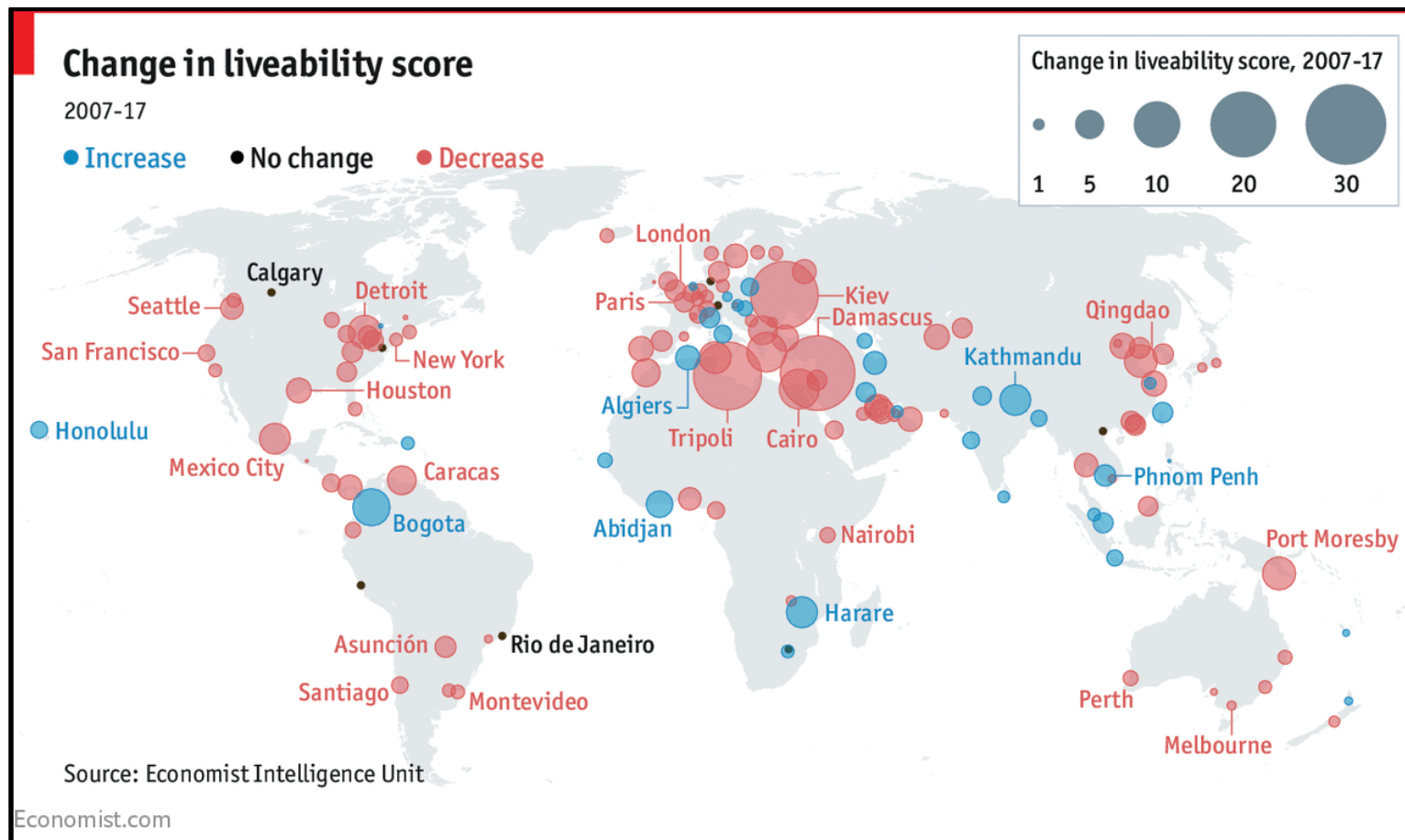
Resource 3 for Question 1
Site B (Residential – The Dairy Farm Estate)



Resource 4 for Question 1
Data collected from Sites A (Nature Park) and B (Residential)

Site A			Site B		
Land use	Nature park		Land use	Residential	
Fall Unit / Cm	Time/Sec	Infiltration Rate (cm/min)	Fall Unit / Cm	Time/Sec	Infiltration Rate (cm/min)
1	2	30	1	25	2.40
2	5	12	2	63	0.95
3	8	7.5	3	134	0.45
4	12	5	4	323	0.19
5	16	3.75	5	431	0.14
6	22	2.73	6	548	0.11
7	30	2	7	683	0.09
8	39	1.54	8	818	0.07
9	48	1.25	9	952	0.06
10	58	1.03	10	1088	0.06
11	70	0.86	11	1221	0.05
12	84	0.71	Average Infiltration Rate (cm/min)		0.42
13	100	0.6			
14	120	0.5			
15	145	0.41			
16	170	0.35			
17	195	0.31			
18	220	0.27			
19	246	0.24			
20	272	0.22			
Average Infiltration Rate (cm/min)		3.56			

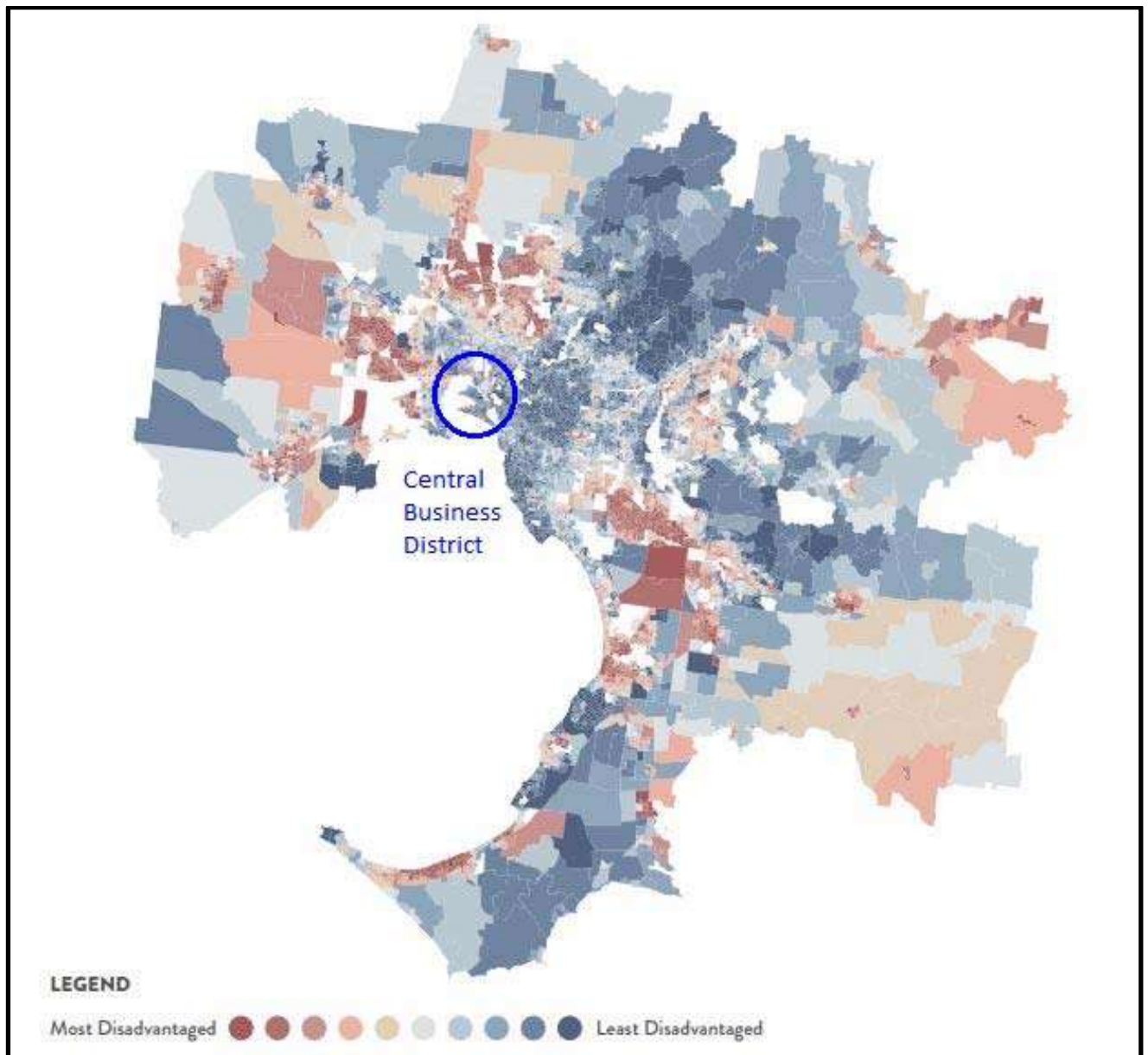
Resource 5 for Question 2



<https://www.economist.com/graphic-detail/2017/08/16/global-liveability-has-improved-for-the-first-time-in-a-decade>

Note: The Liveability index is weighted as follows: 25% for stability (e.g., crime, terrorism, war); 20% for healthcare (availability and quality); 25% for culture and environment (which includes a grab-bag of various metrics, such as temperature, level of corruption, and cultural attractions); 10% for education (availability and quality); and 20% for infrastructure quality.

Resource 6 for Question 2

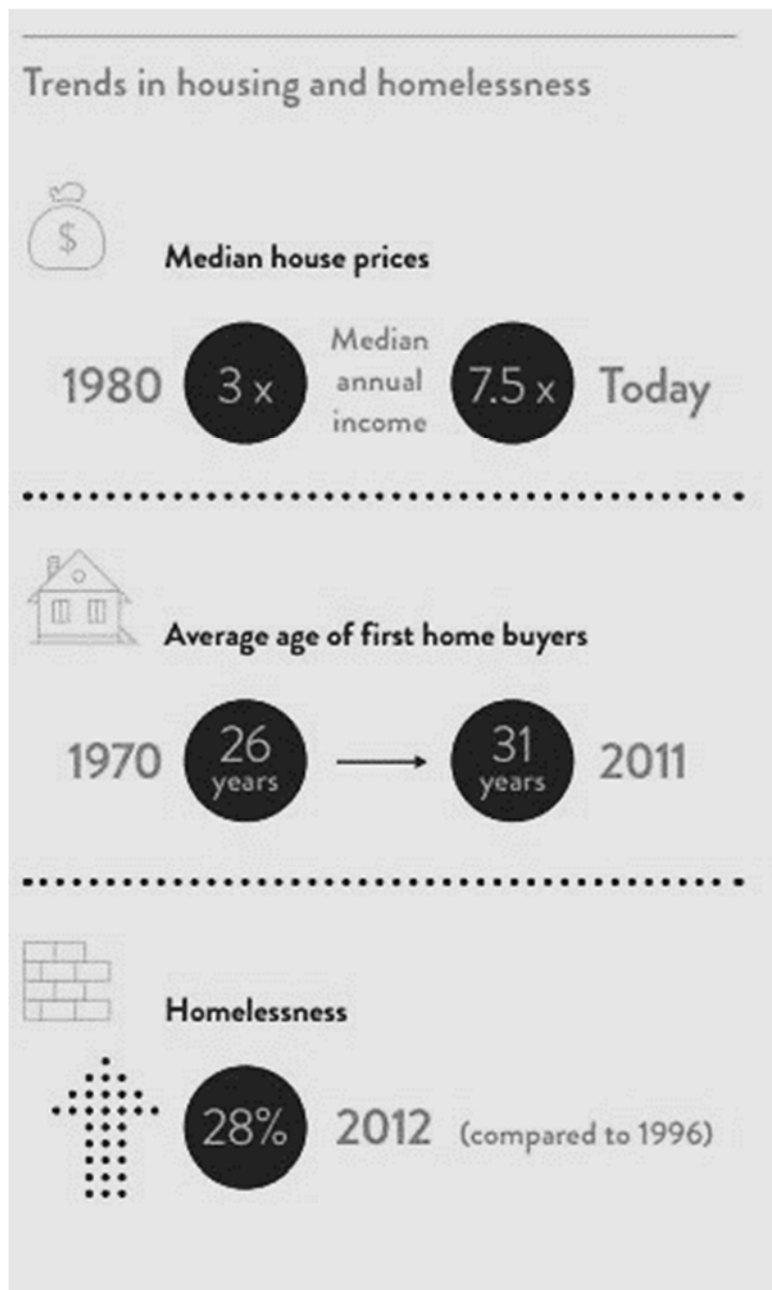


High disadvantage is defined as low access to 'material and social resources and ability to participate in society', which include factors such as employment, English-speaking proficiency and household income.

Source: Resilient Melbourne Report.

<https://www.melbourne.vic.gov.au/SiteCollectionDocuments/resilient-melbourne-strategy.pdf>

Resource 7 for Question 2



Resilient Melbourne Report.

<https://www.melbourne.vic.gov.au/SiteCollectionDocuments/resilient-melbourne-strategy.pdf>



GEOGRAPHY

Paper 1

8813/01

13 September 2018

3 hours

Additional Materials: Answer Paper
1 Insert
World outline map

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.

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 30 geography students from a high school in the UK, wanted to compare the liveability between the city of Birmingham and town of Solihull, both in the West Midlands, UK. Solihull is situated 12.1km southeast of Birmingham. The class was divided into 6 groups and each group had access to the average earnings, cost of living (measured by the monthly rent of an 80m² furnished apartment) and crime rates of the two areas of study.

Each group was tasked to gather data from the local residents about their perception of the liveability of the neighbourhoods. Each group is required to give out 50 questionnaires in both Birmingham and Solihull.

Resource 1 shows the average earnings of Birmingham, Solihull and London in the UK. Resource 2A and Resource 2B show the relative incidence of crime in Birmingham and Solihull. Resource 3 shows the results of the questionnaire survey conducted by a group.

- (a) Suggest a hypothesis for the group's investigation and explain why it is at a suitable scale, capable of research and clearly defined. [4]
- (b) Using Resource 1, Resources 2A and 2B, explain why there may be contrasts in the liveability between Birmingham and Solihull. [4]
- (c) Outline two considerations which the groups should take into account when conducting sampling in both areas. [4]
- (d) Using Resource 3, sketch a pie chart to represent the results of the questionnaire for Statement A and a bar graph for Statement B respectively; and outline one strength of each representation method. [5]
- (e) Evaluate this investigation about the liveability of Birmingham and Solihull and explain how it could be improved and extended. [8]

Section B

Theme 1: Climate Change and Flooding

Flooding in Mekong Delta

- 2** The Mekong River originates in Tibet and flows through southern China into Southeast Asia countries before entering the South China Sea. Of the 70 million people who live in the Mekong Delta, 80 per cent depend directly on the river for their food and livelihoods.

Resource 4 shows the annual water balance of the Mekong Delta. Resource 5 shows the mean annual discharge of Mekong River discharge at Kratie, Cambodia. Resource 6 shows the forecasted path of Cyclone Tembin across the Philippines towards the Mekong Delta. Resource 7 shows the level of climate change damage to agricultural production in Vietnam in 2014.

- (a)** With reference to Resource 4, describe the annual water balance of Mekong Delta. [3]
- (b)** Using Resource 4 and 5 and your own knowledge, explain how climate and two other factors can influence the variations in mean annual discharge of Mekong River at Kratie, Cambodia. [6]
- (c)** With reference to Resource 6, describe the forecasted path and development of Cyclone Tembin across the Philippines towards the Mekong Delta. [4]
- (d)** Based on Resource 6, 7 and your own knowledge, explain the possible impacts of climate change on the population living in the Mekong Delta. [6]
- (e)** With reference to Resource 6, 7 and your own knowledge, explain ways in which the population living in the Mekong Delta can mitigate and adapt to climate change. [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 impacts of the El Nino Southern Oscillation (ENSO) on the tropics. [9]
- (b) Evaluate the extent to which distinctive characteristics of the tropics are a result of the shifting of the Intertropical Convergence Zone (ITCZ). [16]
- 4 (a) Explain the variations in the drainage basin water balance in the humid and arid tropics. [9]
- (b) Evaluate the extent to which flooding in the tropics can be managed by soft engineering strategies. [16]

Theme 2: Urban Change

- 5 (a) Explain the difficulties in measuring sustainable urban development. [9]
- (b) 'Strategies to manage non-hazardous solid waste in cities are rarely successful.' How far do you agree with this statement? [16]
- 6 (a) Explain the political, socio-economic and environmental factors that affect urban liveability in low income cities. [9]
- (b) With reference to the elderly and one social group you have studied, to what extent is it challenging to cater to their needs in an urban area? [16]



EUNOIA JUNIOR COLLEGE
JC2 Preliminary Examination 2018
General Certificate of Education Advanced Level
Higher 1

GEOGRAPHY

8813/01

13 September 2018

INSERT

3 hours

READ THESE INSTRUCTIONS FIRST

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

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

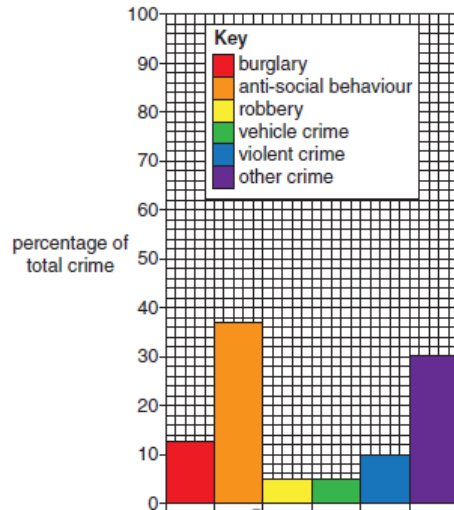
Resource 1 for Question 1

Average earnings of employed residents and average monthly rent of a 80m² furnished accommodation in selected areas, UK

Area	Annual gross earnings (British Pounds)	Monthly Rent of a 80m ² Furnished Accommodation (British Pounds)
Birmingham	26, 686	1,250
Solihull	26, 578	950
London	34, 752	1,600
UK (Average)	28, 758	1,020

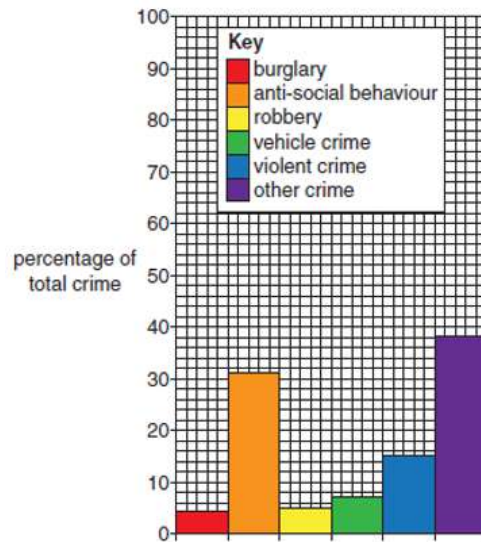
Resource 2A for Question 1

Relative incidence of crime in Birmingham



Resource 2B for Question 1

Relative incidence of crime in Solihull



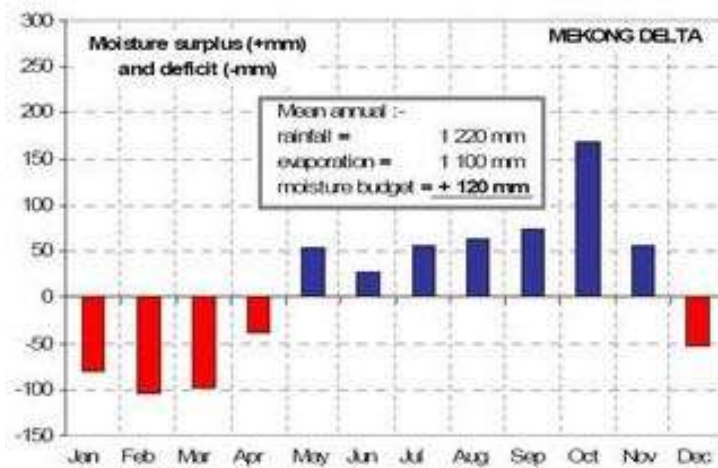
Resource 3 for Question 1

Results of the questionnaire survey

Area Studied: Birmingham Sample Size: 50				
Statement	Agree Strongly	Agree	Disagree	Disagree Strongly
A: I am satisfied with the safety the area	25	21	2	2
B: The cost of living is affordable in the area	2	10	18	20
C: I am happy with the quality of retail facilities in the area.	23	20	4	3
D: I am happy with the amount of green spaces in the area.	2	2	18	28

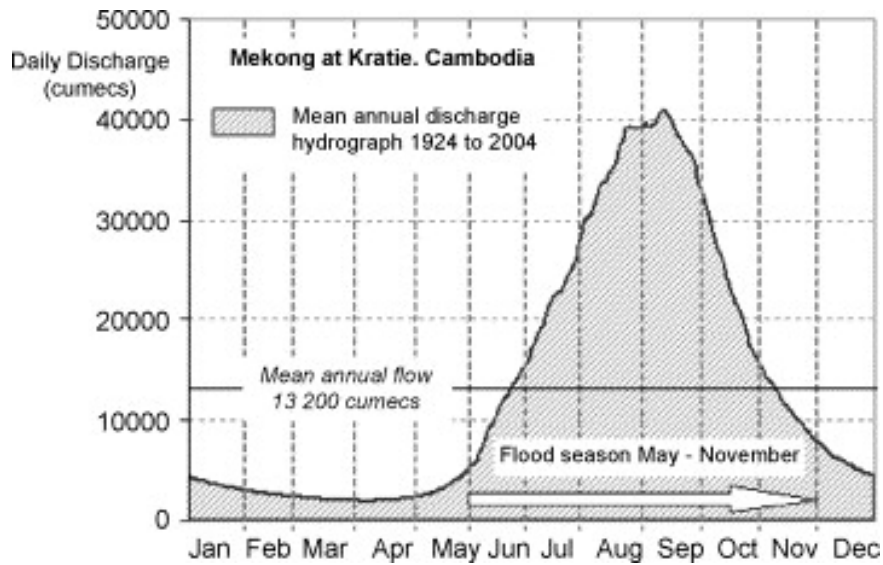
Resource 4 for Question 2

Annual Water Balance of Mekong Delta



Resource 5 for Question 2

Mean Annual discharge of Mekong River at Kratie, Cambodia



Resource 6 for Question 2

Forecasted Path of Cyclone Tembin across Philippines towards the Mekong Delta



Resource 7 for Question 2

Level of climate change damage to agricultural production in Vietnam, 2014

Types of Climate Change Damage	Frequency (1-5) (5 being the most frequent)	Percentage of affected households (%)	Level of Damage (1-5) (5 being the highest level of damage)
Tropical Cyclones	2.25	20.6	2.89
Flooding	2.27	24.5	3.47
Saltwater Intrusion	1.33	5.4	2.67
Land Erosion along rivers/coasts	1.31	3.1	2.86

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Marking Scheme for JC2 H1 Geography Prelims

- 1 A class of 30 geography students from a high school in the UK, wanted to compare the liveability between the city of Birmingham and town of Solihull, both in the West Midlands, UK. Solihull is situated 12.1km southeast of Birmingham. The class was divided into 6 groups and each group had access to the average earnings, cost of living (measured by the monthly rent of an 80m² furnished apartment) and crime rates of the two areas of study.

Each group was tasked to gather data from the local residents about their perception of the liveability of the neighbourhoods. Each group is required to give out 50 questionnaires in both Birmingham and Solihull.

Resource 1 shows the average earnings of Birmingham, Solihull and London in the UK. Resource 2A and Resource 2B show the relative incidence of crime in Birmingham and Solihull. Resource 3 shows the results of the questionnaire survey conducted by a group.

- (a) Suggest a hypothesis for the group's investigation and explain why it is at a suitable scale, capable of research and clearly defined. [4]

- Hypothesis: Birmingham has a higher liveability compared to Solihull in the West Midlands, UK.*

(Hypothesis should include both cities, liveability and also where these two cities are located)

- Suitable Scale: both cities are situated close to one another, 12.1km apart OR 6 groups of 5 students suggest that there is enough manpower to conduct 50 questionnaires across both cities.*
- Capable of Research: Groups have access to various sources of secondary data OR students are able to craft a likert scale (existing methodology) to measure variables of liveability.*
- Clearly defined: Liveability as a variable can be measured/quantified by other measures such as average earnings, cost of living and crime rates.*

- (b) Using Resource 1, Resources 2A and 2B, explain why there may be contrasts in the liveability between Birmingham and Solihull. [4]

[Answers should link explicitly to liveability]

Resource 1: Although the annual gross earnings between both cities are about the same (26k+ pounds), the cost of living in Birmingham is significantly higher, by about 33% (300 more British pounds for the monthly rent). When more income is spent on housing, it means that residents have less to spend on other goods/services that will improve their liveability

From Resource 2A and 2B indicating Crime Rates: Greater % burglary (11%) in Birmingham compared to about 5% in Solihull. This would mean that residents in Birmingham may have lower liveability compared to Solihull as they feel more safe on their streets/or can still go for late night entertainment options without having a curfew.

Alternatively,

Candidates can also quote higher data of violent crime in Solihull.

- (c) Outline two considerations which the groups should take into account when conducting sampling in both areas. [4]

Safety/Risk: Not conduct the survey questionnaires at night, due to crime rates in both cities. Dealing with the public (risk of personal attack/abuse/aggressive behaviour).

*Representativeness: Sampling can take into account **different social groups/gender/income groups** because liveability is a relative concept and different groups of people experience the urban space differently.*

*Representativeness: Ensure that the surveys are conducted in various parts of the city to prevent **Spatial bias**. For e.g. conducted in the city centre and the suburbs.*

*Representativeness: **Time Period Bias** – when the survey should be conducted in terms of seasons/weekday vs Weekends*

Maximum 2 marks: awarded for safety/risk considerations

- (d) Using Resource 3, sketch a pie chart to represent the results of the questionnaire for Statement A and a bar graph for Statement B respectively; and outline one strength of each representation method. [5]

Both bar graph and pie chart must represent the data accurately. Axes and sectors must be labelled correctly with title.

Strength (Bar Graph)

- *display relative numbers or proportions of multiple categories*
- *summarize a large data set in visual form*
- *clarify trends better than do tables*
- *estimate key values at a glance*

Strength (Pie Chart)

- *display relative proportions of multiple classes of data*
- *size of the circle can be made proportional to the total quantity it represents*
- *summarize a large data set in visual form*

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

To evaluate the investigation, candidates should:

- 1) *examine existing data available (both primary and secondary data)*
- 2) *arrive at a conclusion based on data available*
- 3) *point out gaps in the data or problems with methodology*
- 4) *Improvements (to address existing gaps)*
- 5) *Extension (how the GI can increase its scope and scale)*

Levels Marked

Level	Marks	Descriptors
3	7-8	<i>Insightful response in analysing the various sources of data (both primary and secondary). Gaps in the GI are clearly identified and aligned to the suggested strategies. Response shows some knowledge and understanding of liveability and GI methods. Strategies used to improve or extend the research may be generic to fieldwork but of limited relevance to the context.</i>

2	4-6	<i>Able to respond accordingly to the data given in the sources but may leave out on either the primary or secondary data analysis. Provides an explanation of the strategies to improve or extend the research, but response may be unbalanced or lacking in details.</i>
1	1-3	<i>Response shows some knowledge and understanding of liveability and GI methods. Strategies used to improve or extend the research may be generic to fieldwork but of limited relevance to the context.</i>

- 2 The Mekong River originates in Tibet and flows through southern China into Southeast Asia countries before entering the South China Sea. Of the 70 million people who live in the Mekong Delta, 80 per cent depend directly on the river for their food and livelihoods.

Resource 4 shows the annual water balance of the Mekong Delta. Resource 5 shows the mean annual discharge of Mekong River discharge at Kratie, Cambodia. Resource 6 shows the forecasted path of Cyclone Tembin across the Philippines towards the Mekong Delta. Resource 7 shows the level of climate change damage to agricultural production in Vietnam in 2014.

- (a) With reference to Resource 4, describe the annual water balance of Mekong Delta. [3]

- There is a seasonal variation of water balance over the year*
- Moisture deficit between Dec to Apr*
- Moisture surplus between May to Nov*
- Overall, there is a moisture surplus of 120mm for the year*
- Highest moisture surplus in Oct (170mm); highest moisture deficit in Feb (-100mm)*

- (b) Using Resource 4 and 5 and your own knowledge, explain how climate and two other factors can influence the variations in mean annual discharge of Mekong River at Kratie, Cambodia. [6]

Influence of climate

- The seasonal variation of water balance (R4) coincides with the mean annual discharge pattern (R5)*
- During months of high rainfall, there is surplus moisture due to increased quickflow processes - there could be increased soil moisture storage, leading to possible saturation overland flow contributing to increased discharge. Additionally, intense rainfall during the wet season may have led to infiltration overland flow, also contributing to increased river discharge. These coincided with the flood season.*
- During months of low rainfall, the water balance experiences moisture deficit (Dec-Apr), slowflow processes dominate, hence the river is not in flood.*

Influence of human activities such as release of water from Dams

- There could be a regular timed release of water from dams along Mekong River by upper riparian states during the wet seasons as a flood mitigation measure. The water released from the dams could reach downstream riparian regions such as Kratie, contributing to the flood season from May-Nov*

Influence of snowmelt from higher altitudes during Summer

- During summer, the higher temperatures increased snowmelt at the higher altitudes long the Tibetan Plateau located upstream of Kratie.*
- The increased snowmelt contribute to increased discharge along the Mekong River which would have made its way downstream, resulting in a high discharge, peaking in the month of September for Kratie.*

Note: As Resource 5 shows data from 1924 to 2004 (mean annual) and hence factors such as deforestation / landslides are not accepted as factors contributing to an annual regime.

- (c) With reference to Resource 6, describe the forecasted path and development of Cyclone Tembin across the Philippines towards the Mekong Delta. [4]

- *Forecasted path*
 - *Cyclone Tembin was forecasted to move westward from its initial position in the ocean on 20 Dec 2pm to its landfall on 22 Dec 11am. It continued to move westward over the next 3 days*
- *Development*
 - *As the Cyclone Tempin moved along the water, it gained strength as shown by the size of the coloured circles.*
 - *The storm also developed from a tropical depression on 20 Dec to a tropical storm status from 21 Dec and maintained as a tropical storm.*

- (d) Based on Resource 6, 7 and your own knowledge, explain the possible impacts of climate change on the population living in the Mekong Delta. [6]

Possible impacts include

- *Increased frequency of tropical cyclone occurrence – highest frequency as shown in R7 (2.25/5), affecting 20.6% of the households and causing the 2nd most level of damage (2.89). This is corroborated with R6, with Cyclone Tembin's path across Philippines towards the Mekong Delta*
- *Rising global temperature results in melting of ice sheets, glaciers which results in rising sea level which will inundate / flood low-lying coastal areas like Mekong delta.*
- *With higher sea level, it would affect the coastal erosion. Sea dykes like those in the photography are made of mud and soil would not be able to withstand the higher energy and hence will collapse through slumping and inundation results in the saltwater intrusion which explained the increasing salinity in Mekong delta with the highest nearest the sea.*
- *Climate change results in extreme weather. Changes in seasonality and intensity of the rainfall brought by monsoons or cyclones have an impact on the flood regimes of rivers. With more frequent and/or more intense flooding of Mekong delta, river erosional processes increase, hence leading to higher occurrences of land erosion along rivers/coasts*

Possible consequences on population could include:

- *Displacement of Population due to loss of land - inundation and coastal erosion – climate refugees as people have to migrate further inland or to higher ground.*
- *Loss of arable land - affecting agricultural productivity – rice farming the main staple crop grown in the delta is unsuited to grow in saline conditions*
- *Changes in agricultural practices from padi to shrimp/prawns farms*
- *Lack of freshwater for consumption – buy potable water – affect the poor*
- *Economic costs – building coastal protection like dykes, embankments*

Level	Marks	Descriptors
3	5-6	Response demonstrates accurate knowledge and understanding of the consequences of climate change. Explanation were clear, detailed and focus on the effects shown in the resources. Consistent quality of response with reference to the Mekong Delta.

2	3-4	<i>Response demonstrates knowledge and understanding of the consequences of climate change. Explanation may lack accuracy or detail in parts. Response is mostly clear but not of consistent quality with vague reference to the resources and/or Mekong delta.</i>
1	1-2	<i>Response demonstrates some knowledge of the consequences of climate change. Little or unclear explanation were made. Gap in the knowledge is evident with no reference to the resources and/or to the Mekong delta</i>
0	0	<i>No creditworthy response</i>

- (e) With reference to Resource 6, 7 and your own knowledge, explain ways in which the population living in the Mekong Delta can mitigate and adapt to climate change. [6]

Ways to mitigate and adapt to climate change could include:

- *Hard engineering strategies - mainly to cope with floods resulting from rising sea levels, storm surges from tropical cyclones and saltwater intrusion. May include the construction of physical structures such as levees and sea walls on low-lying / flood prone regions. These hard engineering structures prevent water from inundating the low lying regions, hence providing protection against infrastructural damage.*
- *Soft engineering strategies - Afforestation / reforestation / Agroforestry efforts – introduction or establishment of forest to promote higher rates of infiltration and interception to reduce river discharge, hence*
- *Adaptation measures – cyclone forecasting to allow local population to evacuate before arrival of tropical cyclone*
- *Switching to alternative sources of energy to reduce carbon emission*
- *Push by local population for more collaboration between riparian states sharing the Mekong River region.*

Level	Marks	Descriptors
3	5-6	<i>Response demonstrates accurate knowledge and understanding of the strategies to mitigate and adapt to climate change. Explanation were clear, detailed and focus on the efforts that can be made by the population living along Mekong Delta. Consistent quality of response with reference to the Mekong Delta.</i>
2	3-4	<i>Response demonstrates knowledge and understanding of the strategies to mitigate and adapt to climate change. Explanation may lack accuracy or detail in parts. Response is mostly clear but not of consistent quality with vague reference to the resources and/or population of Mekong delta.</i>
1	1-2	<i>Response demonstrates some knowledge of the strategies to mitigate and adapt to climate change. Little or unclear explanation were made. Gap in the knowledge is evident with no reference to the resources and/or to the population of Mekong delta</i>
0	0	<i>No creditworthy response</i>

Theme 1 – Climate Change and Flooding

- 3 (a)** Explain the impacts of the El Nino Southern Oscillation (ENSO) on the tropics. [9]

Indicative Content

The El Nino Southern Oscillation (ENSO) refers to the irregularly periodic variation in winds and sea surface temperatures over the tropical eastern Pacific Ocean, affecting climate of much of the tropics and subtropics. Students should refer to both the warming phase of the sea temperature is known as El Niño and the cooling phase as La Niña when explaining impacts on the tropics. The direct impacts of flooding / drought conditions could lead to further impacts on the agricultural and economic sectors, as well as leading to social impacts (eg: homelessness due to floods). Higher level responses should provide contextualized examples of impacts, and also highlight that impacts are experienced beyond the East and West Pacific, as the ENSO has disrupted atmospheric teleconnections, leading to short term anomalies around the globe.

- (b)** Evaluate the extent to which distinctive characteristics of the tropics are a result of the shifting of the Intertropical Convergence Zone (ITCZ). [16]

Indicative Content

The tropics are defined as regions between 0 to 30 deg north and south. In approaching this question, students should identify the tropics as distinctive from other regions beyond its latitudinal range, as well as within the tropics (ie: Humid Tropics (Af, Am, Aw) and Arid Tropics (BSh, BWh)). More importantly, students are to establish if the shifting of the ITCZ has been responsible for the distinct characteristics of the tropics. In essence, the shifting of the ITCZ has defined the latitudinal boundaries of the tropics which makes the tropics distinctive from higher latitudes; and has also accounted for the seasonal climatic variations of the Am, Aw, BSh climates. However, the Af climate is very much affected by the permanence of the ITCZ, whilst the BWh is defined by the permanence of the STHP. As a counter-argument, students should also discuss the other factors such as topography, continentality and ocean circulation. Higher level responses would discuss the relative importance of the various factors in determining the distinctive characteristics of the tropics.

- 4 (a) Explain the variations in the drainage basin water balance in the humid and arid tropics. [9]

Indicative Content

The drainage basin water balance differs between climates in the tropics as well as over time. In general, it should be noted that the drainage basin water balance in the humid tropics is in surplus, whilst it is in deficit in the arid tropics. Students should establish the differences in drainage basin and provide relevant explanation to the differences, making close reference to the components of the hydrologic cycle (ie: inputs, flows / stores, output). Higher level responses should identify that the drainage basin water balance varies over time as well, especially so for seasonally humid / arid climates (Af, Aw, BSh, BWh).

- (b) Evaluate the extent to which flooding in the tropics can be managed by soft engineering strategies. [16]

Indicative Content

Flooding in the tropics could be caused by a natural overtopping of the river banks due to an intense rainfall event, storm surge caused by tropical cyclones or from sea level rise. In approaching this question, students should actively engage in the discussion on the soft engineering approaches employed to manage floods. These soft engineering strategies could be employed at various scales (regional/local) and take different forms (afforestation, flood hazard zoning, and management of urban areas). Beyond this, students should identify that other strategies (such as hard engineering strategies) may also be used to manage floods. Higher level responses should include the conditions in which such strategies are effective.

Theme 2 – Urban Change

- 5 (a) Explain the difficulties in measuring sustainable urban development. [9]

Indicative Content

Sustainable urban development can be measured by a variety of tools, such as the Ecological Footprint, Happy Planet Index (HPI), the Genuine Progress Indicator (GPI). Notably, indicators that measure sustainability across nations of the world have limitations which are circumvented by regional efforts to develop their own indicators, such as the European Green City Index and the China Urban Sustainability Index. The difficulties in measuring sustainable urban development stem from their inability to accurately 'measure' and 'compare' across space and time, partly due to the differences in how countries define sustainable urban development.

- (b) 'Strategies to manage non-hazardous solid waste in cities are rarely successful.' How far do you agree with this statement? [16]

Indicative Content

The management of non-hazardous solid wastes are usually done at a national/municipal level. Students should evaluate the success of the strategies, both according to the Waste Hierarchy (Reduce, Reuse, Recycle, Recover, and Landfill) and between DCs and LDCs. Higher level responses will also discuss the conditions in which cities would see greater success, particularly with reference to whether the strategies and cities promote a circular urban metabolism.

- 6 (a) Explain the political, socio-economic and environmental factors that affect urban liveability in low income cities. [9]

Indicative Content

Low income cities tend to experience challenges in attaining urban liveability due to a variety of issues such as weak governance (political factor), urban poverty (socio-economic factor) and challenged by a multitude of urban issues affecting the urban environment (environmental factor). Stronger responses would highlight the root issues faced by low income cities that will impede their pursuit of urban liveability.

- (b) With reference to the elderly and one social group you have studied, to what extent is it challenging to cater to their needs in an urban area? [16]

Indicative Content

Both the elderly and migrants (chosen social group) living in an urban area has social and economic needs to be catered to. These could include the need to provide for space for social interaction, healthcare access and relevant employment for the social groups. Students are to discuss the various support structures that cities undertake to cater to the social groups' needs and surface challenges cities face as they do so. Higher level responses should highlight that as the needs of social groups are diverse, it is hard to provide a cookie-cutter approach to cater to all their needs, and hence a many-helping hands approach would be more appropriate, depending on the nature of the urban population and government structures. Ultimately, the pursuit of urban liveability is filled with challenges, which should also start from addressing urban issues arising from a rapid urban growth within the city.



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NUMBER**

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GEOGRAPHY

8813/01

Additional Materials: Answer Paper
1 Insert
World outline map

10 September 2018
3 hours

READ THESE INSTRUCTIONS FIRST

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

Answer **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.

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.

Tie your script securely.

If you have not attempted any of the questions, you are to submit a piece of writing paper with your name, CG and question number written on it.

Section A

Theme 3 : Geographical Investigation

- 1 A group of 20 18 year-old students wanted to examine the factors influencing flood risk in the Thomson Road area in Singapore. They used a map showing the relief of the Thomson Road area and decided on two specific zones to do a comparative study. Factors they have identified include slope angle, land use and vegetation cover. They collected their data over the period of four days in June.

The equipment they used included:

- (i) Clinometer – to measure angle of slope
- (ii) Infiltrometer – to measure infiltration rate
- (iii) Stop watch
- (iv) 50 metre tape measure
- (v) Recording sheet

Resource 1 shows a relief map of Thomson Road and the surrounding area. Resource 2 shows part of the recording sheet used in the investigation. Resource 3 shows an image from Google Earth. Resource 4 shows an image of land use along Lorong 3 Tao Payoh.

- (a) Suggest a suitable hypothesis for the group investigation and explain why the hypothesis is clearly defined and at a suitable scale. [4]
- (b) Select **two** areas A, B or C outlined in Resource 1 and suggest why the group might have chosen those areas for their comparative study. [4]
- (c) Draw a sketch of a graph to show how the data in Resource 2 can be represented and explain its advantages. [6]
- (d) Evaluate the usefulness of the data shown in Resource 3 in the investigation. [4]
- (e) With reference to Resource 4, discuss how data on land use shown in Area C in Resource 1 can be collected. [7]

[Turn over

Section B**Theme 1 : Climate Change and Flooding****The El Niño Southern Oscillation and its impacts on Southeast Asia**

- 2 Resource 5 shows average sea surface temperature anomalies (°C) between July-August 2015. Resource 6 shows wind speed anomalies (m/s) July to August 2015. Resource 7 shows sea level anomalies in February 2016. Resource 8 shows rice production in Southeast Asia. Resource 9 shows the effects of an El Niño shock on real GDP.
- (a) Describe the distribution of sea surface temperature anomalies (°C) in Pacific Ocean in Resource 5. [3]
 - (b) With reference to Resource 5, explain the possible effects of the El Niño Southern Oscillation on rainfall amount and distribution in the region. [6]
 - (c) Explain the relationship between wind direction and sea level anomalies shown in Resources 6 and 7 respectively. [4]
 - (d) With reference to Resources 8 and 9, compare the impacts of an EL Niño event on Thailand and Indonesia. [4]
 - (e) With reference to Resources 8, 9 and your own knowledge, assess the extent of the impacts of El Niño events on Southeast Asia. [8]

[Turn over]

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 main differences in the characteristics of tropical rainforest (Af) and tropical savanna (Aw) climates. [9]
- (b) Evaluate the role of the Hadley Cell in influencing the tropical climates. [16]
- 4 (a) Compare the drainage basin water balance in the humid and arid tropics. [9]
- (b) Discuss the usefulness of flood hydrographs in the study of the flows and storages in a drainage basin. [16]

Theme 2 : Urban Change

- 5 (a) Explain the main reasons for traffic congestion in countries at low levels of development. [9]
- (b) Discuss the effectiveness of attempts to manage the issue of traffic congestion. [16]
- 6 (a) Explain why there are different indices used to measure 'urban liveability' in cities. [9]
- (b) To what extent can the needs of different social groups in the city be met? [16]

--- End of paper ---

Acknowledgements:

Question 1 Resource 1 @ <http://en-sg.topographic-map.com/places/Singapore-6698414/>

Question 1 Resource 2 @ own data

Question 1 Resource 3 @ <https://thetwophilo.files.wordpress.com/2010/07/5upp-thomson-profile.jpg>

Question 1 Resource 4 @ <https://www.google.com.sg/>

Question 2 Resource 5 @ <https://www.climate.gov/>

Question 2 Resource 6 @ <https://www.climate.gov/>

Question 2 Resource 7 @ <https://phys.org/news/2016-03-jason-oceans-ongoing-el-nino.html>

Question 2 Resource 8 @ <http://www.thecropsite.com/articles/1458/el-nio-weather-events-affect-southeast-asias-rice-surplus/>

Question 2 Resource 9 @ <http://www.imf.org/>



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GEOGRAPHY

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Paper 1

10 September 2018

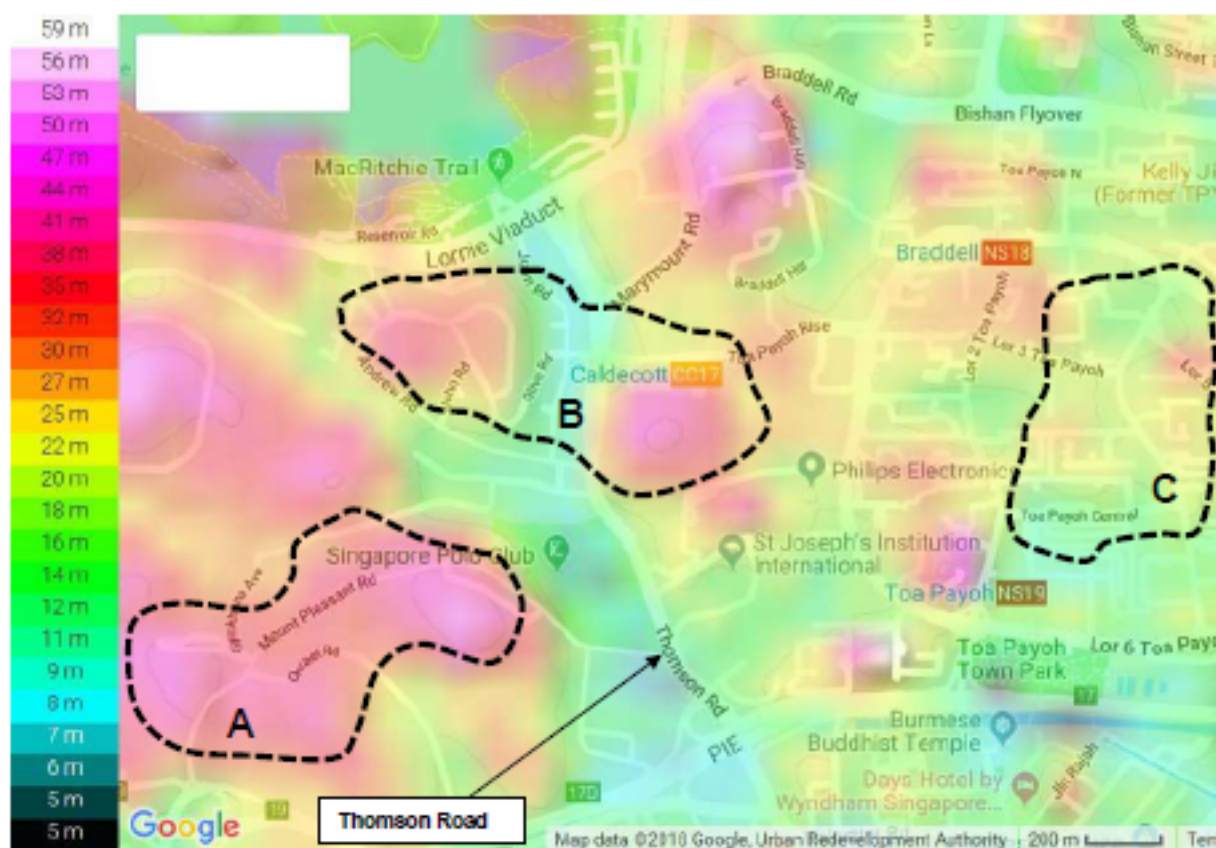
INSERT

3 hours

READ THESE INSTRUCTIONS FIRST

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

Resource 1 for Question 1
Relief map of Thomson Road and its surrounding area



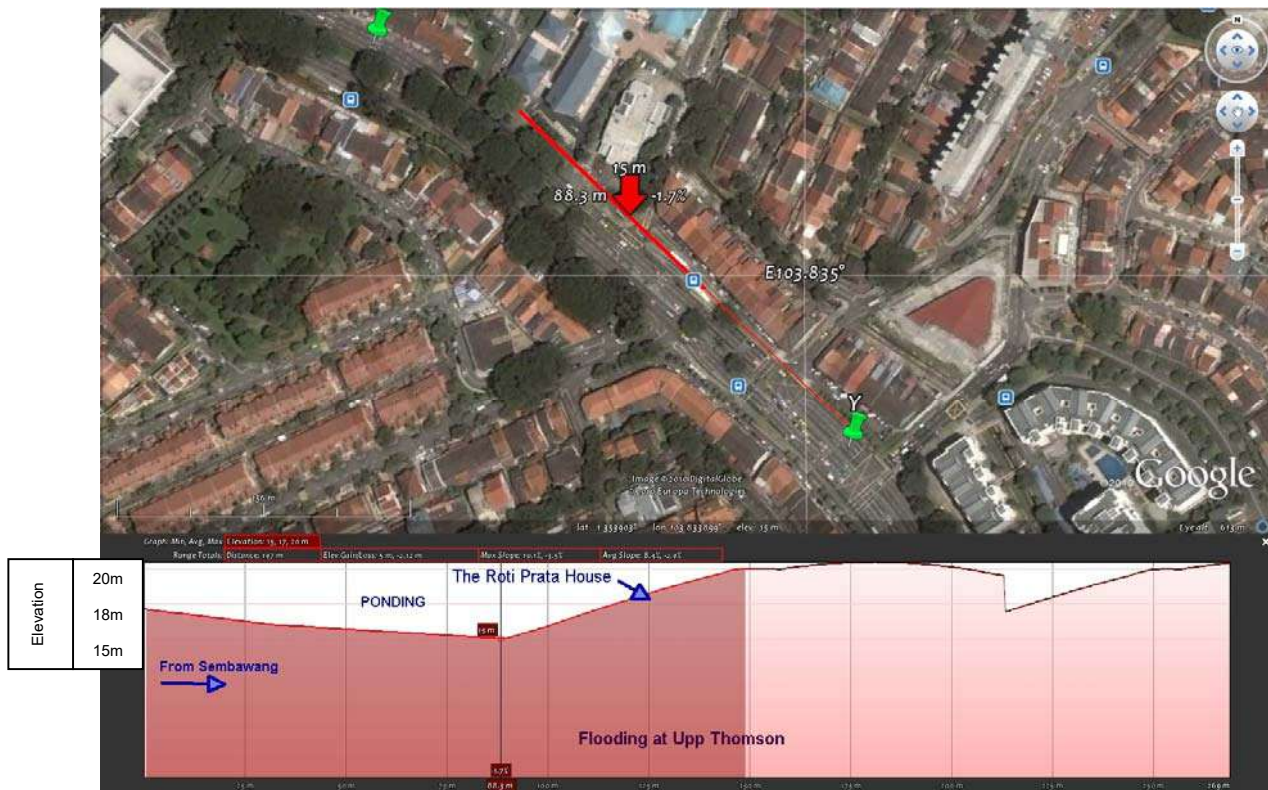
Resource 2 for Question 1
Recording sheet for slope sections along Thomson road area B

Slope section	Land use	Vegetation cover	Average Slope angle	Infiltration rate	
B1	No built up area	Grassy with trees	2.5°	Time from start (min)	Infiltration rate* mm/hr
				0	25.5
				40	22.3
				60	18.0
B2	Walking path on one part of the slope	Grassy with trees	6.4°	Time from start (min)	Infiltration rate* mm/hr
				0	17.8
				40	15.2
				60	12.0

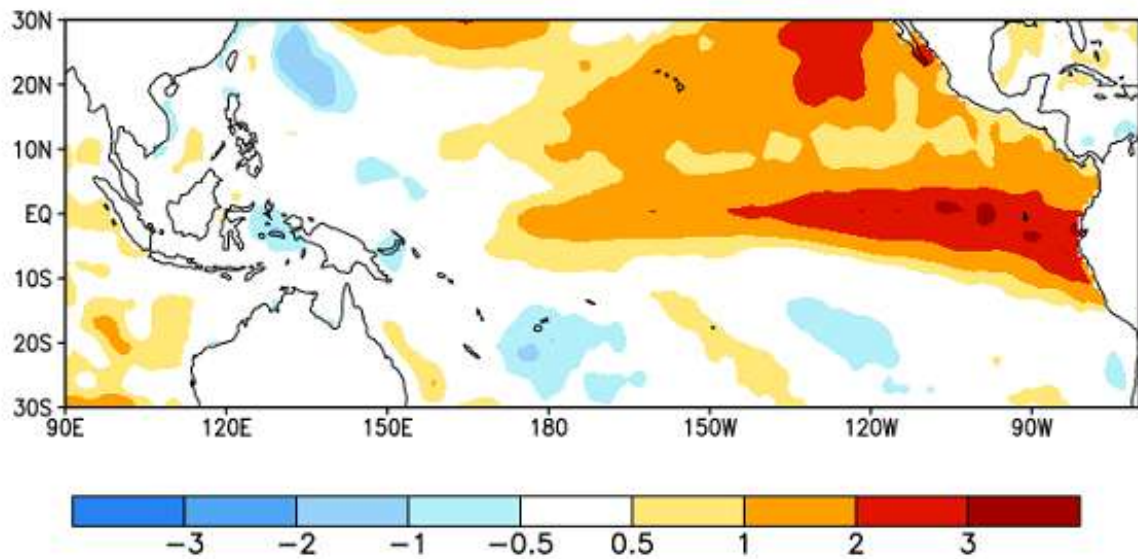
* Infiltration rate is measured by the depth (in mm) of the water layer that can enter the soil in one hour

Resource 3 for Question 1

Image from Google Earth showing the elevation down a section of Upper Thomson Road

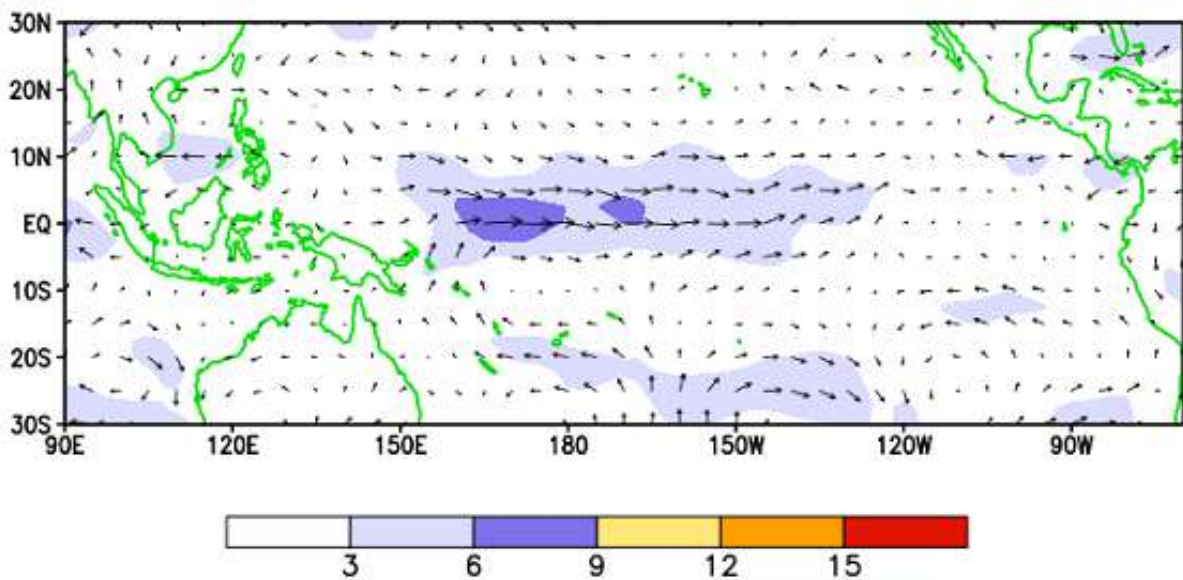
Resource 4 for Question 1
Image of land use along Lorong 3 Toa Payoh

Resource 5 for Question 2

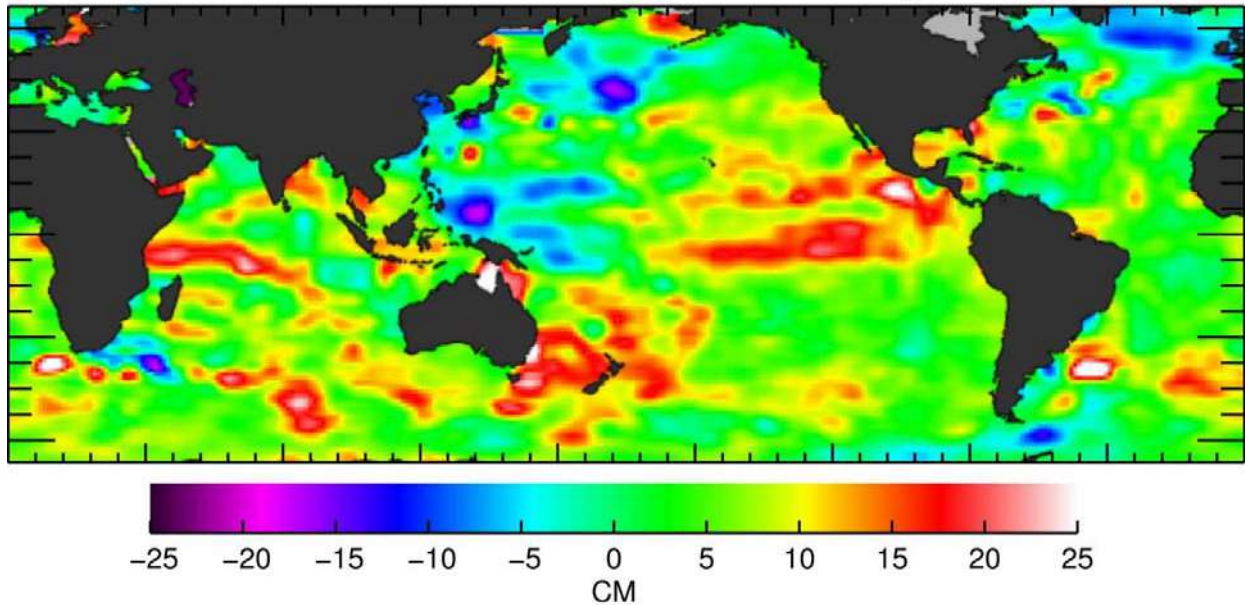
Average sea surface temperature anomalies ($^{\circ}\text{C}$) between July-August 2015

Resource 6 for Question 2

Wind speed anomalies (m/s) July to August 2015

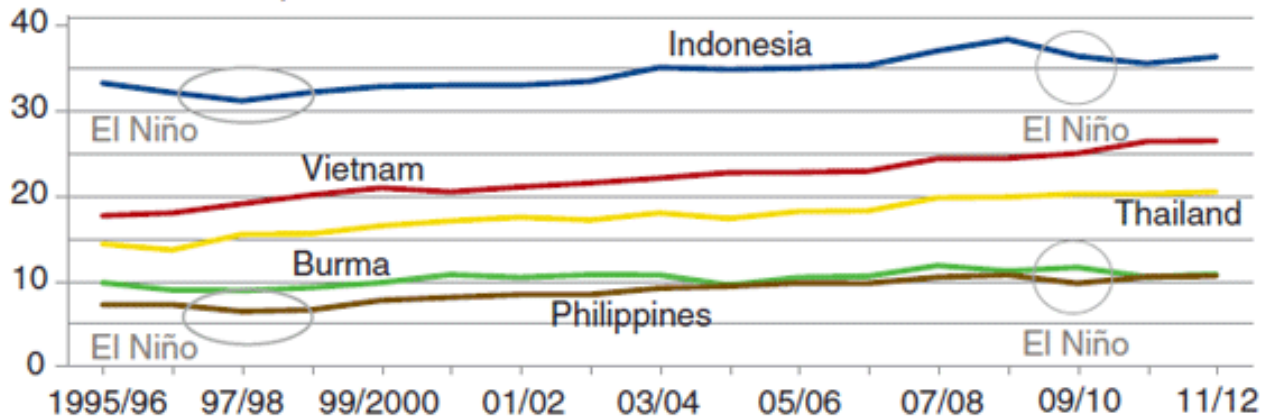


Resource 7 for Question 2
Sea level anomalies in February 2016

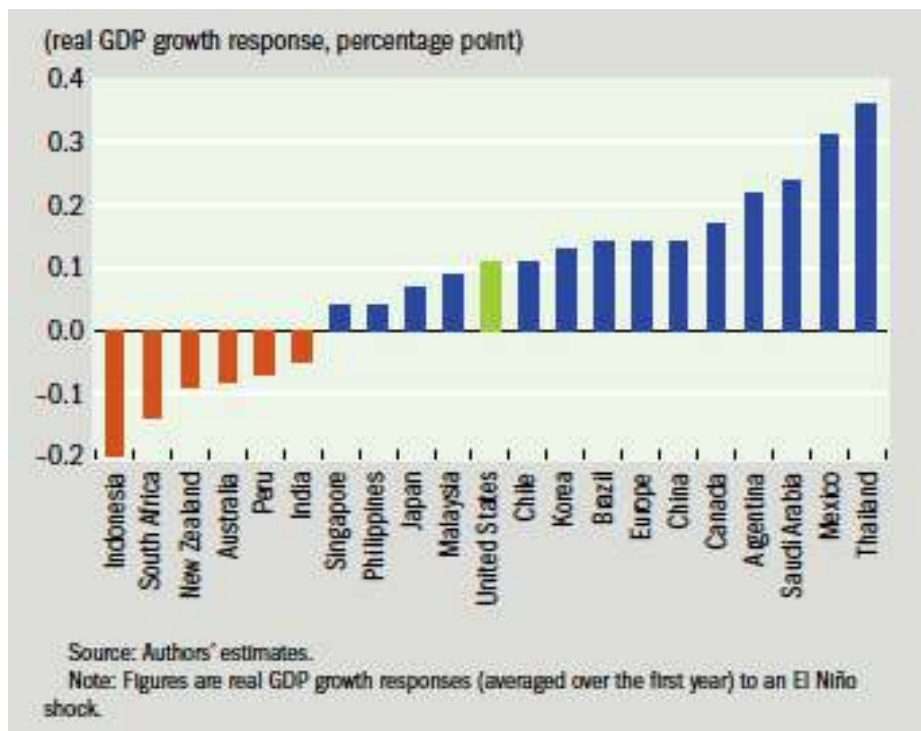


Resource 8 for Question 2
Rice production in Southeast Asia

Million metric tons, milled basis



Resource 9 for Question 2
The effects of an El Niño shock on real GDP



Acknowledgements:

Question 1 Resource 1 @ <http://en-sg.topographic-map.com/places/Singapore-6698414/>
 Question 1 Resource 2 @ own data
 Question 1 Resource 3 @ <https://thetwophilo.files.wordpress.com/2010/07/5upp-thomson-profile.jpg>
 Question 1 Resource 4 @ <https://www.google.com.sg/>
 Question 2 Resource 5 @ <https://www.climate.gov/>
 Question 2 Resource 6 @ <https://www.climate.gov/>
 Question 2 Resource 7 @ <https://phys.org/news/2016-03-jason-oceans-ongoing-el-nino.html>
 Question 2 Resource 8 @ <http://www.thecropsite.com/articles/1458/el-nio-weather-events-affect-southeast-asias-rice-surplus/>
 Question 2 Resource 9 @ <http://www.imf.org/>

2018 C2 Prelims H1 Geography ANSWERS

Section A

Theme 3 : Geographical Investigation

1 Resource 1 shows a relief map of Thomson Road and the surrounding area. Resource 2 shows part of the recording sheet used in the investigation. Resource 3 shows an image from Google Earth. Resource 4 shows an image of land use along Lorong 3 Tao Payoh.

- (a) Suggest a suitable hypothesis for the group investigation and explain why the hypothesis is clearly defined and at a suitable scale. [4]

Example of hypothesis:

A steeper slope will have a lower infiltration rate

Independent variable: slope angle

Dependent variable: infiltration rate

Suitable scale:

- Area is small enough for the group to conduct their study as they can split into 3 groups of about 7 students each
- (b) Select **two** areas A, B or C outlined in Resource 1 and suggest why the group might have chosen those areas for their comparative study. [4]
- Areas B and C
 - Area B has high relief (50m) and low relief (11m) and would be good to study the effect of steep slopes
 - Area C has relative flat and low relief (about 18 – 20m) and would be useful to study the effect of gentle relief
 - Area C is also where a housing area is located and the effect of land use can be analysed as well

- (c) Draw a sketch of a graph to show how the data on infiltration rate for slope sections B1 and B2 in Resource 2 can be represented and explain its advantages. [6]

- A Line graph can be constructed with time from start and infiltration rate as the two axes
- The line graph is a clear representation of the relationship between time and infiltration rate and easy to understand. The lines can be coloured to show the contrast between them.
- Comparisons between the graphs can be made and analysed

- (d) Evaluate the usefulness of the data shown in Resource 3 in the investigation. [4]

- Reflects nature of surface
 - Built-up areas
 - Vegetation cover
 - Roads
- Shows elevation and angle of slope

However,

- Points to locate the specific spots on the map and link to the cross-section are not sufficient. Hence, it is difficult to link the cross-section and the map
- (e) With reference to Resource 4, discuss how data on the effect of land use on floodrisk shown in Area C in Resource 1 can be collected. [7]

- Area C is a housing area
- Use of a map to record information on
 - Roads
 - Vegetation
 - Paths
 - Drainage
 - Buildings
- Survey residents regarding the occurrence of floods both small and large scale in the area.
- Measure the infiltration rate of different surfaces

Include how the students should conduct themselves as they collect data

- Not to destroy the surrounding vegetation
- Not to make noise and disturb the residents
- Watch for traffic
- Do not put pressure on residents to take the survey
- Explain the purpose of the study clearly

Section B

Theme 1 : Climate Change and Flooding

The El Niño Southern Oscillation and its impacts on Southeast Asia

- 2 Resource 5 shows average sea surface temperature anomalies (°C) between July-August 2015. Resource 6 shows wind speed anomalies (m/s) July to August 2015. Resource 7 shows sea level anomalies in February 2016. Resource 8 shows rice production in Southeast Asia. Resource 9 shows the effects of an El Nino shock on real GDP.

- (a) Describe the distribution of sea surface temperature anomalies (°C) in Pacific Ocean in Resource 5. [3]

- High SST anomaly of 2°C on Eastern Pacific and towards the north near North America
- SST decreases towards Western Pacific about -0.5°C to -1°C anomaly
- Lower SST anomaly in the NW

- (b) With reference to Resource 5, explain the possible effects of the El Nino Southern Oscillation on rainfall amount and distribution in the region. [6]

Eastern Pacific

- Warmer
- Lower pressure
- Associated with rainy weather and storms

Western Pacific

- Cooler

- Higher pressure
- Drier and may experience drought

Due to:

- Upwelling cold Peruvian current in the Eastern Pacific weakens
- High pressure conditions weakens as well
- Easterly trade winds weaken
- This causes the water from the Western Pacific to slosh back and SST increases

(c) Explain the relationship between wind direction and sea level anomalies shown in Resources 6 and 7 respectively. [4]

- Higher sea level increase towards Central and Eastern Pacific and winds become westerly
- Change in air pressure in eastern (LP) and western Pacific (HP)
- Winds blow from HP to LP (shown in Resource 6)
- Resource 7 – sea level higher as sea water is pushed towards the Eastern Pacific

(d) With reference to Resources 8 and 9, compare the impacts of an EL Nino event on Thailand and Indonesia. [4]

- Thailand shows a gentle but increasing trend between 1995 and 2012. The rice production does not seem to be affected by the El Nino.
- Indonesia also similarly shows an overall increase in rice production. However, it is quite distinctly affected by El Nino events as there was a clear dip of about 3 million metric tons when the El Nino events occurred in 1997/98 and 2009/10.

(e) With reference to Resources 8, 9 and your own knowledge, assess the extent of the impacts of El Nino events on Southeast Asia. [8]

- Resource 8 – impacts on rice production affects supply for local consumption as well as supply to global markets
- Resource 9 – Indonesia suffered a fall in GDP growth of -0.2 percentage point due to EL Nino events. However, Singapore, Thailand, Philippines and Malaysia experience an increase with Thailand having the highest increase.
 - Indonesia is affected the worst by the El Nino due to the decrease in rainfall
- When dry conditions or drought occurs, farmers may turn to burning to clear the forests and this results in transboundary haze affecting a few countries and the health of thousands of people
- Drier conditions will affect water supply and worsen water scarcity issues

Section C

Theme 1 : Climate Change and Flooding

- 3 (a)** Explain the main differences in the characteristics of tropical rainforest (Af) and tropical savanna (Aw) climates. [9]
- Explain differences in mean annual temperature, annual temperature range, total annual rainfall and rainfall distribution
 - Reasons for differences :
 - Aw lies at a high latitude, hence the mean annual temp will be lower and seasonal temp is higher
 - The ITCZ also affects the areas seasonally during summer causing summer rain and winter dryness
- (b)** Evaluate the role of the Hadley Cell in influencing the tropical climates. [16]
- Hadley Cell is extremely important as the ITCZ is part of the circulation
 - The ITCZ brings rain to the tropical climates such as Af climates. It also influences the monsoon winds and affects the Am climates. It also brings seasonal rainfall to Aw climates
 - Hadley Cell is also important as the STHP belt is part of the circulation
 - The STHPB influences mainly the tropical desert climate bringing it dry conditions all year
 - Other factors
 - Topography – link to monsoon winds and orographic rain
 - Ocean currents and the ENSO
 - Aspect
- 4 (a)** Compare the drainage basin water balance in the humid and arid tropics. [9]
- The drainage basin water balance in the humid tropics will generally have surplus as compared to the deficit in the arid tropics.
 - All the flows and storages in the humid tropics will generally be higher
- (b)** Discuss the usefulness of flood hydrographs in the study of the flows and storages in a drainage basin. [16]
- Draw the flood hydrograph and explain its characteristics
 - Flood hydrographs are useful as they reflect the flows of water in a drainage basin in the event of a storm
 - They can help explain how the nature of the drainage basin make affect the flows and storages of water, such as
 - vegetation cover
 - slope angle
 - land use
 - geology
 - However, it does not help to pinpoint the exact reasons for flows as it reflects as general response to the rainfall event

Theme 2 : Urban Change

- 5 (a)** Explain the main reasons for traffic congestion in countries at low levels of development. [9]

Reasons can include:

- Poor infrastructure, poorly paved roads, narrow roads
- High levels of private car ownership
- Poor public transport
- Poor traffic control
- Rapid urbanization outstripping improvements in infrastructure

- (b)** Discuss the effectiveness of attempts to manage the issue of traffic congestion. [16]

- Select any strategies that decrease private car ownership (e.g. COE), increasing road capacity, improving public transport, improving pathways for alternative forms of movement and transport such as walking and cycling

- 6 (a)** Explain why there are different indices used to measure 'urban liveability' in cities. [9]

- Different indicators are selected to form differing indices as liveability is a relative and subjective concept. It can hold different meanings for people living in different cities in different parts of the world.
- Some organizations have their own agenda in the creation of the indices such as EIU. Hence, the choice of and emphasis on different indicators

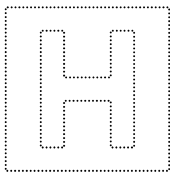
- (b)** To what extent can the needs of different social groups in the city be met? [16]

Elderly:

- creation age-friendly cities
- meeting the social needs of the elderly by increasing social interaction such as senior activities centres
- Meeting the needs for healthcare and mobility by providing subsidies
- Most needs of elderly in DCs can be met as reflected by the development of successful age-friendly cities
- However, there needs to be more emphasis on those individuals who are more reclusive and prone to suicide

Youths:

- The social, economic (employment), physical needs of youths can largely be met
- However, it is difficult to avoid the issues with stress experienced in schools as academic performance is tied closely to urban societies and many countries find it difficult to delink them
- With the advent of the internet, it is also difficult to address the issues of cyberbullying as the reach of the internet is very wide and elusive
- In some societies, infantilisation is also an issue.



INNOVA JUNIOR COLLEGE
JC 2 PRELIM EXAMINATIONS

in preparation for General Certificate of Education Advanced Level

Higher 1

GEOGRAPHY

8813/01

Paper 1

27 Aug 2018

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

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.

At the end of the examination, fasten Section A and B with a cover, and fasten Section C together with another cover page.

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

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



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[Turn over

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Section A

Theme 3: Geographical Investigation

- 1 A group of 20 18 year old students from a junior college in Singapore wanted to examine liveability in different parts of the city. They have selected two housing estates, Punggol and Ang Mo Kio for their investigation.

The students wanted to gather information on recreational facilities, and the availability of amenities and services to gain a fuller picture of liveability in both neighbourhoods. They were given two weeks to complete their investigation in June.

The students carried out research on the two housing estates and gained knowledge about the plans to transform Ang Mo Kio into a walking and cycling town. They also managed to obtain data on the train stations located in the area. The students then decided to divide themselves into four teams of 5, with two teams carrying out the investigation in Ang Mo Kio, and another two teams carrying out their investigation in Punggol. They have decided to carry out surveys at the respective train stations on weekdays from 8am to 9am. The questions asked in the survey were:

- “How long have you lived in Ang Mo Kio/Punggol?”
- “Do you think that Ang Mo Kio/Punggol is a good estate to live in?”
- “Are there enough recreational facilities for the residents of Ang Mo Kio/Punggol?”

They planned to ask every 10th person who walked past them to do the survey. They planned to obtain 50 responses per housing estate.

Resource 1 shows a map of the towns and estates in Singapore. Resource 2 shows the population and housing characteristics in Punggol and Ang Mo Kio. Resource 3 shows a map of the plan for Ang Mo Kio Walking and Cycling town.

- (a) With reference to Resources 1 and 2, explain **two** reasons why there might be contrasts in liveability between Ang Mo Kio and Punggol. [4]
- (b) With reference to Resource 3 and the context provided, explain how your group would minimize potential risk and address ethical concerns in your investigation. [4]
- (c) Your group concluded that the method of data collection through the survey may not be completely reliable and accurate.
Explain how the process of data collection could be improved. [6]
- (d) Sketch a pie chart to represent the housing type in Punggol using the information in Resource 2. [3]
- (e) Evaluate the usefulness of the data shown in Resources 1, 2 and 3 in helping students understand liveability in Ang Mo Kio and Punggol. [8]

Section B**Theme 1: Climate Change and Flooding****Climate Change in developing countries**

- 2** Resource 4 shows the changes in greenhouse gas emissions from 1990-2010. Resource 5 shows the Climate Change Vulnerability Index for 2017. Resource 6 shows various statements on climate change from leaders of Small Island Developing States (SIDS).
- (a)** Describe the trend in greenhouse gas emissions from 1990-2010 as shown in Resource 4. [3]
 - (b)** Explain how the trend in greenhouse gas emissions shown in Resource 4 can have a long-term impact on the climate. [4]
 - (c)** Describe the pattern of vulnerability to climate change shown in Resource 5. [4]
 - (d)** With reference to Resources 5 and 6, explain the factors that can affect a country's vulnerability to climate change. [6]
 - (e)** With reference to Resource 6 and your own knowledge, suggest strategies to minimise the impact of climate change in developing countries. [8]

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Section C

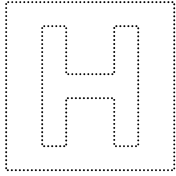
Answer **two** questions from this section. **Either** Question 3 **or** Question 4 and **Either** Question 5 **or** Question 6.

Theme 1: Climate Change and Flooding

- 3 (a) Explain how the shifting of the Inter Tropical Convergence Zone can affect the climate of countries in the humid tropics. [9]
- (b) To what extent is climate the main factor influencing hydrological processes of drainage basins in the humid tropics? [16]
- 4 (a) Explain the factors that can influence the shape of hydrographs in the tropics. [9]
- (b) To what extent are hard engineering strategies more effective than soft engineering strategies in managing fluvial floods? [16]

Theme 2: Urban Change

- 5 (a) Explain the variations in urbanisation trends across urban areas at different levels of economic development. [9]
- (b) Evaluate the effectiveness of strategies to cater to the needs of different social groups in cities. [16]
- 6 (a) With the use of examples, explain the sources of fear OR extent of crowding in cities of highly urbanised cities. [9]
- (b) Evaluate the strategies undertaken by governments and communities to cope with fear in the cities OR lessen crowding. [16]



INNOVA JUNIOR COLLEGE
JC 2 PRELIM EXAMINATIONS

in preparation for General Certificate of Education Advanced Level
Higher 1

GEOGRAPHY

Paper 1

INSERT

8813/01

27th Aug 2018

3 hours

READ THESE INSTRUCTIONS FIRST

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

INSERT

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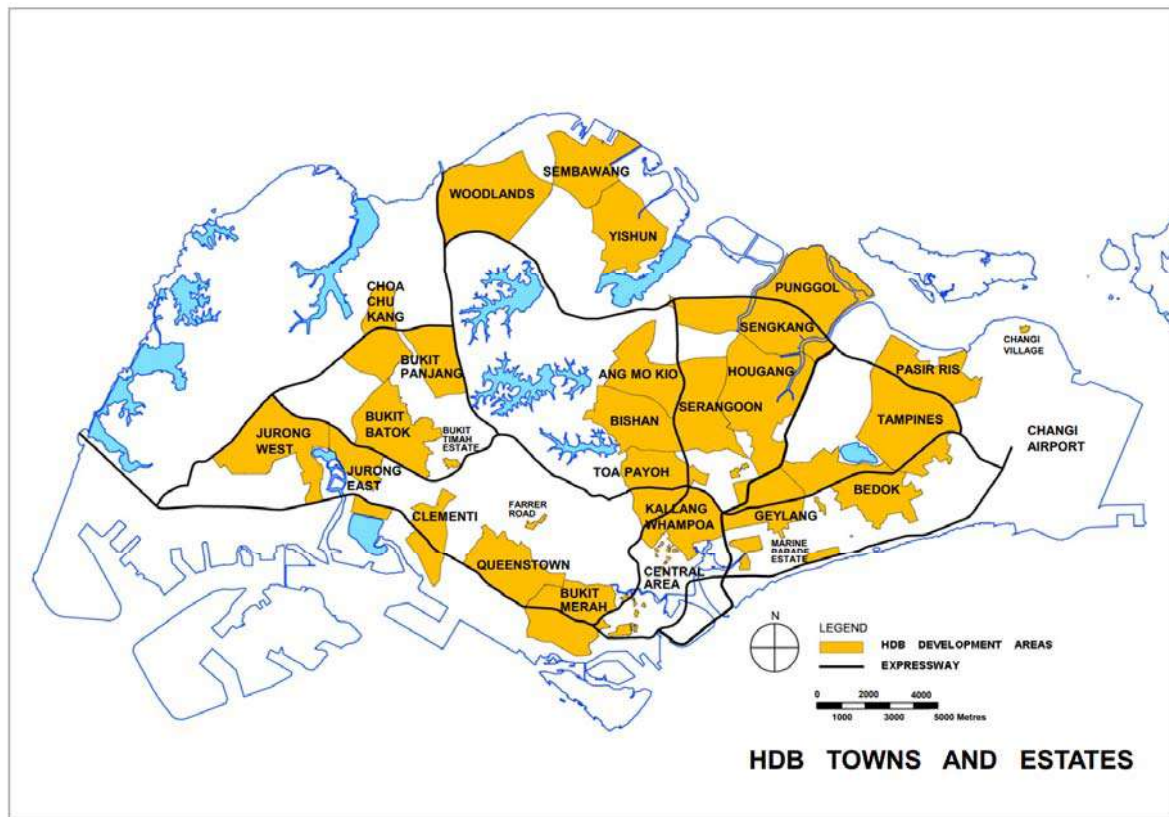
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Resource 1 for Question 1

Housing Development Board (HDB) Towns and Estates in Singapore



Source: Housing Development Board, 2014

Resource 2 for Question 1

Population and housing characteristics of Punggol and Ang Mo Kio

	Punggol	Ang Mo Kio
Age of Town*	Young Town	Mature Town
Population	94,829	144,329
Elderly Population	4,517	24,314
Resident Population by Age Group		
Below 15	25%	17.3%
15-44	50%	42.7%
45-64	20.2%	32%
65 and above	4.8%	8%
Housing Type		
1 and 2-room flats	4.5%	10%
3 and 4-room flats	50.4%	77.3%
5-room and executive flats	45.1%	12.7%

* Mature Towns/Estates refer to towns and estates that were developed before the 1980s. Most flats in these towns were built before the 1980s. Young Towns refer to towns that were developed in the 1990s, where development is ongoing.

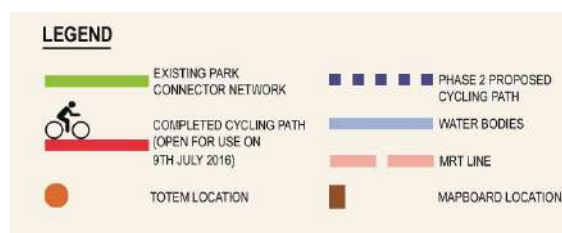
Source: Housing Development Board, 2014

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Resource 3 for Question 1

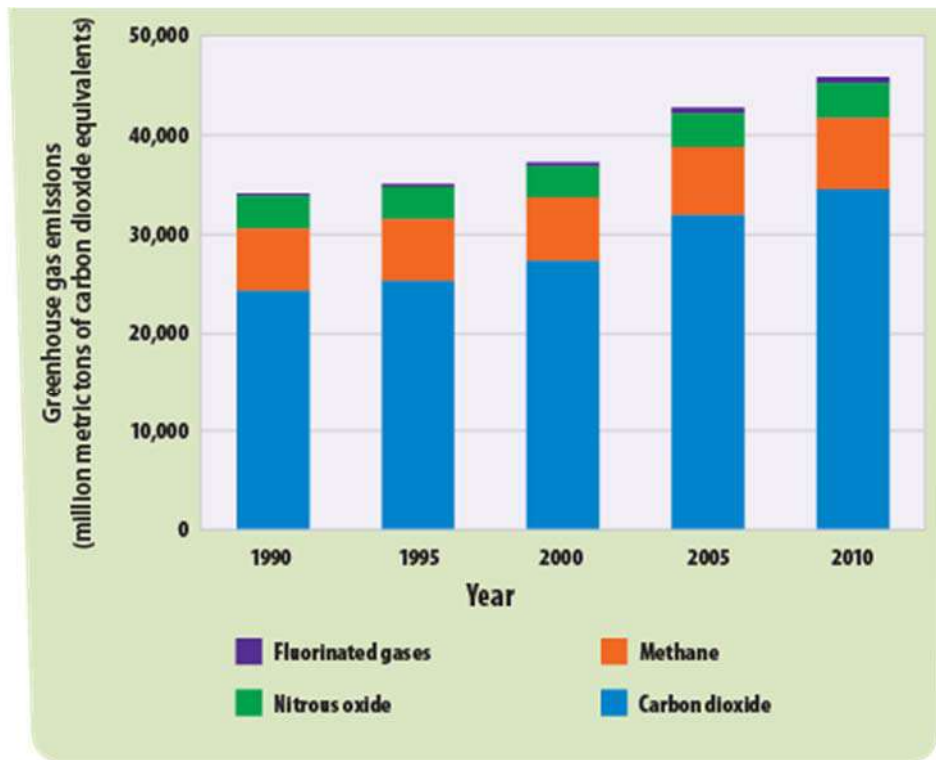
Map of plan for Ang Mo Kio Walking & Cycling Town



Source: Land Transport Authority website, 2017

Resource 4 for Question 2

Emissions of Green House Gases Worldwide (1990-2010)

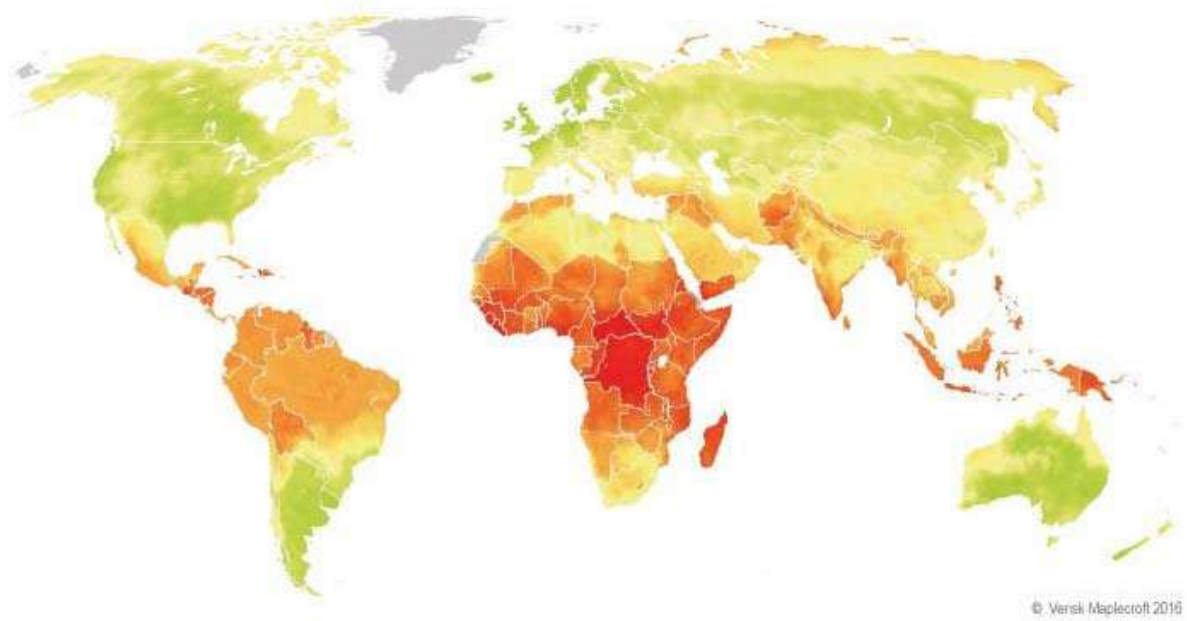


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Resource 5 for Question 2

Climate Change Vulnerability Index 2017



The five worst performing countries

Rank	Country	Region	Score	Category
1	Central African Republic	Africa	0.01	Extreme
2	DR Congo	Africa	0.20	Extreme
3	Haiti	Caribbean	0.24	Extreme
4	Liberia	Africa	0.25	Extreme
5	South Sudan	Africa	0.41	Extreme

The five best performing countries

Rank	Country	Region	Score	Category
191	Denmark	Europe	10.00	Low
190	United Kingdom	Europe	9.96	Low
189	Uruguay	S.America	9.95	Low
188	Iceland	Europe	9.85	Low
187	Ireland	Europe	9.83	Low

Resource 6 for Question 2

Statements on climate change by leaders of Small Island Developing States

“The Maldives is an archipelago consisting of tiny islands scattered in a vast expanse of the Indian Ocean. Over 80% of the land area have less than one meter above mean sea level, climate change and its associated sea level rise would undoubtedly be a catastrophe and threaten the livelihood of the islanders in the Maldives alike many thousands of others in low-lying island states. Sixteen years ago in April 1987, Maldives experienced unusual high waves causing extensive damage to the islands. Two thirds of the whole Maldives, including the capital island, Malé, was inundated for two days causing extensive damage to the infrastructure. Male International Airport, the only gateway to the Maldives, was closed for two days, causing delays in receiving the relief assistance from the international community, cancellation of tourist arrivals and lot more.”

Statement by Mr. Abdullahi Majeed (Maldives) December 2003

“Our Pacific island nations, including my own country, know from bitter experience of cyclones that regularly batter our region, of the disheartening effect of disasters in setting back in a matter of hours hardearned development achievements of many years. SIDS concerns and the vulnerability of our nations are therefore quite real. While we accept the primary responsibility for achieving the goals of the [Barbados] Programme of Action, the reality is that the support of the international community is indispensable to success.”

Statement by Tuila’Epa Sailele Malielegaoi, Prime Minister of Samoa, 2004

“As an island nation, Sao Tome and Principe continues to see our very existence threatened by global warming. Our shorelines erode, our national territory shrinks as the seas rise. Is my small country to end up nothing but a tiny volcanic peak sticking up above the waves with the last of our people clinging to the land left unclaimed by the rising sea? The Kyoto Protocol must be implemented by all for the benefit of all.”

Fradique Bandeira de Melo de Menezes President, Sao Tome and Principe

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IJC H1 GEOG PRELIMS 2018 ANSWER KEY

Section A

Theme 3: Geographical Investigation

- 1 A group of 20 18-year old students from a junior college in Singapore wanted to examine liveability in different parts of the city. They have selected two housing estates, Punggol and Ang Mo Kio for their investigation.

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Resource 1 shows a map of the towns and estates in Singapore. Resource 2 shows the population and housing characteristics in Punggol and Ang Mo Kio. Resource 3 shows a map of the plan for Ang Mo Kio Walking and Cycling town.

- (a) With reference to Resources 1 and 2, explain **two** reasons why there might be contrasts in liveability between Ang Mo Kio and Punggol. [4]

Possible points:

Resource 1 – Ang Mo Kio is more centralized and nearer to connections in transport routes, Punggol is further at the edges of the island and is not as well-connected to transportation.

Resource 2 – Ang Mo Kio is a mature town whereas Punggol is a young town, which can lead to differences in access to amenities and services for its people.

- (b) With reference to Resource 3 and the context provided, explain how your group would minimize potential risk and address ethical concerns in your investigation. [4]

Context - Ethics – ensure the privacy of information of respondents – explain to respondents how their data will be used

Context – Ethics – survey is carried out during rush hour, not to disturb their daily activities and flow of human traffic, make sure to not stand in the path of human traffic and to not pester people to complete the survey

Resource 3 – Risk – many roads and cycling paths – to be wary of dangers from cars and bicycles while carrying out survey in the area around train station

Answer must include at least one risk and one ethical concern.

- (c) Your group concluded that the method of data collection through the survey may not be completely reliable and accurate.

Explain how the process of data collection could be improved. [6]

Accuracy:

- Timing of survey at peak hour: respondents may mostly be working population and not representative of the demographics of the area.
- Questions that are being asked may not accurately provide the perception of liveability amongst residents in the area.

Reliability:

- Sample size may not be large enough (eg: 50 out of 94,829 is only 0.05% of population in Punggol) to provide a representative understanding of liveability

Level	Marks	Descriptors
3	5-6	Response demonstrates accurate knowledge of survey collection methods, issues with both accuracy and/or reliability of these and relevant improvements. Reflects a good understanding of the context of the investigation and of data collection techniques.
2	3-4	Response demonstrates good knowledge of survey collection methods. Provides an explanation of issues relating to reliability and/or accuracy with some reference to possible improvements. Some of the responses may focus on generic fieldwork issues and improvements may not be relevant to the context of the investigation.
1	1-2	Response shows some knowledge of survey collection methods. Some reference is made to issues with reliability and/or accuracy but may recommend irrelevant or inappropriate improvements or provide inaccurate

		explanation of methods. Response may be of limited relevance to the given context.
0	0	No creditworthy response.

- (d) Sketch a pie chart to represent the housing type in Punggol using the information in Resource 2. [3]

For sketching of line graph, 1 mark awarded for each of the following:

- Title
- Relative accuracy of the pie chart
- Appropriate labels for the different segments

- (e) Evaluate the usefulness of the data shown in Resources 1, 2 and 3 in helping students understand liveability in Ang Mo Kio and Punggol. [8]

Resource 1: Useful in understanding about geographical location of area and transport routes by roads, which can affect liveability.

Resource 2: Useful in showing housing in the different areas, and the types of housing, which can affect liveability.

Resource 3: Useful in showing the access to amenities in the areas such as schools, parks, library and other recreational areas, and walking and cycling routes to enhance mobility for AMK.

However,

- Does not show information on access to amenities for Punggol, which is necessary for understanding of liveability in both areas
- Does not take into account other aspects of liveability, such as income levels or cost of living (economic) or pollution levels such as air pollution or even noise pollution (environment).

Level	Marks	Descriptors
3	7–8	Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides a logical and well-developed evaluation that reflects strong critical thinking skills and a good understanding of the requirements of the question.
2	4–6	Response demonstrates good knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides an evaluation, which may be limited in depth and detail. Response reflects critical thinking skills in general but may not always be relevant to the question.
1	1–3	Response shows inadequate knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides little or no evaluation. May include material that is irrelevant to the question.
0	0	No creditworthy response.

Section B**Theme 1: Climate Change and Flooding****Climate Change in developing countries**

2 Resource 4 shows the changes in greenhouse gas emissions from 1990-2010. Resource 5 shows the Climate Change Vulnerability Index for 2017. Resource 6 shows various statements on climate change from leaders of Small Island Developing States (SIDS).

- (a)** Describe the trend in greenhouse gas emissions from 1990-2010 as shown in Resource 4. [3]
- Generally, there has been an increase in greenhouse gas emissions from 1990-2010, from 34,000 to 45,000 million metric tons.
 - The largest increase in greenhouse gas emission is in the emission of carbon dioxide, which increased from 24,000 to 34,000 million metric tons. There is a smaller increase in fluorinated gases, of about 1,000 million metric tons.
 - There is little change in the emission of nitrous oxide and methane from 1990-2010.
- (b)** Explain how the trend in greenhouse gas emissions shown in Resource 4 can have a long-term impact on the climate. [4]
- As incoming solar radiation reaches the Earth's surface, the heat is absorbed by the land and oceans, with some heat being re-radiated back to space.
 - Some of this outgoing heat is absorbed by the greenhouse gases, and the rest is released back to space. This is known as the greenhouse effect.
 - Resource 4 shows that there has been a rapid increase in greenhouse gas emissions. With the increase in greenhouse gases, this would lead to greater entrapment of outgoing terrestrial radiation within the Earth's atmosphere.
 - This is also known as the enhanced greenhouse effect. As a result, this will lead to greater heat retention, increased temperatures and a long term effect on global temperature.
- (c)** Describe the pattern of vulnerability to climate change shown in Resource 5. [4]
- Generally, the countries with the highest vulnerability to climate change are less developed regions within the Tropics.
 - The areas which are most vulnerable are in Central Africa, with countries such as the Central African Republic and DR Congo having the highest scores for vulnerability to climate change at 0.01 and 0.20 respectively.

- Areas which are more vulnerable also include regions such as Southeast Asia, and the Northern section of the South American continent. This includes countries like Haiti, which is also a Small Island Developing State, which has the third highest score for vulnerability at 0.24.
- The areas which are least vulnerable are found in regions such as North America, Europe, Australia and the southern section of the South American continent. These areas tend to be developed and further from the Tropics. This includes countries such as Denmark and the United Kingdom who have the lowest scores for vulnerability.

(d) With reference to Resources 5 and 6, explain the factors that can affect a country's vulnerability to climate change. [6]

- [Resource 5] Geographical location – located in the Tropics shows a greater vulnerability to climate change. This could be due to impact faced by sea level rise, and greater incidences of extreme weather conditions such as typhoons.
- [Resource 5] Level of development – Less developed countries show greater vulnerability. Eg: Haiti. Mix of Geographical location (low lying small island vulnerable to sea level rise, and lack of financial resources to mitigate and adapt effectively to risks). [Resource 6] Relies a lot on international community for aid.
- [Resource 6] Other geographical characteristics – low lying area: vulnerable to sea level rise.

Level	Marks	Descriptors
3	5-6	Response demonstrates detailed knowledge of factors that can affect a country's vulnerability to climate change, with accurate and clear explanations, making close reference to the information found in Resources 5 and 6.
2	3-4	Response demonstrates knowledge of factors that can affect a country's vulnerability to climate change, with clear explanation, making some reference to the information found in Resources 5 and 6. Answers may not be very detailed.
1	1-2	Response demonstrates some knowledge of factors that can affect a country's vulnerability to climate change, with some explanation, making little reference to the information found in Resources 5 and 6. Answers may not be very detailed or relevant to the context given in resources.
0	0	No creditworthy response.

- (e) With reference to Resource 6 and your own knowledge, suggest strategies to minimise the impact of climate change in developing countries. [8]

- [Resource 6] Kyoto Protocol
- [Resource 6] Major impact is sea level rise and cyclones so [Own Knowledge] suggest adaptation strategies.
- [Own Knowledge] Any other strategies – must be linked to developing countries

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"> • Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints <p>OR</p> <ul style="list-style-type: none"> • Makes a decision which clearly addresses different elements of the issue and/or interests of different stakeholders
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"> • Provides an evaluation, which may be limited in depth and insufficient evidence and support used <p>OR</p> <ul style="list-style-type: none"> • 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.
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"> • Provides little or no evaluation <p>OR</p> <ul style="list-style-type: none"> • Evidence of decision-making, if present, are simple and may be flawed and contains no reference to views of stakeholders
0	0	No creditworthy response.

Section C

Theme 1: Climate Change and Flooding

- 3 (a) Explain how the shifting of the Inter Tropical Convergence Zone can affect the climate of countries in the humid tropics. [9]

Indicative content

Candidates should explain the shifting of the ITCZ and how it affects the climatic characteristics (i.e. precipitation and temperature) of various climatic types in the humid tropics (A climates).

A higher level response should clearly explain the shifting of the ITCZ and make very close links to how it affects temperature and precipitation in terms of annual precipitation and seasonality of precipitation for all A climates.

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

- (b) To what extent is climate the main factor influencing hydrological processes of drainage basins in the humid tropics? [16]

Indicative content

Responses should make clear links to the different hydrological processes in the drainage basin such as inputs, pathways, storages and output, when explaining the influence of different factors. The factors discussed should include both natural factors which must include climate and other natural factors such as soil texture, vegetation; and human factors such as urbanization.

A higher level response would be able to provide a detailed explanation of how the different factors would affect the different hydrological processes with specific links to inputs, pathways, storages and/or output where relevant. There is an understanding of how the processes are linked as part of a larger system. There is a strong argument to explain the relative influence of climate versus other factors.

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

- 4 (a) Explain the factors that can influence the shape of hydrographs in the tropics. [9]

Indicative content

Responses should explain various factors such as natural factors (eg: climate, vegetation, geology, soil type, relief, other basin characteristics) and anthropogenic factors (eg: urbanization, afforestation). Responses should also make clear links to characteristics of hydrographs, such as peak discharge and lag time, when explaining the influence of these factors. Diagrams should be drawn where relevant to illustrate the various shapes of hydrographs.

A higher level response should clearly explain the influence of both natural and anthropogenic factors, making links to the characteristics of hydrographs, and makes close reference to the context of the tropics.

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

- (b) To what extent are hard engineering strategies more effective than soft engineering strategies in managing fluvial floods? [16]

Indicative content

Responses should be able to describe and compare hard engineering strategies with soft engineering strategies, highlighting the strengths and limitations of both. Hard engineering strategies can include levees, channelization and flood control dams; and soft engineering strategies can include flood warning systems, afforestation, floodplain landuse zoning and designation of flood shelters. Examples should be included to support the discussion of the effectiveness of the different strategies.

A higher level response an understanding that a variety of strategies need to be employed by countries in order to manage the impact of flooding, and that both hard and soft engineering strategies have its own purpose, strengths and limitations. There is an understanding that its effectiveness can vary across space, in which different countries will have different vulnerabilities to fluvial floods and have different capacities to cope with flooding. There is an appreciation that the implementation of effective strategies can be hampered by various factors.

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

Theme 2: Urban Change

- 5 (a) Explain the variations in urbanisation trends across urban areas at different levels of economic development. [9]

Indicative content

Responses should include a description of the variation in level of urbanization and rate of urbanization across the world in countries at different levels of economic development. There can be a comparison generally across regions, with a clear explanation for the variation in these regions over space and time.

A higher level response would be able to provide clear explanations with the use of specific examples to highlight the variations in urbanization trends, clearly showing the contrast across areas at different levels of economic development.

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

- (b) Evaluate the effectiveness of strategies to cater to the needs of different social groups in cities. [16]

Indicative content

Responses should elaborate on the various strategies to cater the needs of at least two different social groups and evaluate its effectiveness in meeting the needs of different social groups. The strategies discussed should take various approaches (eg: government policies, community efforts) and there should be clear criterion on the assessment of the effectiveness of these strategies (i.e. whether it meets the physical, emotional and economic well-being needs). There should be mention of specific examples and evidence to support the assessment.

A higher level response an understanding that a variety of strategies need to be employed by countries at different levels in order to meet the needs of different social groups in cities. There is a close link to the concept of liveability. There is an appreciation of the various needs of the different social groups, and also an understanding that there are varying needs even within the social groups identified.

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

- 6 (a) With the use of examples, explain the sources of fear OR extent of crowding in cities of highly urbanised cities. [9]

Indicative content

Candidates should explain the concept of fear, and explain are crime and terrorism as the sources of fear in cities. There should be links made to the concept of liveability.

A higher level response should be able to clearly explain how crime and terrorism can lead to fear, and further explain how it can vary for different groups of people in a city. The response would have been supported with clear examples.

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

- (b) Evaluate the strategies undertaken by governments and communities to cope with fear in the cities OR lessen crowding. [16]

Indicative content

Responses should elaborate on the strategies that have been implemented at the level of the government and communities and clearly explain the strengths and limitations of these strategies in reducing fear. There should be clear criterion on the assessment of the effectiveness of these strategies. There should be mention of specific examples and evidence to support the assessment.

A higher level response shows an understanding that a variety of strategies need to be employed by countries at different levels in order to cope with fear in the cities. There is an understanding of the complexity of fear and an understanding that there are various factors that can affect the effectiveness of the strategies (eg: media, sheer large scale of problems of crime).

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



**JURONG JUNIOR COLLEGE
JC2 PRELIMINARY EXAMINATION 2018**

GEOGRAPHY

Higher 1

8813/01

Paper 1

29 August 2018

3 hours

READ THESE INSTRUCTIONS FIRST

Write your name and class on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs or rough working.

Do not use paper clips, highlighters, glue or correction fluid.

Answer 4 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.

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

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

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

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

Please attach your answers to the cover page provided.

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

[Turn over

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Section A**Theme 3: Geographical Investigation****1**

A group of 24, eighteen year old students from Jurong Junior College in Singapore wanted to study the needs of the elderly living in the various public housing estates in Singapore. They had access to various census and survey information on the needs of the elderly from government sources.

The students also wanted to investigate the elderly residents' satisfaction in relation to the various amenities in the neighbourhood. They wanted to investigate the various areas that could enhance the urban liveability of the neighbourhood for elderly residents. They were allocated three days for field investigations at the end of November in the mornings.

Resource 1 shows data on satisfaction levels with elderly-friendly facilities.
Resource 2 shows data on the resident's awareness of Eldercare Services.

- (a) With reference to Resources 1 and 2, explain if the needs of the elderly have been met. [4]
- (b) Explain how the students could have conducted an investigation to gather the data presented in Resource 1 and 2. [7]
- (c) Assess the usefulness and limitations of the data collection and representation methods used in Resource 2. [6]
- (d) Using Resource 1, explain the strengths and limitations of the data collection technique of using surveys to measure urban liveability. [5]
- (e) Suggest and justify another form of data representation method to showcase the information in Resource 1. [3]

Section B**Theme 1: Climate Change and Flooding****2**

Resource 3 shows the Percentage of CO₂ emissions by country.

Resource 4 shows the proportion of CO₂ emissions by sector and the type of fuel used in electricity generation.

Resource 5 shows the top climate change concerns by regions.

- (a) With reference to Resource 3, describe the distribution of CO₂ emissions by country. [5]
- (b) Using Resource 4 (with specific reference to electricity generated by fuel type) and your own knowledge, account for the CO₂ emissions of the United States. [6]
- (c) Using Resource 5, compare and account for the top climate concerns between Europe, Africa and Asia/Pacific. [6]
- (d) Using Resources 3, 5 and your own knowledge, discuss how top climatic concerns in Europe, Africa and Asia/Pacific could be addressed. [8]

[Turn over

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) Account for the variation of precipitation in the tropics. [9]
- (b) Discuss the effects of climate change on human activity. [16]

4

- (a) Explain the different factors that affect the shape of storm hydrographs. [9]
- (b) "The causes of floods are mainly attributed to human rather than natural causes". Discuss the validity of this statement. [16]

Theme 2: Urban Change

5

- (a) Explain factors that could affect sustainable development in cities of countries at different levels of economic development. [9]
- (b) Evaluate the effectiveness of waste management strategies used in countries of different levels of economic development. [16]

6

- (a) Explain the reasons to account for urban re-imaging in countries at high levels of development. [9]
- (b) To what extent have urban re-imaging strategies benefited everyone living in the cities of countries at high levels of development? [16]

[Turn over

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**JURONG JUNIOR COLLEGE
JC2 PRELIMINARY EXAMINATION 2018**

GEOGRAPHY

Higher 1

8813/01

Paper 1

29 August 2018

INSERT

3 hours

READ THESE INSTRUCTIONS FIRST

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

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

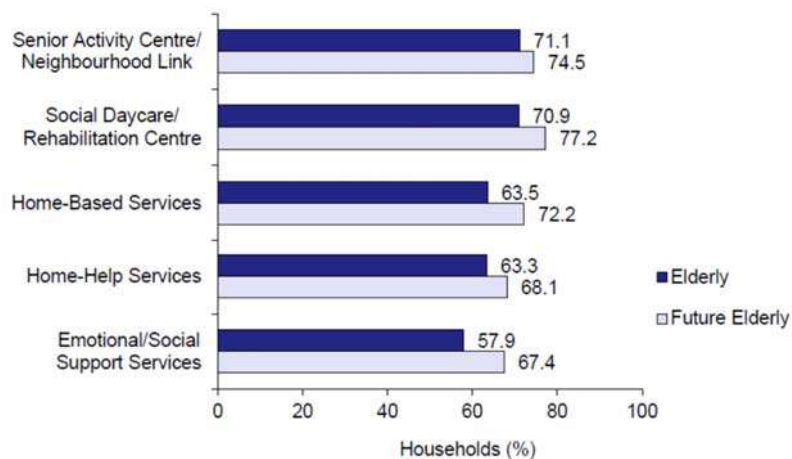
[Turn over

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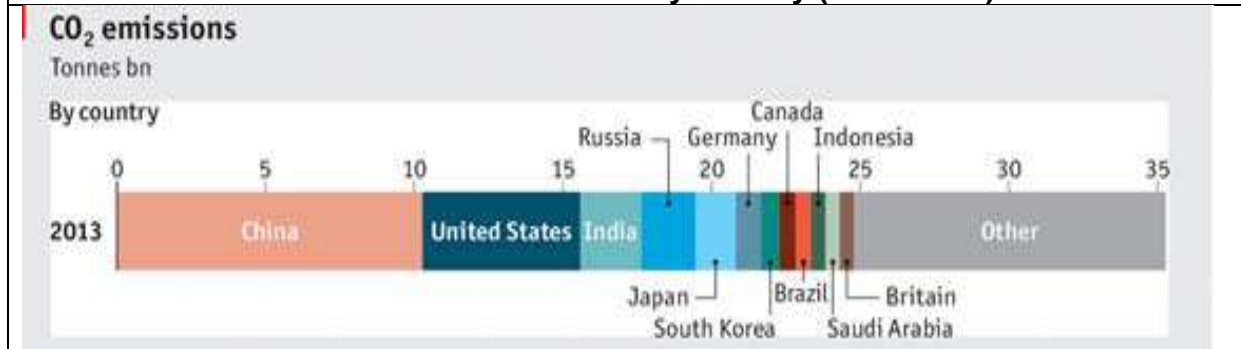
Resource 1 for Question 1
Satisfaction with Elderly-Friendly Facilities by Year

Facilities for Elderly	Households Satisfied (%)			
	2008		2013	
	Elderly	Future Elderly	Elderly	Future Elderly
Bird singing corner	98.6	97.5	94.4	89.0
Support handbars in lifts/along corridor	98.2	97.4	97.9	96.7
Pebble walk	97.7	97.1	96.4	95.9
Fitness station for elderly	97.0	96.4	96.2	94.8
Ramp	96.9	97.7	97.2	97.5
Lift landing on every level	96.5	96.0	95.5	94.4
Senior citizens' corner/centre	95.3	94.9	97.7	96.0
Benches/Seats/Tables	93.4	91.2	91.0	86.4

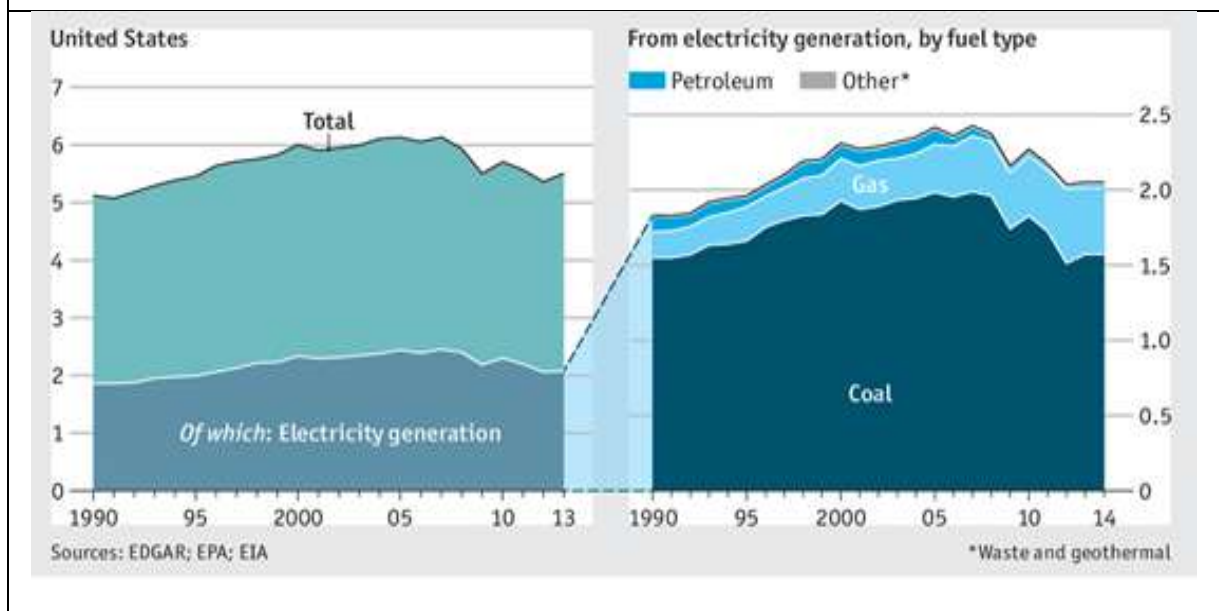
Resource 2 for Question 1
Awareness of Eldercare Services



Resource 3 for Question 2
Carbon dioxide emissions by country (Tonnes bn)



Resource 4 for Question 2
CO₂ emissions by sector and the type of fuel used in electricity generation



[Turn over

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Resource 5 for Question 2
Top climate change concerns by regions

TOP CLIMATE CHANGE CONCERNS BY REGION

	Droughts or water shortages	Severe weather, like floods or intense storms	Long periods of unusually hot weather	Rising Sea Levels
LATIN AMERICA	59%	21%	12%	5%
AFRICA	59%	18%	16%	3%
U.S.	50%	16%	11%	17%
ASIA/ PACIFIC	41%	34%	13%	6%
MIDDLE EAST	38%	24%	19%	5%
EUROPE	35%	27%	8%	15%
GLOBAL	44%	25%	14%	6%

Note: Russia and Ukraine not included in Europe median.
Source: Spring 2015 Global Attitudes Survey, Q32
Data: Pew Research Center, November 2015.
"Global Concern about Climate Change, Broad Support for Limiting Emissions"

H1 Answer Key

DRQ

Question 1

(a)	With reference to Resources 1 and 2, explain if the needs of the elderly have been met.	[4]
	<p>Resource 1 is looking at the satisfaction level of the facilities of the Elderly and Resource 2 is looking at the awareness of eldercare services. In terms of overall, household satisfaction level in Resource 1, from 2008-2013, the elderly have a high level of satisfaction of the lowest score of 91% in all categories. This would indicate that their needs have been met. [1] However, there seems to be a fall in satisfaction level in all categories in terms of "Lift Landing on every level" and "Benches/Seats/Tables", suggesting that needs are not entirely met. [1]</p> <p>For Resource 2, awareness of eldercare services is not a good indicator to indicate if needs are met as it doesn't show the actual usage of these services. [1] However, the lack of awareness levels of the lowest 57.9% to highest 71.1%, suggest that there is a gap in provision of such services to the elderly, either they are not utilising it fully or unaware that they can use it. Or these are not a need at all for the elderly. [1]</p>	
(b)	Explain how the students could have conducted an investigation to gather the data presented in Resource 1 and 2.	[7]
	<ul style="list-style-type: none">• Define the age group of elderly & future elderly• Data collected from equal number of respondents in both categories <ol style="list-style-type: none">1. <u>Groups and venues</u> Students could organise themselves into 4 teams of 6 students each, each team will be assigned to a specific venue where the elderly/future elderly would most likely be. Students might want to work in pairs for safety.2. <u>Sample Size:</u> The students should conduct the surveys with the residents each student should at least do 10 surveys with random residents. This is to ensure that the sample size of the survey would be sufficient for data analysis.3. <u>Timing of the survey:</u> The survey should be done over 3 days at the end of November (are they weekdays or weekends? this might affect the number of survey respondents available). Students should ideally consider the timings that would allow them to have enough respondents to complete their surveys. Given the short 3 day period, students need to choose wisely their timings (e.g. weekday or weekend) to collect sufficient data. For instance maybe, 3 shifts per day at select timings (peak or non-peak	

	<p>hours), where there are more human traffic to be able to have sufficient respondents.</p> <p>4. <u>Survey questions</u> Students should design a short survey with a few questions asking respondents about their interaction levels. The survey should be short in MCQ or short answer questions, so that respondents would be willingly to participate, as it doesn't take up too much of their time.</p>					
(c)	Assess the usefulness and limitations of the data representation method used in Resource 2.	[6]				
	<p><u>Usefulness:</u></p> <ul style="list-style-type: none">• Bar graphs are visually easy to understand, indicating the % clearly.• It also shows 2 categories of elderly and future elderly able to compare future generations.• Shows clearly the percentages accordingly. <p><u>Limitations:</u></p> <ul style="list-style-type: none">• We do not know the sample size of participants for the survey.• Age group of elderly and future elderly is not clearly defined.					
(d)	Explain the strength and limitations of the data collection technique of using surveys to measure urban liveability.	[5]				
	<ul style="list-style-type: none">• Urban Liveability is a very broad topic that could be highly subjective as it looks into a various dimensions from physical facilities and beyond. There are also limitations to the data collection method.• Minimum one category from strength or limitations. <p><u>Questionnaire surveys</u></p> <table><tr><th>Strengths</th><th>Limitations</th></tr><tr><td><ol style="list-style-type: none">1. Large amounts of information can be collected from a large number of people in a short period of time and in a relatively cost effective way2. Can be carried out by the researcher or by any number of people with limited affect to its validity and reliability3. The results of the questionnaires can usually be quickly and easily quantified by either a researcher or through the use of a software package</td><td><ol style="list-style-type: none">1. Is argued to be inadequate to understand some forms of information - i.e. changes of emotions, behaviour, feelings etc.2. Quantitative research is an artificial creation by the researcher, as it is asking only a limited amount of information without explanation.3. There is no way to tell how truthful a respondent is being4. People may read differently into each question and therefore reply based on their own interpretation of the</td></tr></table>	Strengths	Limitations	<ol style="list-style-type: none">1. Large amounts of information can be collected from a large number of people in a short period of time and in a relatively cost effective way2. Can be carried out by the researcher or by any number of people with limited affect to its validity and reliability3. The results of the questionnaires can usually be quickly and easily quantified by either a researcher or through the use of a software package	<ol style="list-style-type: none">1. Is argued to be inadequate to understand some forms of information - i.e. changes of emotions, behaviour, feelings etc.2. Quantitative research is an artificial creation by the researcher, as it is asking only a limited amount of information without explanation.3. There is no way to tell how truthful a respondent is being4. People may read differently into each question and therefore reply based on their own interpretation of the	
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	<p>4. Can be analysed more 'scientifically' and objectively than other forms of research</p> <p>5. When data has been quantified, it can be used to compare and contrast other research and may be used to measure change</p>	<p>question - i.e. what is 'good' to someone may be 'poor' to someone else, therefore there is a level of subjectivity that is not acknowledged</p> <p>5. There is a level of researcher imposition, meaning that when developing the questionnaire, the researcher is making their own decisions and assumptions as to what is and is not important...therefore they may be missing something that is of importance. [Research Biasedness]</p>	
(e)	Suggest and justify another form of data representation method to showcase the information in Resource 1.		[3]
	<p><u>Piechart</u></p> <p>Advantages</p> <ul style="list-style-type: none"> • display relative proportions of multiple classes of data • size of the circle can be made proportional to the total quantity it represents • summarize a large data set in visual form • be visually simpler than other types of graphs • permit a visual check of the reasonableness or accuracy of calculations • require minimal additional explanation • be easily understood due to widespread use in business and the media <p><u>Bar-graph</u></p> <p>Advantages</p> <ul style="list-style-type: none"> • show each data category in a frequency distribution • display relative numbers or proportions of multiple categories • summarize a large data set in visual form • clarify trends better than do tables • estimate key values at a glance • permit a visual check of the accuracy and reasonableness of calculations • be easily understood due to widespread use in business and the media 		

Question 2

With reference to Resource 1, describe the distribution of CO₂ emissions by country. [5]

Highest: China at around 11 billion tonnes, United States at 5.5 billion tonnes, India and Russia at 2 billion tonnes, Japan at 1.5 billion tonnes, Germany 1 billion tonnes, S. Korea, Canada, Brazil, Indonesia, Saudi Arabia, Britain about 0.75 billion tonnes.

- a) Using Resource 2 (with specific reference to electricity generated by fuel type) and your own knowledge, account for the CO₂ emissions of the United States. [6]

US is the 2nd highest carbon emitter

- ➔ Reasons for high carbon emission can be attributed to high affluent population → High energy consumption and use such as cars and electricity
- ➔ Highly dependent on coal for electricity generation. Amongst all fossil fuels, coal has the highest carbon content → Output of carbon will be high
- ➔ Large population base of about 300 million → Thus total resource usage will be high

- b) Using Resource 3, compare and account for the top climate concerns between Europe, Africa and Asia/Pacific. [6]

Top climatic concerns were similar for droughts or water shortages & severe weather, like floods or intense storms. Ranges from 35% concern in Europe (Top concern) to 41% in Asia/Pacific and 59% in Africa (Top concern). Also for the 2nd most important concern, ranges from 27% in Europe to 18% in Africa and 34% in Asia/Pacific. In terms of the 3rd most important concern, Africa and Asia/Pacific registers long periods of unusually hot weather as the 3rd most concern ranging at 16% and 13% respectively. In Europe, the 3rd most concern is rising sea levels, at 15%. For the 4th most concern, Africa and Asia/Pacific registers rising sea levels ranging from 3% in Africa to 6% in Asia Pacific. For Europe, the 4th most important concern is long periods of unusually hot weather at 8%.

Reasons to account: All regions stated droughts or severe weather conditions as top 2 concerns as these concerns are generally more immediate given their increasing frequency of occurrence. Water shortages seem to be of more concern for Africa and Asia/Pacific given their large populations and vulnerability to droughts in certain regions. In Europe, though important, physical water scarcity may seem less of an issue as drought occurrences seem to be more rare in these regions than in Africa and Asia/Pacific. For Africa and Asia/Pacific, due to their large continent size that spans to lower latitudes, long periods of unusually hot weather takes the 3rd most important reason to them. For Europe, it may be of less concern because since they are located at higher latitudes, occurrences of such are less common than for Africa and Asia/Pacific.

- c) Using Resources 1,3 and your own knowledge, discuss how top climatic concerns in Europe, Africa and Asia/Pacific could be addressed. [8]

Indicative content:

Droughts, water shortages → Planning for water supplies such as reduced usage, more water efficiency, water desalination and water transfers. For Africa and Asia/Pacific, assistance could be provided for by more developed countries in the form of technology transfer and also of loans.

Intense storms/Floods → Dams, flood resistant features, flood management and prediction

Hot weather → Building design allowing for maximum ventilation, Green buildings and roofs to allow for cooling, energy efficiency appliances such as air conditioners

Rising sea levels → Sea walls, Raising land levels, pumping stations to allow low elevation areas to stay dry, improve drainage systems.

** Students will have to address all 4 concerns and elaborate upon how the regions could prepare for these concerns.

Level	Marks	Descriptors
3	7-8	Clear focus of question with use of relevant knowledge and examples in the response.
2	4-6	Response provides some analysis and evaluation. Most terms are accurately used. Generally well organised and structured.
1	1-3	Response is brief and fragmentary and lacks clarity.
0	0	No Creditworthy response

H1 essays

Question 3

a) Account for the variation in precipitation in the tropics. [9] [H1 only]

** Answers for this question should target the different climate types, namely the Af, Am, AW, BS and BW climate types.

Indicative content:

Af climate group (High annual precipitation with lack of seasonal variation in precipitation)

Heavy showers are due to the convergence of trade winds at the ITCZ and the subsequent rise of air to produce rain. Rainfall present throughout the year as the ITCZ is never too far off for any month.

Heavy showers in the afternoon as air parcels would have warmed sufficiently by then, leading to atmospheric instability and the generation of convectional rain

Am climate group (High annual precipitation but with distinct seasonality in precipitation)

Presence of monsoons due to the shift of the ITCZ North or Southwards. Presence of trade winds. Summer monsoon in the case of India (wet) → due to the dominance of southwest monsoon winds

that blow across and pick up moisture over the Indian ocean towards the low pressure Asian landmass (Asiatic low)

Winter monsoon in the case of India (dry) → due to the dominance of northeast monsoon winds that blow across the Asian landmass as a result of high pressure air blowing out from the Siberian high towards the oceans. → Cold dry air from continent results in stable conditions developing and hence lack of precipitation

AW climate group (Moderate annual precipitation with distinct wet and dry season)

Precipitation can be explained by shift in the ITCZ that is caused by the movement of the overhead sun. The occurrence of heavy convectional storms provides the bulk of rainfall in four to five months, which is when the sun is above the savannas (summer).

(i.e. the wet season is during the summer months; the dry season is during the winter months when the ITCZ has shifted to locations further away)

When the ITCZ is near during the summer months → dominance of ITCZ nearby and near to rising arm of the Hadley cell → Convectional activity and atmospheric instability → Higher rainfall during wet season.

During the winter months, the ITCZ is shifted away → area is now near to the sinking arm of the ITCZ and stable atmosphere prevails → atmospheric stability → low or almost absence of precipitation during the wet months.

BS and BW climate group (low annual precipitation throughout the year)

Subsidence and atmospheric stability → These areas experience atmospheric stability throughout the year due to its location near to the sinking arm of the Hadley cell (subtropical high) → As a result of this characteristic → persistent high atmospheric pressure impedes convectional activity and the air from rising → lack of cloud formation → Dry conditions throughout the year.

L3 7-9	<ul style="list-style-type: none">• Analytical and explanatory.• Clear focus of question.• Relevant knowledge and good use of examples.
L2 4-6	<ul style="list-style-type: none">• Response includes analysis & explanation.• Weaker responses tend to more descriptive.• Generally well organised and structured but could be unclear at some parts.• Use of terms mostly accurate.
L1 1-3	<ul style="list-style-type: none">• Response does not really address the question fully• Depth of knowledge and understanding is limited.• Response is fragmentary and lacks a clear structure and organisation• Unsupported, brief or incomplete assertions and/or arguments with some inaccurate use of terminology.

b) Discuss the effects of climate change on human activity. [16]

**** Indicative content:** Generally students should classify the impacts from both positive and negative aspects although there are more negative than positive impacts from climate change.

Effects on the Insurance Industry

- An industry very directly affected by the risks is the insurance industry. In recent years, insured losses have increased nearly fifteen-fold.
- An increase in extreme weather related insurance claim is expected from more extreme climatic events such as flooding, landslides and tropical cyclones

Effects on World Food Supply and Changes in the Biosphere

- It is projected that soil moisture will fall by 10% if global warming continues into the next 30 years.
- Crop patterns will shift to maintain preferred temperatures.
- Climatic regions in the midlatitudes could also shift polewards by up to 550km. This can lead to improved harvest and crop yields in the midlatitudes. Is this a positive economic impact?
- However, food security risks are greatest felt in areas near the coast as well as islands.
- Global warming may also lead to an increase in the world population living in malaria and dengue infected areas, especially in the subtropical and midlatitude areas.
- Though on the positive side, some regions which were previously not viable to grow certain food crops may be now warm enough for some of these crops to be grown. May increase food security in some of these regions but though it may be offset by other extreme climatic events.

Effects on Transport

- Roads, airport runways, railway lines and pipelines, (including oil pipelines, sewers, water mains etc) may require increased maintenance and renewal as they become subject to greater temperature variation. Regions already adversely affected include areas of permafrost, which are subject to high levels of subsidence, resulting in buckling roads, sunken foundations, and severely cracked runways.
- Threats to some railway lines that are built in China and Russia over permafrost may mean increase in maintenance on transportation cost. In addition issues relating to safety could arise as well.

Effects on Flood Defense

- Many of the world's largest and most prosperous cities are on the coast, and the cost of building better coastal defenses (due to the rising sea level) is likely to be considerable. Some countries will be more affected than others — low-lying countries such as Bangladesh and the Netherlands would be worst hit by any sea level rise, in terms of floods or the cost of preventing them.
- In developing countries, the poorest often live on flood plains, because it is the only available space, or fertile agricultural land. These settlements often lack infrastructure such as dykes and early warning systems. Poorer communities also tend to lack the insurance, savings or access to credit needed to recover from disasters.

Effects on Migration

- Some Pacific Ocean island nations, such as Tuvalu, are concerned about the possibility of an eventual evacuation, as flood defense may become economically unviable for them. Tuvalu already has an ad hoc agreement with New Zealand to allow phased relocation.
- In the 1990s a variety of estimates placed the number of environmental refugees at around 25 million. The Intergovernmental Panel on Climate Change (IPCC) estimated that 150 million environmental refugees will exist in the year 2050, due mainly to the effects of coastal flooding, shoreline erosion and agricultural disruption (150 million means 1.5% of 2050's predicted 10 billion world population).

Effects on Development

- The combined effects of global warming may impact particularly harshly on people and countries without the resources to mitigate those effects. This may slow economic development and poverty reduction, and make it harder to achieve their development goals. This is also especially so when the economies of these countries also depend heavily on agriculture, which is dependent on the weather. Hunger and disease are predicted to increase due to decreased rainfall and severe weather events, particularly in Africa.

Effects on Health

- The most direct effect of climate change would be the impacts of hotter temperatures themselves. Extreme high temperatures increase the number of people who die on a given day for many reasons: people with heart problems are vulnerable because one's cardiovascular system must work harder to keep the body cool during hot weather, heat exhaustion, and some respiratory problems increase. Higher air temperatures also increase the concentration of ozone at ground level.
- In the lower atmosphere, ozone is a harmful pollutant. It damages lung tissues and causes problems for people with asthma and other lung diseases.
- Rising temperatures have two opposing direct effects on mortality: higher temperatures in winter reduce deaths from cold; higher temperatures in summer increase heat-related deaths.
- The European heat wave of 2003 killed 22,000–35,000 people. The 2006 United States heat wave has killed 139 people in California as of 29 July 2006. In May 2015, India was struck by a severe heat wave. As of 3 June 2015, it has caused the deaths of at least 2,500 people in multiple regions. As recently as in 2018, heat waves which struck during the northern hemisphere summer caused forest fires to occur far north near the Arctic and extreme temperatures in Japan

Spread of Disease

- Global warming is expected to extend the favourable zones for conveying infectious disease such as dengue fever and malaria. In poorer countries, this may simply lead to higher incidence of such diseases. In richer countries, where such diseases have been eliminated or kept in check by vaccination, draining swamps and using pesticides, the consequences may be felt more in economic than health terms. The World Health Organisation (WHO) says global warming could lead to a major increase in insect-borne diseases in Britain and Europe, as northern Europe becomes warmer, ticks and sandflies are likely to move in.

Others

- Effects on more extreme events such as tropical cyclones as sea temperatures are warming up. These events are likely going to get increasingly extreme in terms of intensity and the

range that it covers → Thus this is more likely to have a greater effect on populations especially dense populations who live near the coast.

L4 13-16	<ul style="list-style-type: none"> • Strong evaluative elements that is relevant and comprehensive • Addresses the question • Accurate knowledge and depth of understanding • Argument is clear and well supported by relevant material • Use of terminology is accurate.
L3 9-12	<ul style="list-style-type: none"> • Response displays a sound evaluative element. Response addresses question and features accurate knowledge, reflecting depth of understanding. • Argument of discussion is coherent and supported by relevant materials. • Use of terminology is relevant and mostly accurate.

L2 5-8	<ul style="list-style-type: none"> • 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.
L1 1-4	<ul style="list-style-type: none"> • Responses shows little or no evaluation • Response lacks focus on the question and maybe largely irrelevant. • Fragmentary and lacks clarity. • Unsupported assertions and or/arguments with limited or no use of terminology.

Question 4

(a) Explain the different factors that affect the shape of storm hydrographs. [9]

**** As a general guide, students should give factors coming from at least 2 categories. They need not talk about all factors but a good explanation will be needed. For 9 marks, at least minimally cover 5 factors while for 12 marks cover 6 factors**

Indicative content:

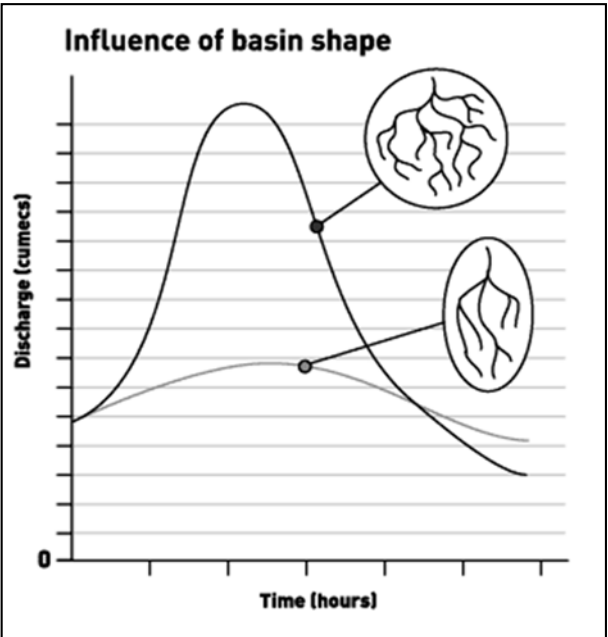
Climatic Factors

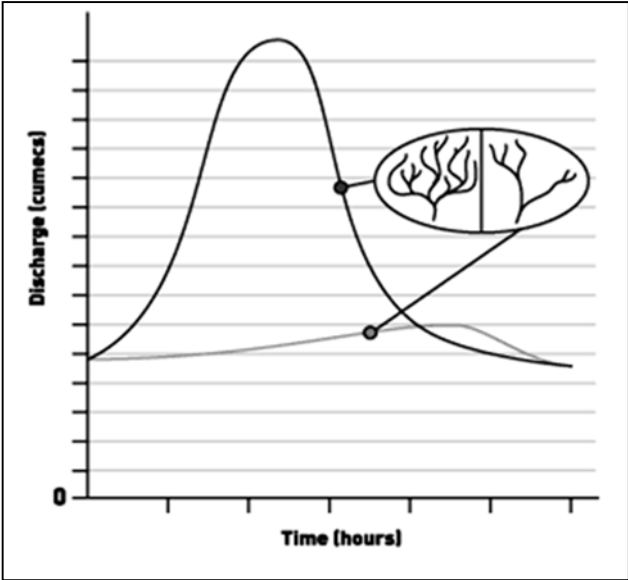
	Effect on hydrological processes	Implication on hydrograph
Rainfall intensity	<ul style="list-style-type: none"> • High rainfall intensity can quickly generate high amounts of HOF • Low rainfall intensity would allow infiltration but would not be able to generate HOF easily 	<p>Steep rising limb, short lag time, high peak discharge</p> <p>Gentle rising limb, long lag time, low peak discharge</p>

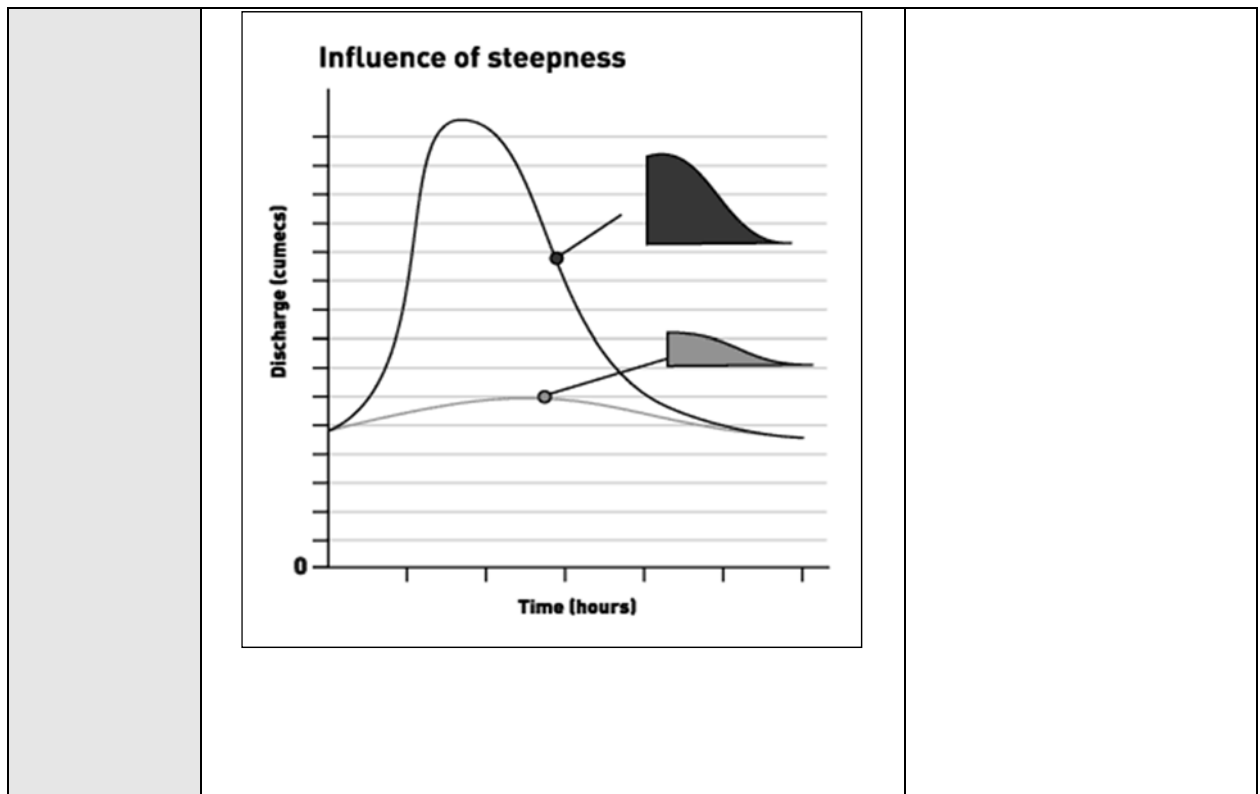
Rainfall duration	<ul style="list-style-type: none"> Prolonged rainfall saturates the ground and tends to generate SOF 	Steep rising limb, short lag time, high peak discharge
	<ul style="list-style-type: none"> Rainfall of short duration may add to soil moisture but may not lead to saturation of the ground. Thus, little or no SOF may be generated. 	Gentle rising limb, long lag time, low peak discharge
Evapo-transpiration rate	<ul style="list-style-type: none"> Low rates of evapotranspiration results in high antecedent moisture (i.e. moisture present in the soil before rain event) and thus encourages the development SOF. 	Steep rising limb, short lag time, high peak discharge
	<ul style="list-style-type: none"> High rates of evapotranspiration results in low antecedent moisture which promotes high rates of infiltration. This slows down the generation of SOF. 	Gentle rising limb, long lag time, low peak discharge
[Extra information] Snowmelt	<ul style="list-style-type: none"> Rapid snowmelt (especially in summer) can quickly generate high volume of overland flows 	Steep rising limb, short lag time, high peak discharge
	<ul style="list-style-type: none"> Slow snowmelt may only gradually generate low volume of overland flows 	Gentle rising limb, long lag time, low peak discharge

Drainage Characteristics

	Effect on hydrological processes	Implication on hydrograph
Basin size	If a basin is small , it is likely that rainfall will reach the main channel more rapidly than in a larger basin. This is because the water will have a much further distance to travel in a larger basin.	Shorter lag time in smaller basins
	If a basin is small , the amount of rainfall received in the catchment area will also be low . This results in a lower amount of discharge in the main channel.	Low peak discharge
	THINK: If a small basin has shorter lag time and also lower peak discharge, will the rising limb also be affected by the basin size? (Hint: Draw the hydrographs and see!)	What is your conclusion? =)

Basin shape	<ul style="list-style-type: none"> In a circular basin, the tributaries often tend to come together and join the main stream approximately in the same place at the same time. Following a period of heavy rainfall, such 'centralized' merging of the streams results in a very large and very rapid increase in discharge of the main stream. In an elongated basin, the tributaries tend to be relatively short, and tend to join the main stream at separate intervals. This means that after a period of heavy rainfall, the runoff from the lower tributaries will reach the gauging station BEFORE the runoff from the upper tributaries finally flow down and reach the gauging station. It also takes a longer time for runoff from the upper reaches of the basin to reach the gauging station. 	<p>Steep rising limb, short lag time, high peak discharge</p> <p>Gentle rising limb, long lag time, low peak discharge</p>
Drainage Density	<ul style="list-style-type: none"> In a basin with high drainage density, a large proportion of rainfall will become overland flow (surface runoff). This leads to a higher and more rapid increase in discharge. 	<p>Steep rising limb, short lag time, high peak discharge</p>

	<ul style="list-style-type: none"> In a basin with low drainage density, a large proportion of rainfall will most likely infiltrate and percolate into the ground. A small proportion of the rainfall will be channeled as overland flow. This leads to a smaller and slower increase in discharge. 	Gentle rising limb, long lag time, low peak discharge
Basin slope gradient	<p>In steep-sided upland valleys, steep slopes leave little time for infiltration and encourage generation of high amounts of surface runoff. Water is likely to reach the river more quickly than in gently sloping lowland areas, leading to rapid increase in discharge.</p>	Steep rising limb, short lag time, high peak discharge



Presence of Vegetation

	Effect on hydrological processes	Implication on hydrograph
Vegetation cover	<p>Leaves and branches increase the rate of interception, which reduces the rate of soil compaction caused the impact of falling raindrops. This increases infiltration rate! At the same time, the roots of plants and trees increase the lines of weaknesses in the ground, further increasing infiltration rate.</p> <p>As such, the presence of vegetation cover generally leads to decreased amounts of surface runoff (due to increased infiltration rate).</p>	<p>Gentle rising limb, long lag time, low peak discharge + Gentler falling limb (since higher infiltration leads to increased throughflow and baseflow)</p>

Geological Factors

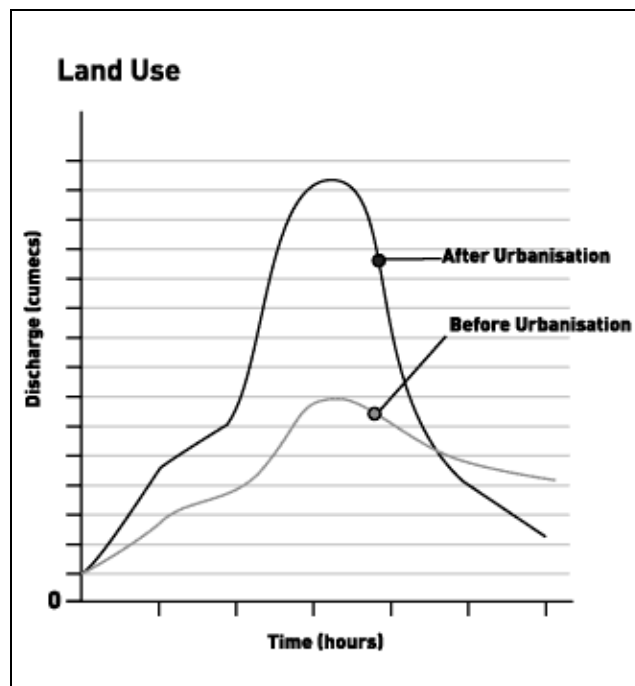
	Effect on hydrological processes	Implication on hydrograph
Soil or rock permeability	<ul style="list-style-type: none"> Impermeable rock or soil reduces infiltration and percolation, resulting in the generation of high volume of overland flow. 	<p>Steep rising limb, short lag time, high peak discharge +</p>

	<ul style="list-style-type: none"> The reduction in infiltration and percolation also decreases the amount of throughflow and baseflow into the river. Permeable rock or soil facilitates high infiltration and percolation, reducing the occurrence of overland flow. Instead, because of high infiltration and percolation, rainfall reaches the stream primarily via throughflow and baseflow. 	<p>Steeper falling limb</p> <p>Gentle rising limb, long lag time, low peak discharge + Gentler falling limb</p>
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Human Factors

	Effect on hydrological processes	Implication on hydrograph
Dams and reservoirs	Dams DO NOT affect the amount of surface runoff <u>generated</u> , BUT they regulate the flow of water and are also able to store a sizeable volume of water in their reservoirs. Generally thus, dams reduce the amount of discharge into the main river or channel.	Lower peak discharge
Deforestation	<p>The reduction of vegetation cover produces the opposite effects to what was mentioned in the above section on "Vegetation Cover". Generally, reduction in forest cover leads to:</p> <ul style="list-style-type: none"> ○ Reduced infiltration rate ○ Higher surface runoff <p>[Note: <u>Afforestation</u> is the counter-process to deforestation, and INCREASES vegetation cover.]</p>	Steep rising limb, short lag time, high peak discharge
Urbanisation	<p>Urbanisation produces large amounts of impermeable surfaces made of concrete, tarmac, and metal. Water cannot infiltrate through such materials, and this leads to a rapid generation of surface runoff.</p> <p>Moreover, drains and canals carry water more quickly to the nearest river.</p>	Steep rising limb, short lag time, high peak discharge

As a result, rainfall reaches the river extremely quickly, greatly reducing lag time and also massively increasing peak discharge.



b)* The causes of floods are mainly attributed to human rather than natural causes. Discuss the validity of this statement. [16]

Causes of floods may be attributed to both human and as well as natural causes. However it must be noted that the factors have to be direct factors. Factors such as urbanisation and deforestation can be discussed but only serve as factors contributing to worsening (acerbating factors) and should not be discussed as direct causes of floods.

Indicative content:

Natural causes of floods

Intense rainfall and tropical cyclones

- Intense rainfall will result in **infiltration-excess flow (IEF)** where rainfall intensity exceeds the infiltration capacity of the ground.
- The increase in IEF causes river discharge to increase, and this can lead to the formation of floods.
- High rainfall intensity is associated with **convective rainfall** and especially in tropical regions. The formation of **tropical cyclones** also generates short but intense rainfall.
- Also, during intense rainfall, the impact from falling raindrops tends to compact unvegetated soil particles, and cause the pore spaces to be sealed (recall: raindrop effect). This reduces infiltration capacity, further increasing the likelihood of IEF being generated.

Prolonged rainfall

- Prolonged rainfall leads to the increase in **soil moisture storage** and **groundwater storage** via infiltration and percolation respectively. The **ground eventually becomes saturated** with water, and over time, **saturation overland flow (SOF)** is generated.
- The increase in SOF causes river discharge to increase, and this can lead to the formation of floods.
- Prolonged rainfall is usually experienced in **tropical monsoon regions**, during the wet (monsoon) season.

Seasonal rainfall during wet season (monsoon season)

- **Tropical monsoon regions** usually experience a distinct **wet season** or **monsoon season**, where there is a higher amount of rainfall. These regions typically experience **prolonged rainfall** (see above) in the wet season, which **generates SOF**.
- Most of the time, countries in such regions are prepared for the increased rainfall during the wet season. However this seasonal increase in rainfall can still lead to the formation of floods, especially if:
 - The wet season is **unusually long or extended**
 - The **intensity of rainfall is higher than expected**
 - The wet season **arrives much earlier than expected**
- The above 3 cases tend to result in **tremendous increases in discharge**. Rivers that are unable to cope with such large increases in discharge will therefore overtop their banks and flood the surrounding area.
 - Eg: Brahmaputra River in India and Bangladesh and Yangtze River in China are prone to flooding during the monsoon seasons. In India, up to 70% of the annual rainfall occurs in 100 days in the summer south-west monsoon

Snowmelt

- **Snowmelt or meltwater** can **greatly increase the discharge** in the river, and cause the river to overflow its banks and flood.
- Snowmelt can be generated by:
 - **Warmer temperatures during spring/summer**
 - **Volcanic events**
- In the spring or summer months in temperate regions, **warmer temperatures can cause snow or ice to melt**, producing large amounts of meltwater.
 - E.g. In December 2008, the state of Washington (USA) experienced heavy snowfall. By January 2009, the heavy snowfall began to rapidly melt, producing enormous amounts of meltwater and generating extremely heavy floods.
 - E.g. In the Yukon River in Canada, the most common cause of flooding is the melting of snow and ice in spring.
- **Rising magma** can heat up the sides of a volcano, causing ice and snow on the flanks on the volcano to melt. **Lava flows and hot gases** from volcanic eruptions can also melt snow and ice, and generate meltwater.
 - E.g. The 2010 volcanic eruption in Iceland produced devastating flash floods, as hot gases from the volcanic eruption melted huge chunks of ice from the Eyjafjallajökull glacier.
 - E.g. The 1985 eruption of the Nevado del Ruiz volcano in Columbia melted ice and snow on the sides of the volcano, producing devastating floods and lahars.

Storm movement

- Storm movement in a catchment area can either amplify or dampen a flood wave.
- Storms that **move down-valley** (i.e. moving from the upper reaches of the basin to the lower reaches) are more likely to cause flooding. This is because such direction of storm movement tends to **amplify the peak discharges downstream**.
 - E.g. The disastrous 1996 flash flood that occurred in Buffalo Creek, Colorado (USA) was due to 2 reasons. Firstly, a severe wildfire caused extensive deforestation in the basin, leading to reduced infiltration and increased surface runoff. Secondly, the storm (that produced the surface runoff) moved down-valley, tremendously amplifying the peak discharges, and hence causing a severe flash flood.

Unusual climatic phenomena

- **Climatic phenomena** such as El Nino and La Nina have resulted in **unexpected occurrences and amounts of rainfall** and these have, in some cases, resulted in floods.
 - El Nino – Said to have played a role in the 1993 Mississippi River flood.
 - La Nina – Said to have played a role in the floods in Sudan and Bangladesh in 1998

Human causes of floods

Dam failure

- Dams are able to **regulate the flow** of water to the downstream areas, providing them with water even during the dry seasons.
- However, dams are also causes of floods if they **fail or collapse**.
- Dam failure can occur due to:
 - **Unexpectedly-high amounts of rainfall**
 - **Sedimentation in reservoir**
 - **Engineering failures**
- Unexpected rainfall. The reservoirs behind dams store water during the rainy season (this water is typically released during the dry season). However, in some cases, the rainy season experiences an unusually high amount of rainfall. The reservoir **may not be designed to hold such a large amount of water**, and the reservoir overflows. Downstream areas receive a sudden surge of water, and flooding occurs.
- Sedimentation in reservoir. Improper maintenance of the dam may lead to the accumulation of sediments in the reservoir. This **reduces the holding capacity** of the reservoir. When this happens, the reservoir is unable to hold large amounts of water, and the dam is more likely to overflow during times of heavy rainfall.
- Engineering failures. In some cases, **leakages** in the dam structures cause the dam to **release water too quickly**. In more severe cases, **engineering failures** may cause the dam to even collapse. In both circumstances, downstream areas receive a sudden surge of water, and flooding occurs.
 - E.g. Banqiao Dam, China
 - E.g. Teton Dam, USA
 - E.g. Val di Stava Dam, Italy
- ** Students can also bring in or feel free to talk about recent case study of dam failure in Laos (2018) which resulted in flooding downstream and loss of lives

Levee failure

- Levees refer to **embankments** on the river bank. Levees can be **natural or artificial**.

- Artificial levees are built to increase the holding capacity of the river channel, and thus prevent overflowing of the river.
- However, levees are also causes of floods if they **fail or collapse**.
- Levee failure can occur due to:
 - **Overflowing of levees,**
 - **Breaching or collapse of levees.**
- Overflowing of levees. In some cases the amount of discharge is extraordinarily high (due to high rainfall or other circumstances), and **far greater** than what the levees were **originally designed to contain**. This causes the river to overflow the levees, and flood the surrounding areas.
- Breaching or collapse of levees. Increased discharge in the rivers also leads to both increased velocity and increased fluid pressure in the channel. Firstly, the increased velocity can increase the rate of **erosion at the base of the levee structure**, causing it to collapse. Secondly, the increased fluid pressure against the levees may also force water to **“breach” the levees**, eventually causing the levees to collapse.

Other contributing reasons though not direct reasons to floods:

- **Deforestation**
 - Deforestation can worsen floods by increasing surface runoff as soil becomes compacted due to removal of trees and vegetation → Increase in IEF → Water reaches channel faster → increase in channel flow → Water overflows channels → flooding
 - Can also increase erosion → Mass movement → holding capacity of river is reduced → flooding occurs due to reduced capacity of river
- **Urbanisation**
 - Concretised surfaces → Impermeable surfaces → Higher IEF → Water reaches channel faster → increase in channel flow → Water overflows channels → flooding
- **Pluvial floods in Urban areas**
 - Water may sometimes be channelled to low points in the city's terrain (also known as 'ponding') → This may happen if drainage systems are choked or rainfall is too intensified. Can happen as most urbanised areas have little permeability

Question 5

(a)

DC	LDC
<p>1. <u>Influence over the world economy</u> Rise of important 'world' and 'global' cities with great economic and political influence internationally. The good thing is they are trend setters but this could mean they would affect global economic trends as well. Could be targets of terrorism (e.g. NY Twin Towers & London Bombings)</p> <p>2. <u>Over-concentration of global capital:</u> Cities have high concentration of financial services such as banking and international</p>	<p>1. <u>Uneven development & under-development:</u> Rise in mega-cities and primate cities and the negative backwash effects on the country. This could lead to uneven development and rural under-development in the LDCs.</p> <p>2. <u>Speed of growth:</u> Rate of urban growth is so rapid that it is 3 times faster than Europe when it first started urbanising. Measures by the government are not quick enough to compliment the rate of growth. However, this rapid and massive scale of urban growth has caused many problems such as the lack of housing; water sanitation facilities and many other problems for LDCs.</p> <p>3. <u>Size of Population (Scale of the problem)</u> For every city-dweller in the DCs, there are 4 city-dwellers in the LDCs. The greatest numbers of large cities are found in LDCs. By 2015, 24 of the 30 largest urban agglomerations will be in LDCs.</p>

<p>business. They might attract more investments compared to other countries.</p> <p>3. <u>Rising cost of living</u> negating the quality of life.</p> <p>4. <u>Increasing Income disparity</u> leading to residential segregation and social tensions.</p>	<p>4. <u>Lack of resources:</u> The greatest challenge for the government of these poorer countries is to improve the lives of the people living in these cities, given the lack of resources and corruption levels in LDCs. The LDCs are becoming urban before they attain a certain level of affluence and development levels associated with urbanisation. This could mean massive social problems which will be shown in many forms of urban deprivations in later lectures of housing and social-economic polarisations.</p>
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Strategies to manage non-hazardous solid waste in DCs and LDCs

[Usually countries adopt a variety of strategies to manage non-hazardous waste]

1. Landfill

- Landfill is a very common waste disposal method but it is not a long term solution. Landfills have to be carefully designed to prevent contamination of groundwater, air and land. Usually the sites are barren and non-productive brown-field sites.
- However, in many land-scarce urban locations, land is precious and expensive, the amount of land is limited and many landfills are running out of space. Once the landfill has exceeded its carrying capacity, it might not be able to be redeveloped as it could be toxic or polluted.
- In Singapore, for instance to reduce land for landfills, the government has been trying to look at other innovative means to reduce waste sent to the landfills. Pulau Semakau is a unique offshore landfill that is constructed in the sea and operated since 1999, about 200,000 tonnes of solid waste and all incinerated ash are sent to the landfill annually to 2035.
- The island covers a total area of 3.5 square kilometres and has a capacity of 63 million m³. The landfill is filled mainly with ash from Singapore's 4 incineration plants. The landfill was designed to be clean, free of smell and is actually quite scenic. Recreational activities are allowed on the island. And care was done during its construction to reclaim the sea into land, to reduce the damage done to the corals. The landfill is lined with impermeable membrane and clay and any leachate produced is treated a plant onsite the island. Regular water testing is also carried to ensure its safety to prevent leakages.

[Used in combination with Taxes]

- In the UK, to reduce waste sent to the landfills, they have implemented a Landfill Tax since 1996.
- In Sweden, less than 1 per cent of Swedish household waste was sent to landfill last year or any year since 2011.
- There is a ban on landfill in EU countries, so instead of paying fines, governments have to look at ways to reduce the waste generated.

2. Incineration

- Incineration is the burning of waste at high temperatures. The process can release harmful emissions and gases into the atmosphere. Such emissions can be reduced via improving combustion techniques and fitting pollution control devices.
- The burning of waste to produce energy can be adopted in incineration.

- Incineration can also reduce mass of waste from 95-96%, hence reducing storage space in landfills that are fast filling up. Incineration merely reduces the waste sent to landfills but landfills are still needed.
- Sweden is a country known for its high ability to sort and recycle waste and its incineration plants lack garbage. The incineration plants produce electricity to supply 250,000 homes and heating for 950,000 homes.
- Since 1991, Sweden was one of the first countries to implement **a heavy tax on fossil fuels** and its incineration plants generates electricity from renewables.
- Incinerated ashes constitute 15 per cent of the weight of waste before burning. From the ashes, metals are separated and recycled, and the rest, such as porcelain and tile, which do not burn, is sifted to extract gravel that is used in road construction. **[Recycling]** About one per cent still remains and is deposited in rubbish dumps. **[Landfills]**
- The smoke from incineration plants consists of 99.9 per cent non-toxic carbon dioxide and water, but is still filtered through dry filters and water. The dry filters are deposited. The sludge from the dirty filter water is used to refill abandoned mines.
- The Swedish government also worked on educating the people to change their mindset and habits and **recycle and reuse**, to generate less waste.
- There has been a **national campaign** called “**Miljönär-vänlig**” who has been around for several years to promote **repairing, sharing and reusing**. **Recycling stations** are as a rule no more than 300 metres from any residential area. Most Swedes separate all recyclable waste in their homes and deposit it in special containers in their block of flats or drop it off at a recycling station.
- Swedish households sort their newspapers, plastic, metal, glass, electric appliances, light bulbs and batteries. They also separate food waste and all of this is reused, recycled or composted.
- Rubbish trucks are often run on recycled electricity or biogas. Wasted water is purified to the extent of being potable. Special rubbish trucks go around cities and pick up electronics and hazardous waste such as chemicals.
- They government has a cohesive **national recycling policy** that engages the **private sector** as well, where they import and burn waste to produce energy for the national heating network to combat the freezing Winters in Sweden.
- Other examples, private companies like H&M has begun accepting used clothing from customers in exchange for rebate coupons in an initiative called Garment Collecting.
- The Optibag company has developed a machine that can separate coloured waste bags from each other. People throw food in a green bag, paper in a red one, and glass or metal in another. Once at the recycling plant, Optibag sorts the bags automatically. This way, waste sorting stations could be eliminated.
- The southern Swedish city of Helsingborg even fitted public waste bins with loudspeakers playing pleasant music – all in the name of recycling.

3. Taxation

- This method tries to deter waste production by passing the cost of waste management to the consumers. This hopes to reduce waste and increase recycling rates. Cost can be passed on to consumer by increasing retail products for its packaging. This method is also often combined with other methods such as **recycling**.
- For instance, the UK has this environmental tax called the Landfill Tax of 1996, where to avoid the extra cost, the country commits to reducing waste through industrial legislation and increasing the cost of disposing waste to landfills. However, UK has not been able to reduce the waste, hence to reduce the

		development in CBD locations and peripheral locations offer lower costs. <ul style="list-style-type: none"> • This also leads to suburbanisation as the rich move away from the city centre. • Unemployment – especially for blue-collar workers, jobs might be also be more for females 	
(b)	To what extent have urban re-imaging strategies benefited everyone living in the cities of countries at high levels of development?		[16]

▪ **Define Key terms:**

- **Urban Re-imaging strategies** → 24 hour cities, flagship development project, heritage tourism & cultural tourism

*(Re-imaging strategies are part of **Gentrification** efforts to project a better image of the inner city to attract investment back so as to reverse the negative effects of inner city decline)*

▪ **Gentrification projects aim to:**

- Redistribute income within the city through the 'trickle-down' effect. I.e. trickle down of benefits into the pockets of the most disadvantaged through job creation, servicing visitors and incoming visitors
- Increased consumer spending can spur the multiplier effect as other related and non-related industries develop
- Reverse urban decline via the promotion of economic vitality, improving social conditions, social integration, upgrading & improving physical environment of city

▪ **Causes of urban decline**

1. De-industrialisation
2. Economic decline
3. Suburbanisation
4. Influx of migrants

Re-imaging hopes to bring back economic investments to the city centre, however, redistribution of income is not uniform.

Negative effects of inner city decline:

Economic, social and environmental decline

- Lack of services
- Unemployment
- Drugs and crime
- Urban decay
- Road congestion and pollution
- Lack of green space

Suggested Thesis Points (Body): Using the case study of Sheffield

Benefits in terms of economics and physical infrastructure, likely to be benefiting only the middle class people.	Didn't really benefit the poor.
<ul style="list-style-type: none"> • Overall there has been a stunning transformation in the visual appearance of the area • 1.7 billion pounds of public sector investment attracted a further 6.1 billion of private sector investment, mainly in new businesses, office development and housing 	<ul style="list-style-type: none"> • Most of the new housing is built with the encouragement of the LDDC; housing is very expensive and well beyond the reach of the original inner city residents. This has led to major gentrification • Although 7,700 council houses were refurbished, relatively little was done for locals particularly in

<ul style="list-style-type: none"> • The population of the area increased from 39,000 in 1981 to 68,000 in 1995 • 140 million was spent on reclaiming a total of 7 sq kilometres of derelict land • 950 million was spent on improving access to the area, including new roads, the Docklands Light Railway and the London City Airport • The number of businesses located in the area increased from 1000 in 1981 to 2350 in 1995 and the number of jobs from 27,000 to 66,000 • 19,000 new homes were built refurbished • 7700 council houses were refurbished (Some help for the poor but insufficient) 	<p>the early years of the LDDC.</p> <ul style="list-style-type: none"> • Most of the new jobs (in areas such as financial services and the media) need highly skilled or experienced people. Few opportunities have opened up for the relatively unskilled inner city residents • The influx of highly paid professional population has increased socio-economic inequalities and highlighted the poverty in the social housing estates • The rapid changes has destroyed the traditional close-knit 'Eastenders' community • Inadequate public expenditure on transport infrastructure means that transport links to the area are inadequate.
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Suggested Points for Conclusion:

- Analyses that there are global, structural and systemic problems that re-imaging cannot fully address
- Re-imaging strategies are merely marketing strategies that change the physical landscapes via redevelopment but often they do not solve root problems of inner city decline of social inequality and economic restructuring

H1 Generic Level Descriptors for 9m SEQ sub-part (a)

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.

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.



MERIDIAN JUNIOR COLLEGE
PRELIM EXAMINATION
Higher 1

H1 Geography

8813/01

Paper 1

13 September 2018

3 hours

Additional Materials: Answer Paper
1 Insert
World outline map

READ THESE INSTRUCTIONS FIRST

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

Start each question on a fresh sheet of paper.

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 wherever they serve to illustrate an answer.
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten this **cover sheet**, the question paper, Insert and all your work in **chronological order** securely together for submission.
The number of marks is given in the brackets [] at the end of each question or part question.

This document consists of 4 printed pages

Name: _____

Class: _____

Index number: _____

Qn no. (Section A)	Marks	Qn no. (Section B)	Marks
1		3 or 4 *	
2		5 or 6 *	
Total			

*** Please circle the question attempted**

Section A

Theme 3: Geographical Investigation

- 1 You are part of a team of 20 Singaporean researchers funded by the Thai government to study whether flood risk varies across different sites on the Chao Phraya River in Bangkok. The research is carried out from the months of September to December.

Your team has decided to do quantitative research through measuring the river discharge and qualitative research through administering questionnaire surveys to the residents in both sites.

Your team has identified 2 study sites along the Chao Phraya River with different types of residents: legal homeowners at site A and slum dwellers at site B

Your team decided to measure the channel velocity, cross section area, channel depth and channel width to investigate the flood risk of the Chao Phraya River at both sites.

Your team will be using an ultrasonic sensor to measure channel depth. An ultrasonic sensor sends a sound wave to the river bed and uses the time taken for an echo to return to the sensor to measure channel depth.

Your team has also been provided with a flowmeter to measure river velocity.

Your team will be given access to the current satellite imagery of the Chao Phraya river.

The Thai government granted your team full access to all location along the Chao Phraya river and have also provided boats for you all to take measurements from.

For this investigation, your team came up with the hypothesis:

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

Resource 1 shows the Satellite Map of Site A and Site B in Bangkok.

Resource 2 shows photographs of Site A and Site B.

Resource 3 is a cross section illustration of how the ultrasonic sensor works.

Resource 4 shows the annual rainfall distribution in Bangkok.

- (a) With reference to Resource 1 and 2, explain why the hypothesis is suitable. [4]
- (b) Explain how your group will minimise the impact of their investigation to the river and its users. [4]
- (c) With reference to Resource 1 and 3, describe how channel depth can be measured accurately at Site A. [3]
- (d) Explain possible challenges that might arise when trying to conduct the quantitative and qualitative research at both sites. [6]
- (e) Evaluate this investigation about flood risk and explain how the quantitative and qualitative research could be improved to better understand flood risk in Site A and Site B. [8]

Section B**Theme 2: Urban Change****Ecological Footprint and Sustainable Development**

- 2** Resource 5 shows the global ecological footprint distribution.
Resource 6 shows global ecological footprint changes from 1961 to 2009.
Resource 7 shows the projected urbanisation trends until 2050.
- (a)** With reference to Resource 5, describe the global ecological footprint distribution. [3]
- (b)** With reference to Resource 5 and your own knowledge, explain why ecological footprint distribution differs globally. [6]
- (c)** With reference to Resource 6, describe the changes in global ecological footprint from 1961 to 2009. [3]
- (d)** With reference to Resource 7, account for projection in urbanisation trends until 2050. [5]
- (e)** With reference to any of the Resources and your own knowledge, to what extent do you agree that urbanisation will hinder the achievement of sustainable development? [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 & Flooding

- 3 (a) With the aid of diagrams if necessary, explain the rainfall pattern associated with Indian sub-continent in the period from December to February. [9]
- (b) Assess the effectiveness of the responses to global warming at a variety of scales. [16]
- 4 (a) Explain how overland flows vary in the tropics. [9]
- (b) Describe the main aspects of tropical monsoon (Am) climates. To what extent are they distinctive from other tropical climates? [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) To what extent do you agree that environmental factor is the most important factor in affecting the liveability of cities? [16]
- 6 (a) Explain how the issue of crowding **or** fear is produced in cities in countries at low levels of development. [9]
- (b) Assess the success of strategies used to try to mitigate the issue of **either** crowding **or** fear in the city. [16]



MERIDIAN JUNIOR COLLEGE
PRELIM EXAMINATION
Higher 1

H1 Geography

8813/01

Paper 1

13 September 2018

INSERT

3 hours

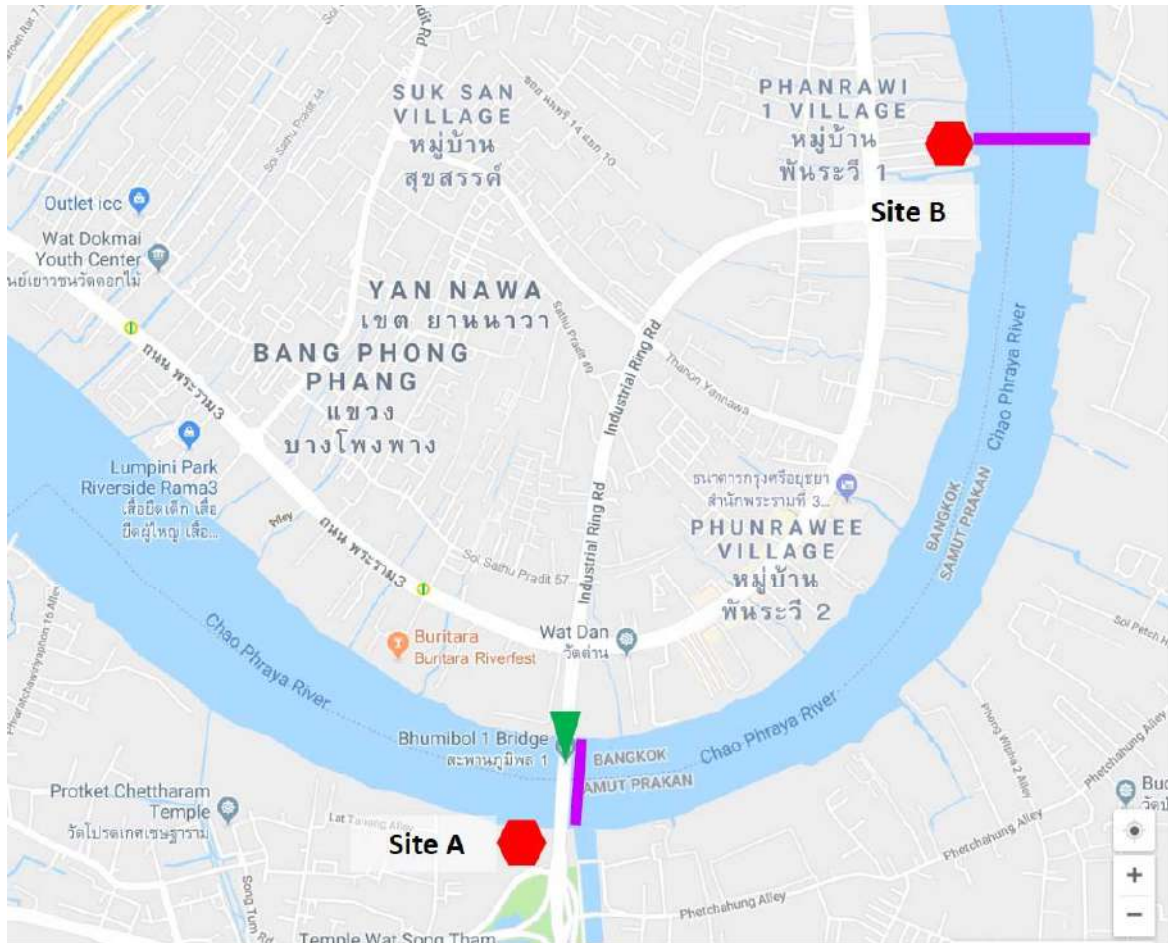
READ THESE INSTRUCTIONS FIRST

This Insert contains all the Figures and Tables referred to in the questions.

This document consists of 6 printed pages.

Resource 1 for Question 1

Satellite imagery for Site A and Site B in Bangkok



Channel width to measure

Scale: 1 cm is to 200m



Investigation site



Bridge

Resource 2 for Question 1

Site A



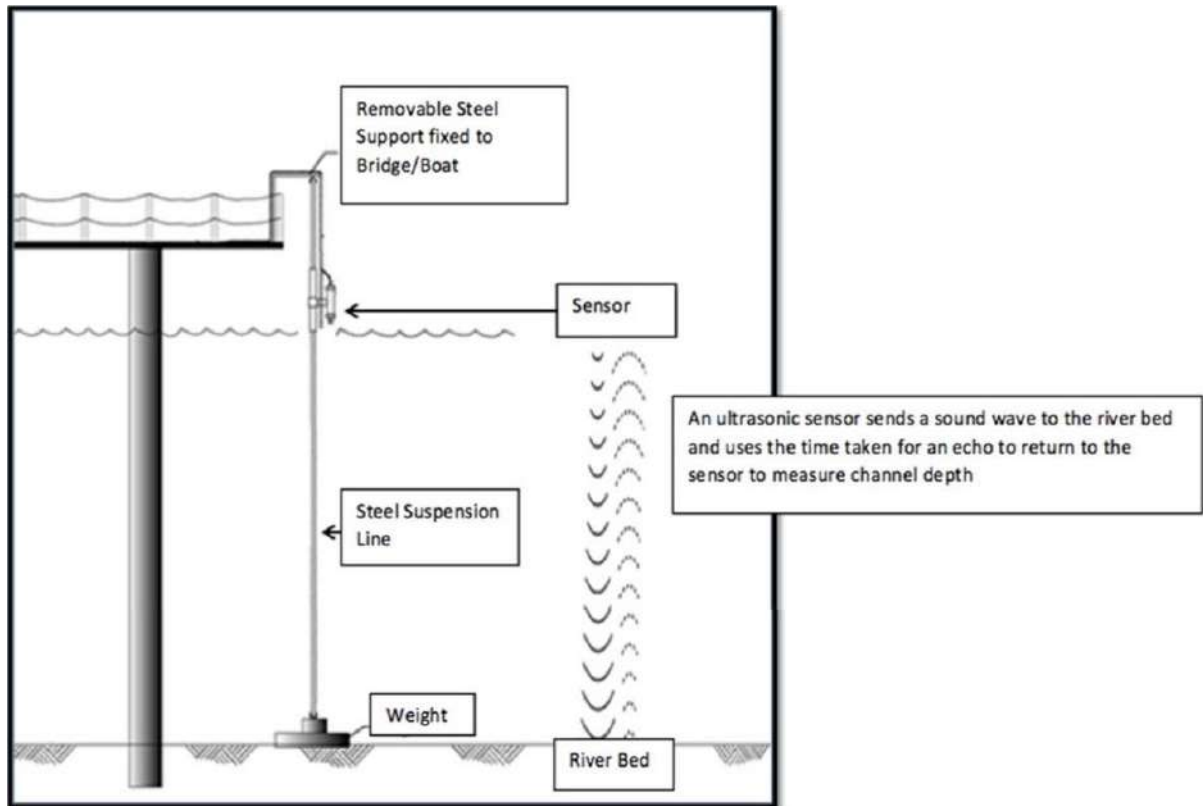
Site B



/

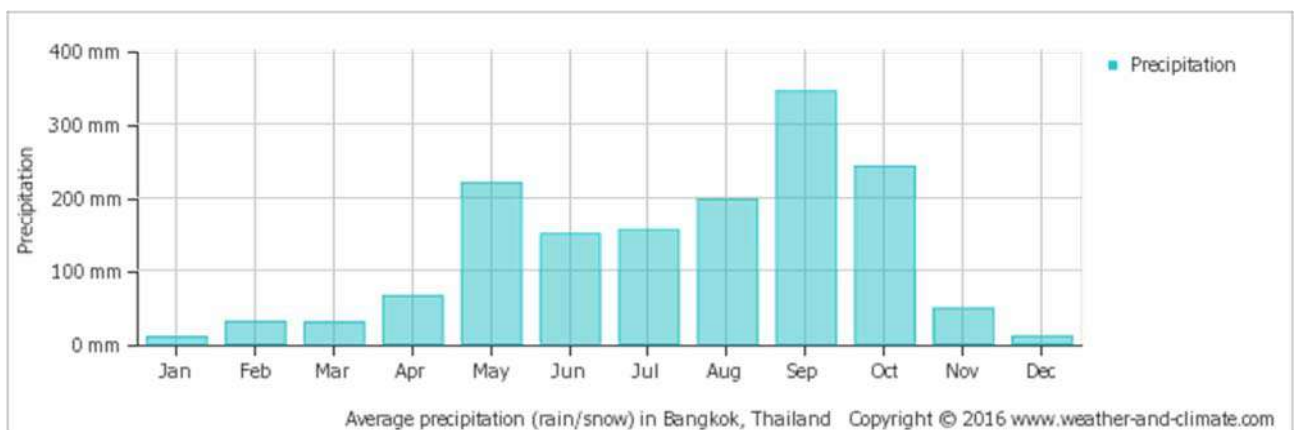
Resource 3 for Question 1

Ultrasonic sensor used to measure flood risk



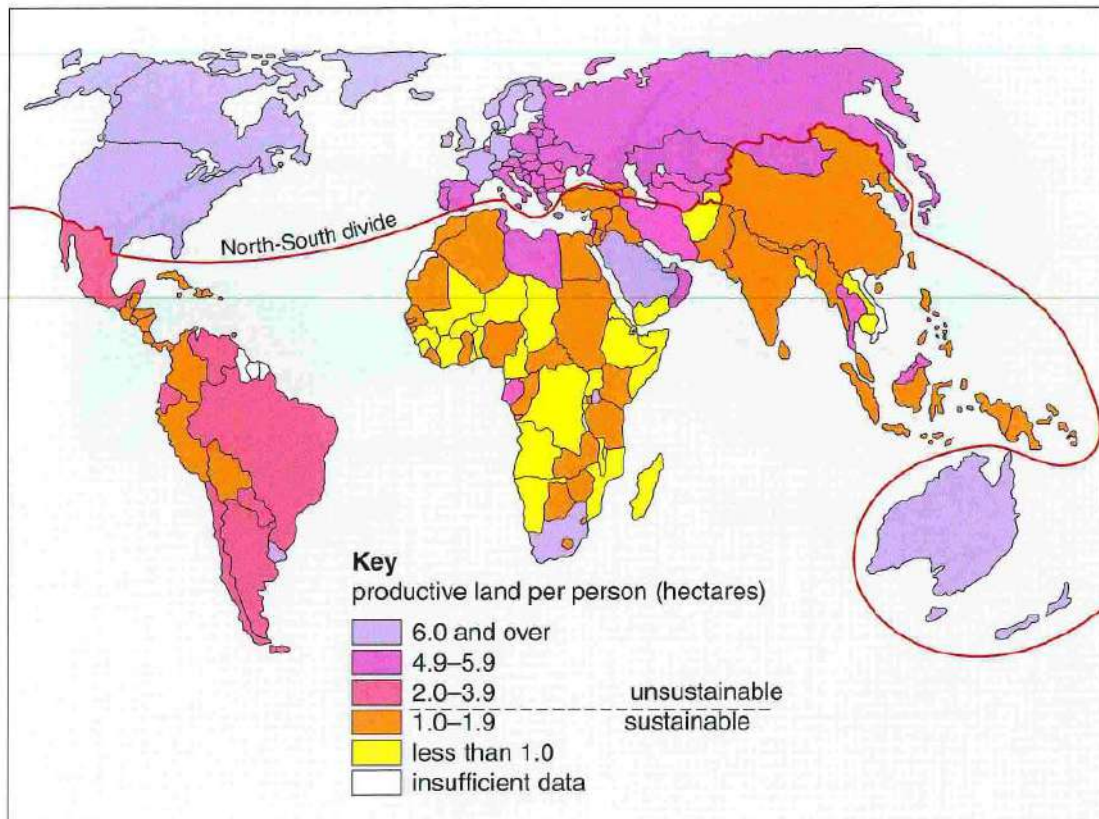
Resource 4 for Question 1

Annual rainfall distribution in Bangkok



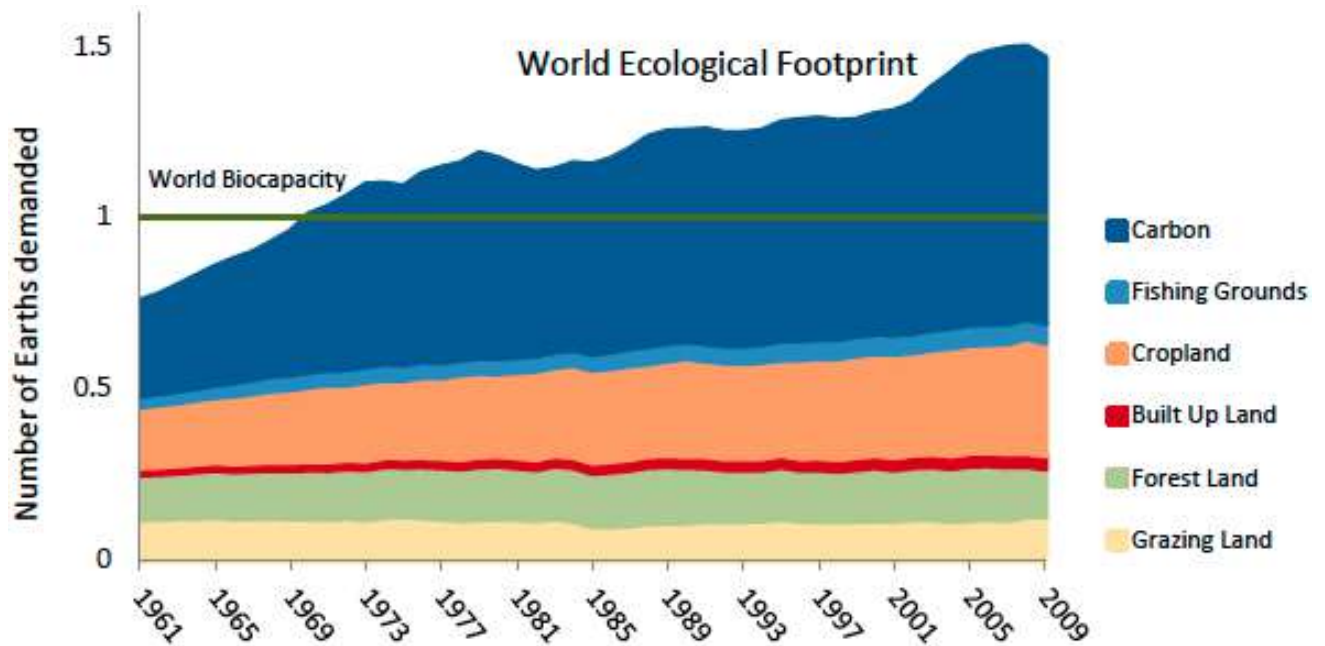
Resource 5 for Question 2

Global ecological footprint distribution, by country, 2000



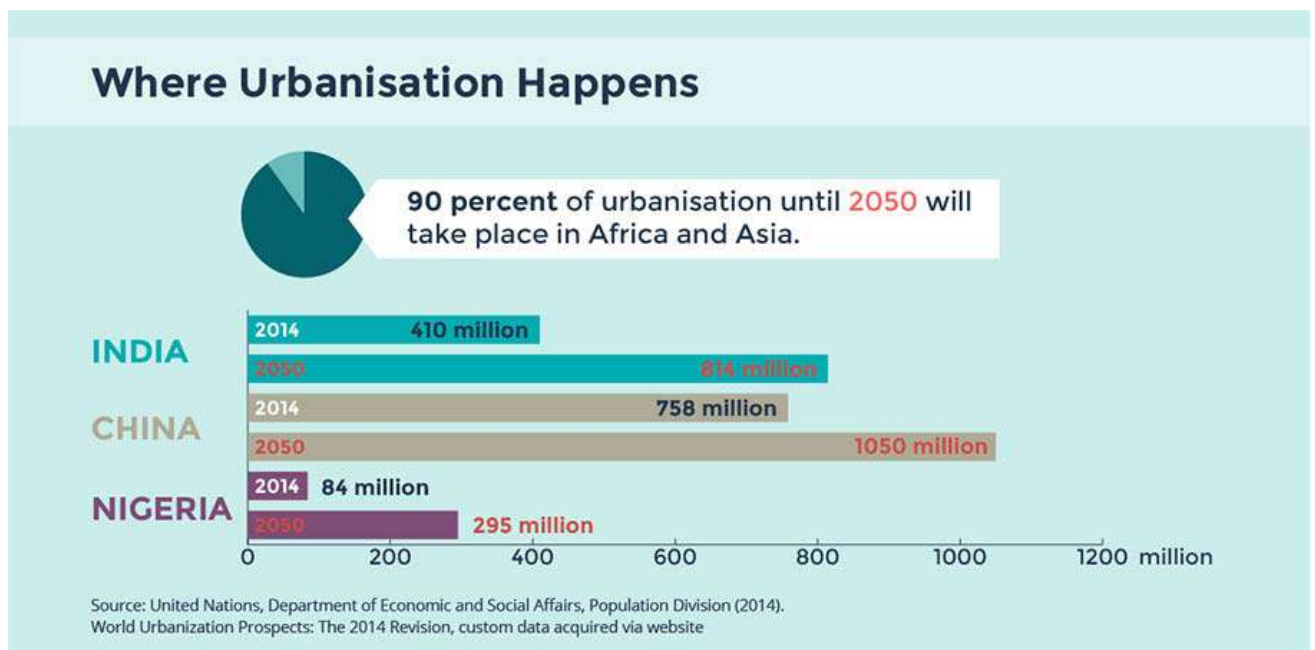
Resource 6 for Question 2

Global ecological footprint changes from 1961 to 2009



Resource 7 for Question 2

Urbanisation trends until 2050





MERIDIAN JUNIOR COLLEGE
PRELIM EXAMINATION
Higher 1

H1 Geography

8813/01

Paper 1

13 September 2018

3 hours

Additional Materials: Answer Paper
1 Insert
World outline map

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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.

Start each question on a fresh sheet of paper.

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

This document consists of 4 printed pages

Name: _____

Class: _____

Index number: _____

Qn no. (Section A)	Marks	Qn no. (Section B)	Marks
1		3 or 4 *	
2		5 or 6 *	
Total			

*** Please circle the question attempted**

Theme 3: Geographical Investigation

1(a)	With reference to Resource 1 and 2, explain why the hypothesis is suitable.	[4]
	<ul style="list-style-type: none"> The hypothesis is suitable because it can be tested through measurements of the river discharge to determine flood risk with equipment The hypothesis is suitable to test because the characteristics of the two sites are different, The hypothesis is suitable to test because students have adequate manpower and time to carry out 	
(b)	Explain how your group will minimise the impact of their investigation to the river and its users.	[4]
	<ul style="list-style-type: none"> To minimize impact to the river, our group will ensure that we do not dump any litter into the river To minimize impact to the users of the river, do not disrupt other activities. 	
(c)	With reference to Resource 1 and 3, describe how channel depth can be measured accurately at Site A.	[3]
	<ul style="list-style-type: none"> Use the Bhumibol 1 Bridge as reference for the channel width and attach ultrasonic sensor on the bridge and make sure sensor is lowered till just at the surface Take readings at various intervals for channel depth, measure at least 3 times at each interval for the results to be reliable Once all the intervals are taken, channel depth can be found by taking the average 	
(d)	Explain possible challenges that might arise when trying to conduct the quantitative and qualitative research at both sites.	[6]
	<ul style="list-style-type: none"> Disruption of velocity different rocks/branches/debris at river bed affecting channel depth and ultrasonic sensor measurement Dangerous to row between/under slums Challenge in qualitative research includes language barrier in conducting the survey Residents especially in Site B are unwilling to answer the survey as they are not sure what the information will be used for. Too busy to answer the questionnaire survey <p><i>Mix of both Quantitative and Qualitative challenges are required to score full credit (3 well explained points)</i></p>	
(e)	Evaluate this investigation about flood risk and explain how the quantitative and qualitative research could be improved to better understand flood risk in Site A and Site B.	[8]

Evaluate: *Explain what is good about this investigation*

- Comprehensive, utilize both quantitative and qualitative data to find out about flood risk. Different characteristics of sites to investigate, certain information can be tallied with other information like satellite information to cross check channel width.

Improvement to quantitative and qualitative (*Essentially answering the challenges in d) and also check if there are some resources meant to be used but not used e.g. R4*)

Improvement to quantitative:

1. Seen from R4 → actually Bangkok has seasonality of rainfall, therefore measurement of flood risk needs to be extended to more months when measuring to better understand how flood risk varies across the year.
2. Measure infiltration rate of slopes at both side as runoff can affect floodrisk
3. Take note of any flood mitigation measures already in place at both sites

Improvement to qualitative:

1. Bring a translator along, translate the questionnaire
2. Do a flood risk matrix (elaborate)
3. Interview government officials about (?)

Section B

Theme 2: Urban Change

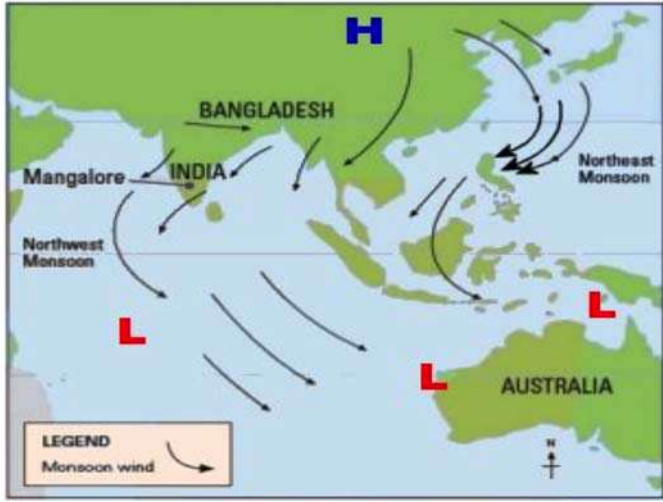
Ecological Footprint and Sustainable Development

2	(a)	With reference to Resource 5, describe the global ecological footprint distribution.	[3]
<ul style="list-style-type: none"> • Countries North of the North-South divide have higher and unsustainable ecological footprint of more than 4.9 productive land per person compared to countries South of the divide • Countries located South of the divide have a greater variation in ecological footprint from less than 1.0 to 6.0 and over compared to countries north of the divide • The highest ecological footprint can be found in continents such as North America, Western Europe and Australia at 6.0 and over productive land per person • Continent with the lowest ecological footprint is Africa with majority of the continent having less than 1.9 productive land per person • Anomaly can be seen that in continents like Africa, South Africa has high EF of 6.0 and over . Or Anomaly like Middle East and South Africa (south of the divide) 			

Reminder: East/West of Continents, Countries or Oceans but not world map(only north south and name by continents because earth is round and rotating).

	(b) With reference to Resource 5 and your own knowledge, explain why ecological footprint distribution differs globally.	[6]
<p>Ecological footprint: Amount of Biologically productive land required to produce energy, food and goods consumed and also to absorb waste [MUST LEARN]</p> <ul style="list-style-type: none"> • DCs (mostly at North of the divide) has higher EF because • Affluence → more consumption of foods from elsewhere → import goods and food → high EF (cite data) • DCs have more energy use for their type of industries and lifestyles → contribute to EF by carbon footprint (a subset of EF) • DC by consuming more food/goods → produce more waste and take up more biologically productive land <p>EF is already measured by per capita → Its not total carbon emission and carbon footprint please read the question thoroughly</p>		
	(c) With reference to Resource 6, describe the changes in global ecological footprint from 1961 to 2009.	[3]
<ul style="list-style-type: none"> • Overall <u>steady</u> increase from about 0.75 earths to 1.5 earths demanded, and in 1969 the world Biocapacity has been exceeded. • Carbon contributed to the <u>largest increase</u> by about 0.5 earths demanded • Built up land, forest land and grazing land remained <u>relatively constant</u> over the period 		
	(d) With reference to Resource 7, account for projection in urbanisation trends until 2050.	[5]
<p>See data: 90 Percent of urbanisation until 2050 will take place in Africa and Asia: data shows the Countries in Asia and Africa that will have the largest increase</p> <p>Urbanisation-> Proportion of people in a country living in towns and cities.</p> <p><i>Essentially asking why LDCs have large projected urbanisation</i></p> <ul style="list-style-type: none"> • DCs already reached high levels of urbanization, hard to continue urbanizing e.g. Singapore already 100% urbanized, so majority of urbanization will happen in LDCs • Large scale Rural-Urban Migration where people move to cities to seek jobs in factories etc • Large scale natural increase (higher birth rate) + lowering death rates due to improvements in healthcare 		

	(e)	With reference to any of the Resources and your own knowledge, to what extent do you agree that urbanisation will hinder the achievement of sustainable development?	[8]
<p>SD: Development that meets the needs of the present without compromising ability of future generation to meet their own needs. Maximise three interdependent goals (social, economic, environmental), meet the basic needs of the poor, overcome limitations in technology</p> <p>Hinder SD: Harder to achieve environmental development → seen from the EF increase, more urbanisation where have more demands on environmental resources and also produce more carbon emissions etc in cities.</p> <p>Hinder SD: Compromise on social development where the rural urban migration lead to the poor staying in slums etc....</p> <p>Not hinder SD: Help to meet the basic needs of the poor (jobs in urban area), help achieve social and economic development for countries that urbanised properly</p> <p>Levels marked: Accept a range of points, high level responses need to show both sides of the argument and also link to SD and its tenets</p>			

3	(a) With the aid of diagrams if necessary, explain the rainfall pattern associated with Indian sub-continent in the period from December to February	[9]
<p style="text-align: center;">NORTHEAST MONSOON (AMIHAN) November to March</p>  <ul style="list-style-type: none"> • Student should explain how the Position of the overhead sun changes in relation to the months and migration of the ITCZ • Subsequently, students should then explain places in India that encounter more rain (east coast- Chennai) compared to places which experiences dry season 		
	(b) Assess the effectiveness of the responses to global warming at a variety of scales.	[16]
<p>Students should first define global warming – rise in global temperature worldwide</p> <p>in this essay, student need to address at least 3 scales (Global, Regional, National, Local/Individual) and also the two types of responses: Adaptation and Mitigation approaches.</p> <p>Higher level responses will not just compare effectiveness of responses across scale but also how effectiveness of responses vary within scale (e.g. DCs vs LDCs)</p>		

4	(a)	Explain how overland flows vary in the tropics	[9]
<p>Students must identify the different types of overland flows → HOF and SOF</p> <p>Students must identify the different types of tropical climate – at least → Humid vs Arid Tropics</p> <p>Students should then proceed to explain how different factors that vary across different tropical climates affect HOF/SOF</p> <p>Factors include:</p> <ul style="list-style-type: none"> • Type of rainfall • Vegetation Density • Geology • Relief • Urbanisation 			
	(b)	Describe the main aspects of tropical monsoon (Am) climates. To what extent are they distinctive from other tropical climates?	[16]
<p><i>Student must address both aspects of the question: Describe and To What Extent are they distinctive → all five climates should be addressed</i></p> <p>Tropical Monsoon (Am): High rainfall, distinct wet and dry season</p> <ul style="list-style-type: none"> • Similar to all tropical climates in terms of average annual temperature above 18°C • Similar to Humid tropical climates (high rainfall) • Different in terms of total amount of rainfall (especially vs Savanna and Arid Tropic climates) • Different in terms of seasonality of rainfall (only similar to Aw climate) 			

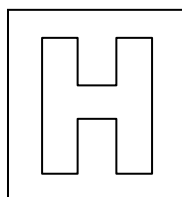
5	(a)	Explain how urban reimagining may affect different urban dwellers in cities at high levels of development.	[9]
<p>Explain what is Urban Reimagining</p> <p>Explain the effects of Urban Reimagining – Social, Economic, Environmental and positive negative on urban dwellers</p> <p>Important to note that context of this question is DC</p>			
	(b)	To what extent do you agree that environmental factor is the most important factor in affecting the liveability of cities?	[16]
<p>Define what is urban liveability</p> <p>Signpost that there are various factors affecting liveability environmental, socio-economic, political factors</p> <p>Rank environmental factors against other factors and explain why environmental factors are <u>is/is not</u> the most important factor in affecting the liveability of cities</p>			

6	(a)	Explain how the issue of crowding or fear is produced in cities in countries at low levels of development.	[9]
<ul style="list-style-type: none"> Answers may consider how cities at high levels of development (e.g. economic, social, environmental) may host factors which contributes to fear. There are several sources of fear in the city (e.g. crime and terrorism). associated with cities at high levels of development and make explicit links to how these contribute to fear in cities. For instance, a city with a high level of economic development may raise the international profile of the city and makes it a possible target for terrorists and hence increased fear amongst residents in the city. 			
	(b)	Assess the success of strategies used to try to mitigate the issue of either crowding or fear in the city.	[16]
<p>Indicative content:</p> <p>Having established the factors which contribute to fear in the city in part (a), candidates would now explain how to better cope with fear.</p> <ul style="list-style-type: none"> Answers should include a discussion of both successes and failures in mitigating the chosen issue (crowding or fear). For fear in the city, strategies to cope with fear include increased surveillance, redesigning environment, militarization of police and a visible presence of armed police on city streets and at airports and seaports, to investment in 'safe' living environments such as the provision of street lighting/street cameras to reduce crime or strengthened border controls to seek to reduce the threat of terrorism. A higher level response could look at the effectiveness of strategies with reference to 1-2 specific case studies. Another possible approach could be to analyse the application of selected strategies in different cities and account for their success(es) and failure(s). 			

Candidate Name: _____

Class Adm No

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2018 Preliminary Exams Pre-University 2

GEOGRAPHY (HIGHER 1)
Combined Paper

8813
10 September 2018

3 hours

Additional Materials: Answer Booklet/Paper
 1 Insert
 World Outline Map

INSTRUCTIONS TO CANDIDATES

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

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, 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 20 tertiary students from Millennia Institute decided to go to Kota Tinggi, Johor, Malaysia for a three-day fieldwork exercise during the December school holidays. They are interested to conduct a geographical investigation to find out about flood risk in the area.

To prepare for the investigation, the students made use of Google Earth to identify the areas they would conduct their fieldwork. They then crafted a research question as follow:

Do residents who stay at Kampung Kelantan experience lower flood risk than those who stay at Taman Kemang in Kota Tinggi?

The students have also crafted a survey questionnaire that they would like to administer for their investigation when they go to Kota Tinggi.

Resource 1 shows the secondary research that the students have done on the field site. Resource 2 shows the survey questionnaire the students have crafted for the investigation.

- (a) Using Resource 1 and the information above, state three reasons why the crafted research question is capable of research. [3]
- (b) With reference to Resources 1, 2 and the information above, devise a plan for the students to collect primary data for the investigation. [6]
- (c) Suggest how students could supplement the primary data that would be collected as shown in Resource 2 to find out more about flood risk in Kota Tinggi. [3]
- (d) Using Resource 2, explain how the crafted survey questionnaire could be improved. [5]
- (e) With reference to Resources 1 and 2, assess whether the students' investigation would be useful in ascertaining flood risk. [8]

Section B**Theme 2: Urban Change****Reimaging in the USA**

- 2** Resource 3 shows the population trends in the American Midwest's 15 most populous cities. Resource 4 shows the spatial distribution of cities in the American Midwest with the highest rates of population growth and negative population growth. Resource 5 shows a proposed mixed-use development in the city centre of Detroit.
- (a) With reference to Resource 3, describe the population trends in American Midwest's 15 most populous cities. [4]
- (b) Discuss possible reasons for the population trends in the American Midwest's 15 most populous cities as shown in Resource 3. [6]
- (c) With reference to Resource 4, compare the locations of cities in the American Midwest exhibiting the highest rates of population growth with those exhibiting the highest rates of negative population growth. [4]
- (d) Explain how the proposed urban reimaging project as shown in Resource 5 may enhance the urban liveability of Detroit. [5]
- (e) Discuss how the urban reimaging project as shown in Resource 5 may bring about unequal impacts to different urban dwellers in Detroit. [6]

Section C

Answer **two** questions in 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 causes of climate change since the Holocene. [9]
- (b) “Transition from fossil fuel to alternative energy sources is able to reduce the negative effects of climate change”. To what extent do you agree with the statement? [16]
- 4 (a) Explain how human activities can influence the characteristics of flood hydrographs in the tropics. Support your answer with relevant diagram(s). [9]
- (b) Assess the view that hard engineering strategies are more effective than soft engineering strategies in managing floods in the tropics. [16]

Theme 2: Urban Change

- 5 (a) Explain the causes of traffic congestion in cities of low levels of development. [9]
- (b) Evaluate the strategies used to manage traffic congestion in cities. [16]
- 6 (a) Explain the issues affecting the elderly in the city. [9]
- (b) Assess the extent to which strategies employed to manage issues affecting different social groups in the city have been effective. [16]

Copyright Acknowledgements

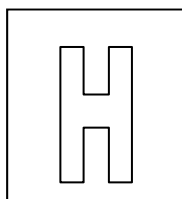
Question 1 Resource 1	https://www.google.com/earth/ (last accessed 20 Aug 2018)
Question 1 Resource 2	Copyright Millennia Institute
Question 2 Resource 3 & 4	https://www.csgmidwest.org/publications/may2011populationtrends.aspx (last accessed 20 Aug 2018)
Question 2 Resource 5	https://www.clickondetroit.com/real-estate/bedrock-gets-final-approval-on-4-major-redevelopment-projects-in-downtown-detroit (last accessed 20 Aug 2018)

Candidate Name: _____

Class:

Adm No

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2018 Preliminary Exams Pre-University 2

GEOGRAPHY (HIGHER 1)

8813
10 September 2018

INSERT

3 hours

READ THESE INSTRUCTIONS FIRST

This Insert contains all the resources referred to in the questions.

Resource 1 for Question 1

Secondary research that the students have done on the field site



Resource 2 for Question 1**Survey questionnaire the students have crafted for the investigation****Survey Questionnaire on Residents' Perception towards Flood Risk**

Dear participant, we are a group of students from Singapore who is interested to find out about flood risk in Kota Tinggi. We would appreciate your help in answering the following questions.

Section A

Age: _____

Gender: _____

Occupation: _____

How long have you stayed in this neighbourhood?

- ☐ Less than 1 year
- ☐ 1 to 5 years
- ☐ 5 to 10 years
- ☐ More than 10 years

Monthly household income: _____

Section B

Kota Tinggi last experienced a flood in January 2018. Have you experienced a flood before?

- ☐ Yes
- ☐ No

What are some flood management strategies in place in Kota Tinggi/Johor River?

Do you think the flood management strategies are effective? Why or why not?

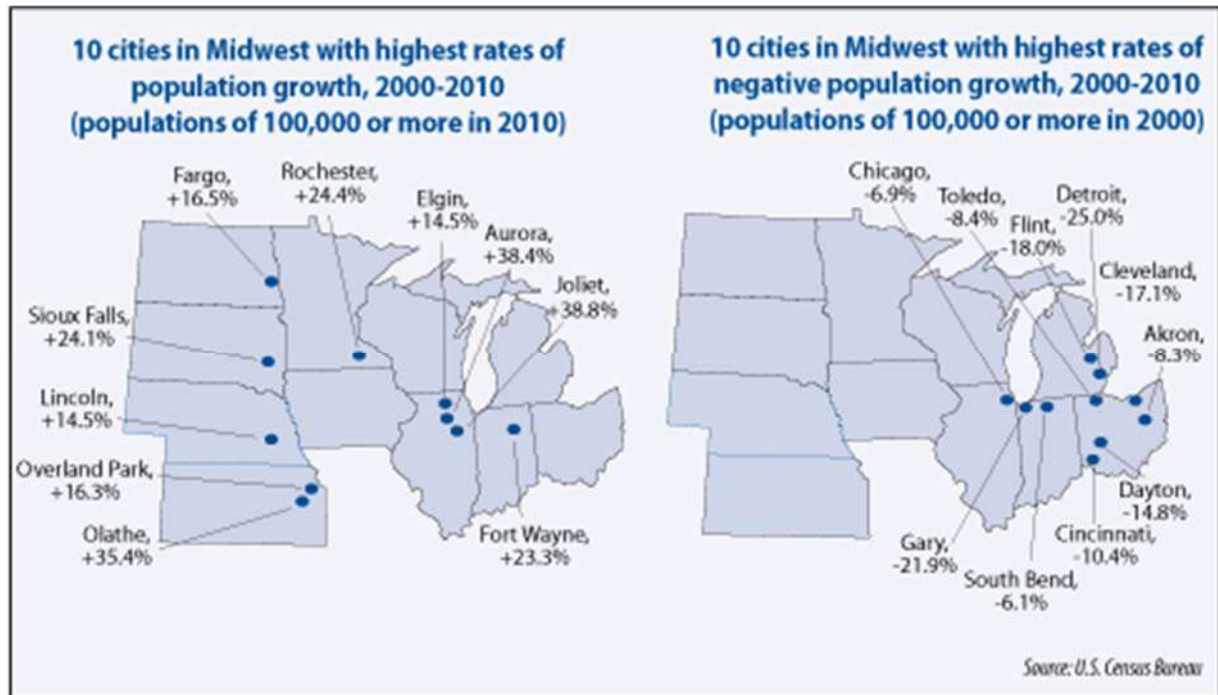
Resource 3 for Question 2

Population trends in the American Midwest's 15 most populous cities

Population trends in Midwest's 15 most populous cities			
City	Population in 2010	Population change from 2000	% change in GDP of city's metro area (2001-2009)
Chicago	2,695,598	-6.9%	+26.1%
Indianapolis	829,718	+4.8%	+36.0%
Columbus, Ohio	787,033	+10.6%	+28.4%
Detroit	713,777	-25.0%	+1.3%
Milwaukee	594,833	-0.4%	+30.2%
Omaha	408,958	+4.9%	+44.0%
Cleveland	386,815	-17.1%	+20.8%
Minneapolis	382,578	0.0%	+31.2%
Wichita, Kan.	382,368	+11.1%	+30.5%
Cincinnati	296,943	-10.4%	+20.7%
Toledo, Ohio	287,208	-8.4%	+13.7%
St. Paul, Minn.	285,068	-0.7%	+31.2%
Lincoln, Neb.	258,379	+14.5%	+35.6%
Fort Wayne, Ind.	253,691	+23.3%	+20.0%
Madison, Wis.	233,209	+12.1%	+51.0%
U.S. figures	308,745,538	+9.7%	+37.5%
Sources: U.S. Census Bureau, U.S. Bureau of Economic Analysis			

Resource 4 for Question 2

Spatial distribution of cities in the American Midwest



Resource 5 for Question 2**Urban Reimaging Project in Detroit**

An urban reimaging project - the skyscraper is set to be the tallest building in the American Midwest city

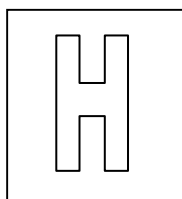


The proposed skyscraper is a milestone representing Detroit's credible new era of hope, modernity and growth. This is projected to be an outstanding collaboration between multiple levels of government and private industry that will unleash billions of dollars of investment, resulting in transformational impacts to Detroit. The skyscraper which is projected to be the tallest building in Detroit will be complete with a publicly accessible sky deck on top of the residential floors. It will also include restaurant, retail and office space, and extensive exhibit and public space that will be open to all.

Candidate Name: _____

Class Adm No

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2018 Preliminary Exams Pre-University 2

GEOGRAPHY (HIGHER 1)
Combined Paper

8813
10 September 2018

3 hours

Additional Materials: Answer Booklet/Paper
 1 Insert
 World Outline Map

SUGGESTED RESPONSES

Section A

Theme 3: Geographical Investigation

- 1 A class of 20 tertiary students from Millennia Institute decided to go to Kota Tinggi, Johor, Malaysia for a three-day fieldwork exercise during the December school holidays. They are interested to conduct a geographical investigation to find out about flood risk in the area.

To prepare for the investigation, the students made use of Google Earth to identify the areas they would conduct their fieldwork. They then crafted a research question as follow:

Do residents who stay at Kampung Kelantan experience lower flood risk than those who stay at Taman Kemang in Kota Tinggi?

The students have also crafted a survey questionnaire that they would like to administer for their investigation when they go to Kota Tinggi.

Resource 1 shows the secondary research that the students have done on the field site. Resource 2 shows the survey questionnaire the students have crafted for the investigation.

- (a) Using Resource 1 and the information above, state three reasons why the crafted research question is capable of research. [3]

Award 1 mark for each correct reason provided, up to a maximum of three marks

- Kampung Kelantan and Taman Kemang stated in the research question are of close proximity to one another/accessible by roads within Kota Tinggi as seen in R1
- The research question has clearly defined the population (residents in Kampung Kelantan and Taman Kemang) and variable (flood risk)
- Students are given three-day to conduct their research which gives them sufficient time to collect the necessary data
- From R1, the two settlements in Kota Tinggi are located near the Johor River which makes it possible to study flood risk in these areas
- 20 students provide sufficient manpower to split the work to collect data from the 2 neighbourhoods

Point marked [Any reason provided after 3 reasons given will not be accepted]

Marker's Report

- Students need to use GI concepts of 'population' and 'variable' for RQ/Hypothesis, not target audience, areas
- Some stated reasons without providing data from the question stem/R1 hence did not get the mark for the particular reasons (There is a need to use the resources to answer DRQ!!)
- Some stated in their responses unsupported statements (e.g. accessible by public transport – cant tell from R1)

- (b) With reference to Resources 1, 2 and the information above, devise a plan for the students to collect primary data for the investigation. [6]

Indicative Content

- Manpower
 - The group of 20 students should split themselves into 2 groups to go to the 2 neighbourhoods respectively as seen in R1
 - Each group should target to collect at least 30 questionnaires for more statistical reliable data
 - The survey questionnaire should be conducted in pairs to minimise the risk that students may face such as verbal or physical attack while conducting the questionnaire [Risks + Mgmt]
 - Each pair should thus collect at least 6 responses
- Sampling
 - In each neighbourhood, students should adopt an appropriate sampling method to administer the survey questionnaire
 - Students could adopt systematic sampling, where they go to every k^{th} household as pre-determined to conduct the survey questionnaire [Population – residents of the respective neighbourhoods]
 - There should be at least 30 questionnaire collected from each neighbourhood for more statistical reliable data
- Survey Questionnaire
 - Before conducting the survey questionnaire seen in R2, it is important that students ask for permission to conduct the questionnaire. Once permission is given, students should ensure the anonymity and confidentiality of the responses collected [Ethics]
 - Students should inform participants of the time required for the survey questionnaire and when needed to provide the necessary translation or help for the participants to respond to the questionnaire [Limitations + Mgmt]
 - Students should consider conducting their fieldwork over the weekend so that they are able to avoid the lack of data due to residents not being at home during the weekday when they work or residents not being able to help with the investigation due to time constraints [Limitations + Mgmt]

Level	Marks	Description
3	5-6	Response demonstrates accurate knowledge of geographical investigation planning in relation to primary data collection. Outlines a relevant and coherent plan with reference to the planning of GI, covering different aspects of it. Response is relevant to context of question throughout.
2	3-4	Response demonstrates some knowledge of geographical investigation planning with reference to primary data collection. Outlines a clear plan with some reference to the planning of GI. Different aspects of GI plan are considered but may lack breadth or depth. Response is mostly relevant to the context of the question but may lack clarity and coherence.
1	1-2	Response demonstrates limited knowledge of geographical investigation planning with reference to primary data collection. Outline of plan is limited and little reference to the planning of GI. Different aspects of GI plan not considered and explanation lacks detail. Much of the response may not be relevant to the context of the question.
0	0	No creditworthy response

Marker's Report

- Poorly done as many did not provide in detail what need to be done
- Merely stating is insufficient (e.g. many stated that the students can do stratified sampling but did not explain the how)
- Some confused and thought that R2 is an interview but it is a survey questionnaire
- Students need to be clear of what are the things to be discussed under GI plan and think which are the relevant ones to be brought up in relation to collecting primary data (some have misconceptions, confused between limitations/risks/ethics)
- A handful discussed about presenting the primary data – not needed for this question as it specifically talks about collecting primary data

(c) Suggest how students could supplement the primary data that would be collected as shown in Resource 2 to find out more about flood risk in Kota Tinggi. [3]

Indicative Content

- Primary data collected from the survey questionnaire in R2 would only allow students to understand the perception of flood risk from the residents
- Secondary data on flood risk should be obtained from available research done to find out if there is a difference in flood risk between the 2 locations
- Students could also find out the severity of impact of past flood incidents on the two neighbourhood, as well as the likelihood/frequency of flood that the 2 places experience
- Past flood incidents should also be researched upon to know the magnitude and frequency of flood occurrence in Kota Tinggi
- Research could also be done on flood management strategies already put in place in Kota Tinggi and their effectiveness to help supplement findings for Section B Q2 and Q3 as shown in R2
- Field sketch or photographs of observed flood management strategies could be done as well

Level	Marks	Description
3	3	Response makes purposeful use of R2 to suggest supplementary secondary data required for the students' investigation. Suggested data are supported with relevant and clear explanation.
2	2	Response provided suggestions on secondary data but may not always relate to the context of the investigation or R2 itself. Explanation provided to support response may lack detail in parts.
1	1	Response did not make use of R2 to suggest supplementary data. Response lacks focus on the question and has little to no explanation on suggested secondary research required.
0	0	No creditworthy response

Marker's Report

- Students need to make reference to what is shown in R2 then suggest what other forms of data would help to make up for R2
- Some students are confused – suggested doing infiltration rates (Note: Flood risk is looking at risk to the impacts of flooding, whereas when looking at infiltration rates, we are more concerned with it as how surface conditions could affect the occurrence of flood. They are 2 separate concepts. Students need to clarify their misconceptions and also know what are the A levels GI LOs which are: 1) Factors influencing flood risk and ways to mitigate it and 2) Influence of land use on infiltration rates

(d) Using Resource 2, explain how the crafted survey questionnaire could be improved.
[5]

Indicative Content

- Unnecessary data
 - Data such as occupation, gender and monthly household income is irrelevant to the context of the investigation and thus there is no need to collect such data and could be removed
- Sensitive/personal data
 - Questions such as age, occupation and monthly household income are sensitive data that respondents may not feel comfortable in giving. If required to be included, students should provide the options for participants to opt out in providing such details
- Closed options vs open ended
 - To collect data such as age and monthly household income, students should provide options for participants to choose from as specific data is not required. These options should be provided in ranges so that participants are also more comfortable in providing
- Options provided
 - There is a need to ensure that options provided do not overlap with one another. For Section A question 4, options provided overlap with one another. I.e. If a resident stay in the neighbourhood for 5 years, he or she could be choosing both 2nd and 3rd option. The provision of options needed to be curated to ensure no overlapping to avoid confusion
- Wording of questions
 - Leading questions: Section B Q1 is worded in such a way to lead respondents to answer 'Yes'. Students should remove the first statement and in general ask the respondents if they have experienced a flood before
 - Too open ended questions: Section B Q2 requires respondents to have knowledge on flood management strategies. Respondents may not know what the measures are. Instead, students should provide respondents with a list of flood management strategies (supplement with necessary photos to help respondents) and perhaps get the respondents to rate their usefulness on a Likert scale (modifying Section B Q2 and Q3) in managing flood if they are aware of their presence

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of questionnaire design. Explanation of issues and suggestions of improvement are sound and detailed. Reference is made to Resource 2 and response is relevant to context of question throughout.
2	3-4	Response demonstrates some knowledge of questionnaire design. Explanation of issues and suggestions of improvement are mostly valid but somewhat limited in relevance and detail. Some of the response may not fully address the context of the question.
1	1-2	Response demonstrates limited or no knowledge and understanding of questionnaire design. Explanation lacks detail and makes little or no reference to the resource. Overall the response does not address the context of the question.
0	0	No creditworthy response.

Marker's Report:

- Most are able to suggest improvements to be made but very few discussed upon the issues with the survey questionnaire. Students should identify the issues first then suggest improvements
- Most did not critique the way the questions are crafted in the survey questionnaire but focused more on what is included/excluded (See above)

(e) With reference to Resources 1 and 2, assess whether the students' investigation would be useful in ascertaining flood risk. [8]

Indicative Content**Useful:**

- R1 shows that Taman Kemang is nearer to Johor River as compared to Kampung Kelantan
- Data collected from R2 would allow students to find out if there is a difference in residents' perception towards flood risk in the 2 neighbourhoods
- Using both data from R1 and R2, they are useful in allowing students to understand if distance to the river affects flood risk of locations

Not useful [Factors influencing flood risk]:

- The investigation looks at how distance to the river affects flood risk of places and it is insufficient to collect data only from residents [R2]
- Flood risk is affected by multitude of factors and students should collect other data to supplement findings such as elevation of locations [topography] and types of land use
- There is a need to collect more secondary data to find out the physical extent of flood impacts in the past, the frequency of flood occurrences in the 2 locations shown in R1 [Flood risk = severity x likelihood]
- Students should also conduct research [field sketch/photographs, secondary research] on flood management strategies put in place in Kota Tinggi to assess their effectiveness in reducing flood risk of places [Flood risk = (Hazard x Vulnerability) / capacity to cope]

Not useful [Data]:

- Furthermore, reliance on data collected from residents as seen in R2 would be insufficient to understand flood risk
- This is because their perceptions towards flood risk could be subjective and subjected to varied interpretations
- Also, though there are open ended questions in the survey questionnaire, it does not allow the students to gain more insights to the experiences of residents
- It would be better if students could also conduct interviews or focus group discussion with selected participants so that they can gain more in-depth understanding to the perceptions of flood risk by the residents in the 2 neighbourhoods

H1 Generic Level Descriptors for 8m DRQ on Themes 3		
Level	Marks	Descriptors
3	7-8	Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides a logical and well-developed evaluation that reflects strong critical thinking skills and a good understanding of the requirements of the question.
2	4-6	Response demonstrates good knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides an evaluation, which may be limited in depth and detail. Response reflects critical thinking skills in general but may not always be relevant to the question.

1	1-3	Response shows inadequate knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides little or no evaluation. May include material that is irrelevant to the question.
0	0	No creditworthy response

Marker's Report

- Poorly done. Students need to focus on answering to the demands of the question and to evaluate the students' GI in relation to what they are trying to investigate
- Please work on the structure of response for 8m evaluative DRQ question
- Some attempted to evaluate the resources but ended up doing selectively, i.e. giving one-sided evaluation for each resource → this is not evaluation. If decided to structure by resources, students should provide both sides to each resource to show the evaluation. If not, then structure in a way with argument-driven TS

Section B

Theme 2: Urban Change

Reimaging in the USA

- 2 Resource 3 shows the population trends in the American Midwest's 15 most populous cities. Resource 4 shows the spatial distribution of cities in the American Midwest with the highest rates of population growth and negative population growth. Resource 5 shows a proposed mixed-use development in the city centre of Detroit.

- (a) With reference to Resource 3, describe the population trends in American Midwest's 15 most populous cities. [4]

Award 1 mark for each point to a maximum of 4 marks.

Possible responses include:

- More cities in the American Midwest's 15 most populous cities witness a population growth since 2000 (1m)
- 53.3% of the cities witnessed population growth while 46.7% of the cities exhibit a negative population growth (1m)
- Detroit registers the largest population decline at -25% since 2000 (1m)
- Fort Wayne registers the largest population growth at 23.3% (1m)

Data from the Resource should be used when appropriate to support responses.

Point marked

- (b) Discuss possible reasons for the population trends in the American Midwest's 15 most populous cities as shown in Resource 3. [6]

Indicative Content

- Some cities witnessed population growth as a result of state policies to revitalise/rejuvenate the economy (eg. Successful urban reimagining project, reindustrialisation efforts)
- Some cities witnessed population growth as a result of inward migration. This is contributed by a combination of push and pull factors. The former may include the lack of economic opportunities in the sending cities/rural regions and the latter may include the (perceived) economic opportunities in the receiving cities.
- Some cities witnessed a negative population growth as a result of deindustrialisation which sees the relocation of the manufacturing sector to cities in the developing world.

Levels marked

Levels	Marks	Descriptors
3	5 -6	Response demonstrates good knowledge of the likely reasons contributing to population growth in some cities, but a decline in others. Explanation is detailed, thorough and relevant to the context of the question. Reference is made to the resource to substantiate response.
2	3-4	Response demonstrates reasonable knowledge of the likely reasons contributing to population growth in some cities, but a decline in others. Explanation is clear and mostly relevant to the context of the question. Reference is made to the resource to substantiate response.
1	1-2	Response demonstrates some or limited knowledge of the likely reasons contributing to population growth in some cities, but a decline in others. Response may only explanation to address the reasons contributing to population growth or the reasons contributing to negative population growth. Explanation may not be always relevant to the context of the question.
0	0	No creditworthy response.

- (c) With reference to Resource 4, compare the locations of cities in the American Midwest exhibiting the highest rates of population growth with those exhibiting the highest rates of negative population growth. [4]

Award 1 mark for each point to a maximum of 4 marks.

Possible responses include:

- Cities exhibiting the highest rates of population growth are mostly located at the eastern parts of their respective districts/provinces (1m) while cities exhibiting highest rates of negative population growth are more dispersed (1m)
- Locations of certain cities exhibiting highest rates of population growth are in close proximity to locations of cities exhibiting highest rates of negative population growth (1m)
- Cities exhibiting the highest rates of negative population growth are mostly located at the eastern parts of the American Midwest (1m)

Data from the Resource should be used when appropriate to support responses.

Point marked

- (d) Explain how the proposed urban reimagining project as shown in Resource 5 may enhance the urban liveability of Detroit. [5]

Indicative Content

- The proposed urban reimagining project may draw in new investment into the city.
- The proposed urban reimagining project will create new leisure facilities for the locals.
- The increase in investment, can encourage urban (population) growth in the city, and this in turn, can bring in more investment which further enhances the liveability of the city.

Levels marked

Levels	Marks	Descriptors
3	5	Response demonstrates good knowledge of the possible positive impacts of the urban reimaging project on urban liveability. Explanation is detailed, thorough and relevant to the context of the question. Reference is made to the resource to substantiate response.
2	3-4	Response demonstrates reasonable knowledge of the possible positive impacts of the urban reimaging project on urban liveability. Explanation is clear and mostly relevant to the context of the question. Reference is made to the resource to substantiate response.
1	1-2	Response demonstrates some or limited knowledge of the possible positive impacts of the urban reimaging project on urban liveability. Explanation may not be always relevant to the context of the question.
0	0	No creditworthy response.

- (e) Discuss how the urban reimaging project as shown in Resource 5 may bring about unequal impacts to different urban dwellers in Detroit. [6]

Indicative Content

- The urban reimaging project (eg. restaurants, retail services) is likely going to cater to specific economic class of urban dwellers but not others
- The urban reimaging project as a symbol of the 'modernity' is likely going to further marginalize groups of people like the elderly, who are stereotypically conceived as incompatible with urban modernization
- The economic opportunities that are created as a result of the urban reimaging project will only benefit urban dwellers working in the service/tertiary sectors but not others
- Increase in rent prices that follow the urban reimaging project may price out the lower socio-economic class.

Levels marked

Levels	Marks	Descriptors
3	5 -6	Response demonstrates good knowledge of the unequal impacts of the urban reimaging project to different urban dwellers in Detroit. Explanation is detailed, thorough and relevant to the context of the question. Reference is made to the resource to substantiate response.
2	3-4	Response demonstrates reasonable knowledge of the unequal impacts of the urban reimaging project to different urban dwellers in Detroit. Explanation is clear and mostly relevant to the context of the question. Reference is made to the resource to substantiate response.
1	1-2	Response demonstrates some or limited knowledge of the unequal impacts of the urban reimaging project to different urban dwellers in Detroit. Explanation may not be always relevant to the context of the question.
0	0	No creditworthy response.

Section C

Answer **two** questions in 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 causes of climate change since the Holocene. [9]

Introduction

Climate change is defined as a change in any statistical property of the atmosphere, such as a change in mean temperature. Holocene is the second epoch of the Quaternary period (the past 11,700 years). It is characterised by generally warmer temperatures as compared to the Pleistocene. There are natural and anthropogenic causes of climate change during the Holocene.

Body

TS1: A natural factor contributing to climate change since the Holocene is solar forcing.

Related to solar forcing is how the amount of heat emitted by the Sun varies over time. Measurements of solar forcing variations on a day-to-day basis have established that there are at least three significant periodic cycles in solar output: the relatively well-known 11-year 'Schwabe' sunspot cycle, a 78-year 'Gleissberg' cycle and the 200-year 'Suess' cycle. There is a positive correlation between the temperatures experienced on Earth and the number of sunspots. Sunspots are cooler regions on the sun's surface that appear as dark spots; and when the number of sunspots increases, the areas surrounding the sunspots radiate more energy to compensate for the lower temperatures of the sunspots, resulting in higher solar radiation emitted. The higher the number of sunspots, the higher the amount of solar radiation emitted and global temperature increases. The number of sunspots peaked in the year 2000, which coincided with an increased in temperature across the globe.

TS2: Another natural factor contributing to climate change since the Holocene can be attributed to volcanic activities.

Upon eruption, volcanoes can emit vast amounts of particulate matter, known as aerosols, into the atmosphere. Aerosol particles reflect sunlight and can produce net cooling of the atmosphere. One example is the eruption of Mount Pinatubo in the Philippines in 1991. At that time, tremendous explosions sent volcanic ash up to 30km into the stratosphere. This aerosol cloud of ash remained in the atmosphere during 1991 and 1992, and calculations suggest that the aerosols released counterbalanced the warming effects of additional greenhouse gases added by human activities in the year 1992. However, by 1994, most aerosols from the eruption had fallen out of the atmosphere and global temperatures returned to the previous higher levels.

TS3: An anthropogenic factor contributing to climate change since the Holocene can be attributed to urbanisation.

Urbanisation is the increase in proportion of people living in urban areas. Today, 54 per cent of the world's population lives in urban areas, a proportion that is expected to increase to 66 per cent by 2050. Projections show that urbanisation combined with the overall growth of the world's population could add another 2.5 billion people to urban populations by 2050, with close to 90 percent of the increase concentrated in Asia and Africa. Due to high concentration of economic and human activities in the urban areas, high production and consumption inevitably require high amount of energy. Large amount of fossil fuels are burnt to provide energy for the functioning of economic

activities and also for daily human activities such as transportation. An outcome of this is enhanced greenhouse effect, contributing to global warming/climate change of the present.

TS4: Another anthropogenic factor contributing to climate change since the Holocene can be attributed to industrialisation.

Since the 1850s, there has been an exponential increase in the input of carbon dioxide to the atmosphere by industrial activities, mainly the combustion of fossil fuel. Economic activities (such as those in secondary industries) rely heavily on the burning of fossil fuels for the production of energy that result in the release of greenhouse gases. Production of goods also emit greenhouse gases as by-products. Most emissions have come from the developed countries, with 90% originating in the northern hemisphere. However, in recent years, developing countries such as China and India, are contributing more to global greenhouse gases emissions due to rapid industrialisation. Accelerating rates of industrialisation is the main contributor of global warming, or the climate change of the present which Earth is experiencing today.

Marker's Report

- Only 2 students attempted Q3, of which only 1 student did part (a)
- Poor content knowledge present, presence of misconceptions as well
- Should not only focused on natural factors as Holocene involves global warming where human factors play a part as well (context matters!)

- (b) "Transition from fossil fuel to alternative energy sources is able to reduce the negative effects of climate change". To what extent do you agree with the statement? [16]

Introduction

Climate change is defined as a change in any statistical property of the atmosphere, such as a change in mean temperature. Given the finite nature of fossil fuel and the role that they play in contributing to climate change, it is no surprise that renewable forms of energy have been sought in the recent years in our bid to secure more environmentally sustainable future. Renewable forms of energy present themselves as cleaner modalities of growth, and as they do not emit greenhouse gases in their production, are on a superficial level able to reduce the negative effects of climate change. However, renewable energy should not be venerated as the silver bullet solution to our current environmental crisis as they do not address the root cause/systemic driver of climate change - which is consumerism. Additionally, transition to renewable energy is a short term solution to climate change as it rests on the assumption that technology/technological development can allow human societies to overcome environmental problems/limits. But the development of technology, ironically, can be understood as the key reason why climate change is occurring at such an unusual rate today. Lastly, transition towards alternative energy may not be able to reduce the negative effects of climate change at all locations. Not all countries are able to invest in renewable to reduce the negative effects of climate change. Low income countries, lacking economic funds, may have difficulties transiting towards such cleaner modes of growth. As such, this essay will only agree with the given statement to a small extent.

Body

TS1: On a superficial level, renewable energy forms present themselves as cleaner modalities of growth and as they do not emit greenhouse gases in their production - are on a certain level able to reduce the negative effects of climate change.

Case Study: One country developing its alternative energy sector is China. Today, the country leads the way in terms of new installed wind energy capacity. In 2009 alone, China installed 13.8 gigawatts of new wind power capacity (compared to 6.3 gigawatts in 2008). The transition into renewable/alternative energy allows China to reduce its fossil fuel reliance. On a certain level, this allows China to pursue economic growth without (excessively) contributing to enhanced greenhouse effect which is the primary cause of climate change today.

TS2: However, renewable energy should not be venerated as the silver bullet solution to our current environmental crisis as they do not address the root cause or fundamental systemic driver of climate change - which is consumerism.

Case Study: **Consumerism is a necessary process that reproduces our capitalist economy.** As the demand for goods increases, the need to produce these goods also increases. The production of goods, on top of depleting natural resources, also generates greenhouse gases. Consumption is much higher in high income countries than low income countries. As such, the high income countries continue to be greatest perpetrators of climate change. USA has the highest per capita emissions with 18.6 tonnes CO2 equivalent, while Luxembourg had 18.5 tonnes, and Australia came in third with 17.7 tonnes. The world average, for comparison, was 3.4 tonnes, and China had just 1.8 tonnes.

TS3: Additionally, transition to renewable energy is a short term solution to climate change as they rest on the assumption that technology/technological development can allow human societies to overcome environmental problems and limits. The technological infrastructures needed to facilitate renewable energy development require harvesting natural resources - which is finite. Over-exploitation of natural resources is a main driver of climate change.

Case Study: The fast expansion of the solar energy sector in China is driven by the government's drive to diversify the country's energy supply structure, which at present relies heavily on fossil fuels such as coal and imported oil. But the manufacturing (and improvement) of solar panels require technology – which is contingent upon Earth's natural resource base. A solar panel contains metals such as lead and copper and also has an aluminium frame. Production of solar cells also require pure, crystallised silicon wrapped under a thick layer of plastic membrane for protection. Harvesting these materials technology and resources is a driver of climate change in itself. On a separate note, solar plants are relatively short-lived. The cost that comes from separating and purifying the waste materials from used solar panels, an industrial process that not only requires plenty of labour and electricity input, but also chemicals such as acids that could cause harm to the environment is projected to be a huge problem lying ahead of China.

TS4: Lastly, transition towards renewable energy may not be able to reduce the negative effects of climate change in all places and locations. Not all countries are able to invest in renewable energy to reduce the negative effects of climate change. Low income countries, lacking economic funds, may have difficulties transiting towards cleaner modes of growth.

Case Study: Germany is transiting towards renewable energy like solar to achieve more sustainable futures. Enough renewable energy was produced in Germany in 2016 to cover 32% of the country's electricity consumption, a staggeringly large proportion by global standards. The transformation is placing a heavy burden on its citizens. Germany spent 25 billion euros (\$26 billion) on renewable energy in 2016, most of which—23 billion euros—consumers paid through a surcharge on their electricity bills. It is unlikely that low income countries, struggling to resolve a range

of other issues, will have the economic funds to invest in technology to reduce the negative effects of climate change.

Extension

To permanently resolve the negative effects of climate change requires us to rethink the capitalist economic structure that underpins our political, social and cultural lives. But under current approaches to manage climate change, this will remain unaddressed.

Marker's Report

- Students who did 3b did better than those who attempted 4b (Selection of question is important!)
- However, the students focused on evaluating AES alone but did not evaluate in relation to the question which is on reducing the negative effects of CC
- More elaboration required. After the P, must elaborate on your argument and ensure that it links back to the question as well. Same for case study provided

- 4 (a) Explain how human activities can influence the characteristics of flood hydrographs in the tropics. Support your answer with relevant diagram(s). [9]

Indicative Content

A hydrograph measures the amount and speed at which rainfall falling into a drainage basin reaches the river channel. A hydrograph is made up of the following important characteristics: rising and falling limb, peak discharge, lag time and baseflow. Students should discuss how various human activities such as urbanisation, deforestation, afforestation and agricultural activities that modify characteristics of drainage basin can affect the characteristics of flood hydrographs in the tropics.

A higher level response will offer detailed explanation of the changes in the characteristics of flood hydrograph due to human activities in the context of the tropical environment supported by the effective use of accurate diagrams of hydrographs comparison. Examples from the tropics should be provided to value-add the analysis.

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

Suggested Essay

A hydrograph measures the amount and speed at which rainfall falling into a drainage basin reaches the river channel. It is made up of the following characteristics: rising and falling limb, peak discharge, lag time, bankfull discharge and baseflow. A river flood takes place when the river discharge exceeds the bankfull discharge. In the tropics, due to human activities such as urbanisation, deforestation and agricultural activities that modify the characteristics of drainage basin, the characteristics of hydrograph could easily be affected.

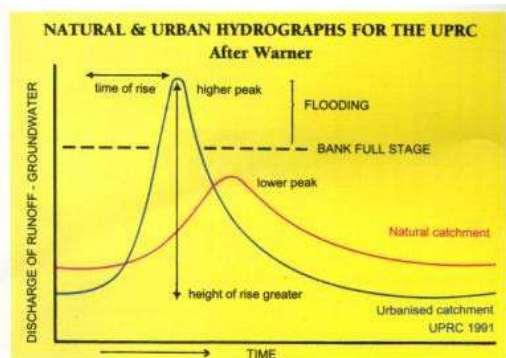


Figure 1: Comparison of hydrographs of rivers in before and after urbanisation in the Upper Parramatta River Catchment Trust, Australia

P: In the tropics, high rates of urbanisation can result in higher peak discharge, shorter lag time and lower baseflow associated with the flood hydrograph.

E: Urban population of developing countries, which most of them lie entirely within the tropics, has risen from 286 million to 1,515 million between 1950 and 1990 and is expected to reach 4 billion by 2025. Due to urbanisation, there would be higher proportion of ground covered by impermeable surface such as concrete that inhibits the process of infiltration. Less infiltration would thus result in less percolation and less formation of groundwater that would contribute to river discharge via baseflow prior to the rainfall event, as seen in Figure 1, where urbanisation leads to lower value for the approach segment of the hydrograph due to lower infiltration that could take place, more overland flow is then resulted. This increase in amount of overland flow that forms during a rainfall event then contributes directly to

the river, leading to the hydrograph to capture a higher peak discharge after urbanisation has occurred. It is also more likely for the place to experience flood after urbanisation has taken place as it is more probable for peak discharge to exceed bankfull discharge as compared to prior urbanisation. Since overland flow is also the fastest lateral flow that contributes to river discharge, the increase in generation of overland flow at a faster rate after urbanisation also leads to shorter lag time as seen in Figure 1.

Ex: This is observed in the Upper Parramatta River Catchment Trust in Australia where peak discharge is heightened, lag time is shortened and baseflow is lowered after urbanisation. It could also be observed from Figure 1 that the chance of river flooding is increased due to urbanisation that has occurred in the surrounding drainage basin of the river.

L: Hence, urbanisation in the tropics can result in changes to hydrographs such as higher peak discharge, lower baseflow and shorter lag time.

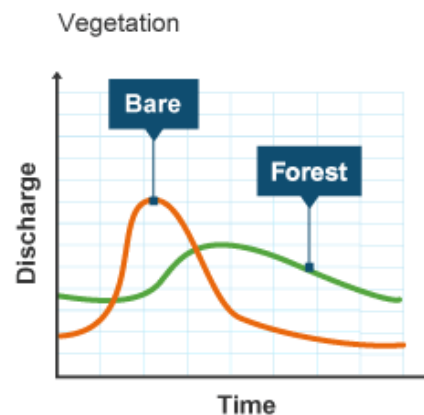


Figure 2: Comparison of hydrographs of rivers with bare and forested surroundings

P: In addition, the tropics is plagued by the issue of tropical deforestation that could modify the drainage basin greatly and result in changes to the characteristics of hydrographs. Similarly, afforestation as a measure to mitigate the issue of deforestation and climate change could also result in changes to the hydrograph, but opposite to that of deforestation.

E: In the tropics, although the rate of deforestation has decreased in the recent decade, it is still happening at a high rate and is expected to continue so in the near future, as fuelled by development and high consumption rates. When deforestation takes place in a drainage basin, it reduces the change of interception due to loss of forest cover. This increases the intensity of rainfall reaching the ground, causing rainsplash effect that will compact the soil and lower the porosity of the ground. Not only that, the lack of leaf litter results in lower humus to be formed to help with aggregating soil particles together, thus further reducing the permeability of the ground. Together, the lowered permeability of the ground reduces the occurrence of infiltration and instead promotes the generation of overland flow. This leads to higher peak discharge, shorter lag time and lower baseflow observed in hydrographs associated with after deforestation as seen in Figure 2. OTOH, afforestation as a strategy to manage deforestation or to mitigate climate change via enhancing sinks has the opposite effect. The increase in forest cover would encourage infiltration and less overland flow to form, causing hydrographs to adopt longer lag time, lower peak discharge and higher baseflow.

Ex: For example, deforestation in Indonesia Borneo has increased the occurrence of flooding over the past 30 years. Higher peak discharge with deforestation makes it more likely for the peak discharge to exceed the bankfull discharge over a shorter period of time, increasing the chance of flood occurrence.

L: Therefore, modification of forest cover in a drainage basin, in particular deforestation and afforestation, can cause changes to the characteristics of hydrographs.

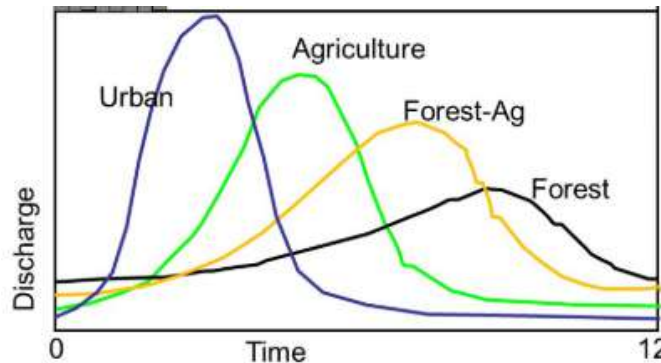


Figure 3: Effect of agriculture on characteristics of hydrograph

P: Agricultural activities that take place in the tropics can in general result in hydrographs to have higher peak discharge, lower baseflow and shorter lag time.

E: With favourable climatic conditions especially in the humid tropics, the tropics host large extent of agricultural activities to meet the global demand for food. However, agricultural activities that take place within drainage basin can affect the characteristics of hydrographs. To make space for agriculture, forests are removed and replaced with crops that have lower interception rates due to less forest cover and vegetation density. Similar to deforestation, the conversion of land use from forest to agriculture leads to lower permeability of ground due to higher rainsplash effect that compacts the soil. In addition, the rearing and grazing of animals such as cattles could further reduce the porosity of the ground. Although ploughing of soil may help to increase soil porosity, when taken as a whole, agricultural activities tend to lower ground permeability, resulting in hydrographs to have lower baseflow, higher peak discharge and shorter lag time as compared to forested land use as seen in Figure 3.

Ex: This is evident in Brazil where large tracts of Amazon Rainforest has been converted for agricultural activities such as soya plantations and cattle ranching to meet the global demand for agricultural produce, but has modified the characteristics of hydrographs that increases the chance of flood occurrence.

L: Thus, the engagement of agricultural activities often associated with deforestation has the potential to result in hydrographs to adopt higher peak discharge, shorter lag time and lower base flow.

Marker's Report

- Very poorly done. Most who attempted this did not even have clear content and conceptual knowledge (cannot even identify the characteristics of hydrograph or only focused on 1 particular characteristic for the entire response)
- Some discussed about flash and fluvial floods – needed for this case?
- Diagrams provided are not purposeful – There should be 2 hydrographs drawn on 1 diagram to compare the before and after
- No examples given by any student in their response
- Please work on content for hydrograph

- (b) Assess the view that hard engineering strategies are more effective than soft engineering strategies in managing floods in the tropics. [16]

Indicative Content

Hard engineering strategies are man-made structural controls put in place to control river discharge to offer direct protection to vulnerable areas and they include the construction of dams, levees, and flood storages and the reinforcement of channels via widening, straightening or deepening. On the other hand, soft engineering strategies involve measures that are non-structural, non-physical and involve institutional aspect that rely on participatory processes of stakeholder inclusion to address local flood concerns. They include measures such as flood prediction, warning and evacuation, flood plain zoning and afforestation. Students need to compare between hard and soft engineering strategies based on suitable criteria to evaluate whether hard engineering strategies are more effective than soft engineering strategies in managing floods.

A higher level response should consider a diverse range of strategies for both. Candidates could agree with the statement and provide justification where hard engineering strategies are deemed to be more effective than soft engineering strategies in managing floods, yet acknowledging how in some instances, soft engineering strategies could be more effective. Alternatively, candidates could disagree with the statement but also acknowledge how in some instances, hard engineering strategies could be more effective but is more of an exception. Candidates could also emphasise in this case how successful examples of flood management often include both hard and soft engineering strategies. Candidates should make use of relevant real-world case studies to exemplify their arguments and stand.

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

Suggested Essay

Introduction

Flood occurs when flow in the river exceeds its bankfull discharge. When a flood occurs, it can bring about devastating social, economic and environmental impacts. To lower these impacts, humans have found ways to manage floods, either by reducing its occurrence or intensity or increase adaptive capacity of people towards floods. Strategies to manage floods can be broadly classified into hard and soft engineering. Hard engineering strategies are man-made structural controls put in place to control river discharge to offer direct protection to vulnerable areas and they include the construction of dams, levees, and flood storages and the reinforcement of channels via widening, straightening or deepening. On the other hand, soft engineering strategies involve measures that are non-structural, non-physical and involve institutional aspect that rely on participatory processes of stakeholder inclusion to address local flood concerns. They include measures such as flood prediction, warning and evacuation, flood plain zoning and afforestation. Comparing the effectiveness of hard and soft engineering strategies, I agree with the statement to a small extent. Although hard engineering strategies can be more effective as it involves smaller group of stakeholders and provides more immediate direct protection against flood, unlike soft engineering strategies, its interference with the natural system make them unsustainable in the long run to manage floods. Furthermore, hard engineering strategies are designed to protect to a maximum limit of magnitude of flood beyond which they could fail and bring about worst impacts that soft engineering strategies would not encounter. These costly hard engineering strategies that rely on good expertise also limit its effectiveness in terms of applicability in countries with varied economic status while soft engineering strategies provide a more sustainable and viable solution to manage flood in most countries, especially developing countries.

Body Paragraphs

TS1 [stakeholders]: By involving less stakeholders in its implementation and offering more direct protection to vulnerable areas, hard engineering strategies can be more effective than soft engineering strategies in managing floods.

- Hard engineering strategies manage flood by reducing the occurrence of flood at where they are implemented and provides immediate protection to vulnerable areas and communities once completed. Soft engineering strategies on the other hand attempts to lower the impact of flood on communities, with no physical structural control in place [how people may still feel the insecurity without structural control]
- A top down approach that usually involves less stakeholders as compared to soft engineering strategies for its effectiveness. Soft engineering strategies relies heavily on participatory processes of stakeholder inclusion for its effectiveness
 - Three Gorges Dam has been effective in reducing the occurrence of flooding along the Yangtze River by controlling the amount of discharge downstream. It has helped to reduce the amount of damage suffered by the people living along the river, especially in Hunan province
 - Effectiveness of flood warning system could be undermined by people who do not heed the warnings. In September 2011, although the Nigeria's Emergency Management Agency (NEMA) had sent out messages via radio to governments and citizens in seven states of heavy rainfall prediction and getting everyone to be prepared for floods, few states adhered to the early warning messages and many did not have emergency preparedness measures at all. This led to 140 people killed and tens of thousands of people being displaced. (<https://reliefweb.int/report/nigeria/flood-early-warning-messages-not-heeded>)

TS2 [sustainability in long term]: However, in the long run, hard engineering strategies present itself as a less sustainable way to manage flood due to its interference with the natural system unlike soft engineering strategies.

- Flood is a natural phenomenon/hazard that can happen due to variety of reasons such as excessive rain, rapid snowmelt or even the failure of man-made flood management
- Hard engineering strategies often involve modifications to the river or the implementation of structure in the rivers. They aim to either increase the capacity of river to hold more water or increase the speed of flow so as to reduce the occurrence of flood. However, such strategies would disrupt the natural processes that would otherwise take place without the modifications as the dynamics of a river will be affected.
- On the other hand, soft engineering strategies are often implemented in a way that is ecologically sensitive and more sustainable in the long run. They do not interfere with the natural system but rather aim to reduce the risk of people to flood by lowering their vulnerability or increasing their capacity to cope
 - Channel realignment in the Mississippi River, USA: length of the river has been reduced by 240km to reduce the occurrence of flood. Yet, as flow velocity is faster, the river has more energy to erode the river banks and bed. This leads to the deposition of extra sediment that is derived from upstream erosion in the downstream reaches and aggradation of the river bed is resulted. This has an impact on the river dynamics in the long run as aggradation of river bed downstream would lower the river

capacity to hold its discharge and in turn increase the occurrence of flood there, transferring the flood issue spatially downstream.

- Floodplain zoning that involves placing restrictions on land usage in the areas surrounding a river or ensuring certain protection schemes in place for locations deemed as high risk areas. This provides some leeway for the river to flood naturally, should discharge exceed capacity. In Australia, planning controls are put in place to ensure new buildings and works on properties are appropriate to the flood hazard as pre-determined by flood hazard mapping that aids in floodplain zoning to lower the severity of flood impacts.

TS3 [Technological sustainability]: Also, hard engineering strategies are often designed to protect up to a certain magnitude of flood and could bring about worst impact in the event it fails while soft engineering strategies would not encounter such issue.

- Based on past data collected on flood an area experienced, hard engineering strategies are implemented in the most economical way to protect communities from floods that are of higher frequency. Thus, hard engineering strategies implemented may not be designed to protect communities from flood events of high magnitude due to its lower probability of occurrence.
 - For example, a dam failure incident happened in 1975, when Banqiao dam in China broke when Typhoon Nina resulted in a 1-in-2000 year flood when it is only designed to for a 1-in-1000 year flood. 26,000 people who were living downstream died when their villages were flooded. The dam was not constructed to withstand this high intensity rainfall brought about by the typhoon that resulted in the high magnitude flood.
- OTOH, soft engineering strategies do not have this issue as they do not involve structural control to hold back or contain discharge. It is recognised that flood can still occur but measures are put in place to manage flood via the management of people's behaviour to lower their vulnerability or the management of the natural system to lower the intensity of flood
 - Afforestation in the Han River Basin, Inner Mongolia, China. On 21st July, 1989, a heavy storm of about 186 mm precipitation hovered over those two river basins. In the Han river basin which has been subject to engineering and afforestation measures for six years, the flood peak flow is $3\,100\text{ m}^3\text{ s}^{-1}$ as compared to the nearby Bu river basin which has never been subject to any remedial or alleviation measures and the peak flow is $4300\text{ m}^3\text{ s}^{-1}$. The area of the former river basin is 1.6 times that of the latter but its flood peak flow is only 72% of the latter

TS4 [Spatial influence]: Furthermore, hard engineering strategies often require high cost that makes it less cost effective in some place contexts where there is a lack of economic capacity as compared to soft engineering strategies.

- Hard engineering strategies tend to be a costlier option to manage flood than soft engineering strategies. High cost is involved in the design, expertise, resources, maintenance and implementation of the strategies required.
 - In the case of New Orleans, USA, flood control infrastructure along the Mississippi River is estimated to cost about USD \$14 billion. Though hard engineering strategies help to control floods and lessen impact, such expensive strategies may not be an available option to countries or cities with limited economic capacity. Instead, countries or cities with weaker economic capacity would often opt for soft engineering strategies that serve to reduce the impact of floods but at a lower cost or more cost effective.

- For example, in Bangladesh, since the floods in 1987, hard engineering measures in place have shown to bring little benefits in managing floods. Instead, flood forecasting and warning scheme that could warn owners of dangers to allow for advance evacuation or preparation serve as more cost-effective strategies. Using satellite images, flood warnings are given five to eight days before it happens and disseminated through Voice Message Broadcast and Short Message System. The 2014 floods in Bangladesh have shown community people received, understood and trusted the warnings give, utilising it to take actions to protect their lives and livelihoods.

Conclusion

In conclusion, I agree with the view that hard engineering strategies are more effective than soft engineering strategies in managing flood to a small extent. Although hard engineering strategies involves less stakeholders and offers more direct protection unlike soft engineering strategies that attempts to lower the impact of flood to communities and relies heavily on multiple stakeholders for its effectiveness, hard engineering strategies are often less sustainable as they modify the environment that displaces the issue spatially and temporally unlike soft engineering strategies that adopt more ecologically sensitive measures. Furthermore, hard engineering strategies has an upper limit to its design and should a flood beyond this limit were to occur, can bring about worst impact to the area while soft engineering strategies that make use of non-structural controls face no such issues. Also, hard engineering strategies are less effective than soft engineering strategies as the high cost involved makes them less cost effective in some place contexts where there is a lack of economic capacity. That being said, the effective management of floods cannot be simply reduced to just the adoption of either hard or soft engineering strategies. Based on the place itself, authorities need to determine the best mix of strategies most suited to local conditions to be taken to put in place hard engineering strategies to prevent the occurrence of flood from happening and also soft engineering strategies to educate people towards the actions to take to lower their vulnerability and increase their capacity to cope should a flood were to take place.

Marker's Report

- Another poorly done question. Most students did not answer to the demands of the question. The question did not ask to evaluate on hard engineering strategies but asked to evaluate the effectiveness of hard vs soft engineering strategies in managing floods! Yet, almost all students only focused on evaluating hard engineering strategies hence a L1
- Note that this is a comparative question and all TS should compare both hard and soft engineering strategies based on certain criteria
- Students need to work on crafting argument driven TS

Theme 2: Urban Change

- 5 (a) Explain the causes of traffic congestion in cities of low levels of development. [9]

I: Explain

R: What are the causes of traffic congestion in cities of low levels of development.

A:

Introduction:

Traffic congestion is defined as a condition on transport networks that occurs as use increases, and is characterised by slower speeds of vehicles, longer trip times and increased vehicular queuing. In urban areas at low levels of development, the increase in private vehicle ownership, lack of public transportation, insufficient road capacity and increase in urban sprawl are some reasons that contribute to traffic congestion issue.

Body Paragraph 1:

Increase in private vehicle ownership is one reason that caused traffic congestion issue in urban areas at low levels of development. Due to rising income, rapid economic development and a burgeoning middle class in developing countries, there has been an increase in private vehicle ownership in the past 2 decades in urban areas at low levels of development. Without the increase in road capacity, the increase in private vehicle usage on the road would translate into traffic congestion. This is evident in Guangzhou, China, where the number of privately-owned cars registered monthly averages at a high of around 6000 to 7000 since 2006. This has led to traffic congestion issue being very common in Guangzhou itself. Its rush hour average car speeds are estimated to be at 20km/h and this is expected to become slower in following years. Thus, the increase in private vehicle ownership in cities of developing countries has led to the issue of traffic congestion experienced.

Body Paragraph 2:

Besides the increase in private vehicle ownership, the lack of public transportation could also lead to the issue of traffic congestion in urban areas at low levels of development. In cities of developing countries, due to lack of economic capacity and poor urban planning, they may lack public transportation. This lack in public transportation results in people to rely on private vehicles which exacerbates the issue of traffic congestion. Furthermore, lack of proper planning also causes transport systems to be developed in a haphazard manner, leaving little room for future development. For example, in Hanoi, Vietnam, the lack of public transportation has led to its people to rely on private vehicle such as motorcycle for commute. The city has more motorcycles than households and more than 80% of journeys in the city were carried out by motorcycles and scooters in 2008. This has led to heavy traffic congestion in Hanoi. Hence, traffic congestion issue in urban areas at low levels of development could be caused by the lack of public transportation.

Body Paragraph 3:

In addition, traffic congestion issue in urban areas at low levels of development could be brought about by insufficient road capacity. There are often insufficient road capacity in cities of developing countries due to lack of proper urban planning to manage traffic issues. With this, the roads in the city are not able to accommodate to the high volume of vehicles which result in traffic congestion issue. Even if the road exist, they often tend to be narrow, poorly maintained and unpaved which exacerbates the issue of traffic congestion. In Bangkok, Thailand, there is a severe shortage of roads. Only 18% of its surface is covered with roads, as compared to 20% in majority of other major cities. Its road capacity is only sufficient to accommodate 2 million vehicles a day but the daily

number of vehicles on the road in Bangkok is more than double of that. This insufficiency in road capacity aggravates that transport congestion that Bangkok faces. Bangkok's traffic moves 57% slower on average compared with a clear road situation. Therefore, traffic congestion issue in urban areas at low levels of development could be brought about by insufficient road capacity.

Body Paragraph 4:

Lastly, the increase in urban sprawl could be a reason as to why there is the issue of traffic congestion in urban areas at low levels of development. Urban sprawl is the spread of an urban area into what used to be the countryside. As cities in developing countries undergo suburbanisation, more people are moving to suburbs at the edge of cities. This may worsen traffic congestion as these people may see a need to drive their cars into the city centre to get to work. This is further compounded by people being brought into city on large roads or motorways and these roads often link up with smaller, older, narrower roads in the city centre which may then cause a bottleneck and congestion. This is evident in cities of Mexico, where in a bid to boost economic growth, the government has built more houses at the periphery. This led to a 100% increase in urban population while urban areas increased by 600%. This huge increase in urban sprawl and the associated increase in people living out on the periphery to access their places of employment resulted in severe traffic congestion in Mexico cities. If urban sprawl is not properly managed by urban authorities, the issue of traffic congestion will be resulted. Hence, traffic congestion issue in urban areas at low levels of development could be due to the increase in urban sprawl.

- (b) Evaluate the strategies used to manage traffic congestion in cities. [16]

I: Evaluate

R: To what extent have the strategies use to manage traffic congestion in cities been effective?

A:

Introduction:

Transport problems in urban areas often arise because of the large numbers of automobiles found on the road. As the carrying capacity of the road is limited, the influx of cars into the urban areas would give rise to problems such as congestion. As a result, the congestion would lead to a waste of time waiting for the cars to clear while air pollution is detrimental to health, especially to those with respiratory problems. To reduce the transport problems, governments often adopt different management strategies and implement them hand in hand. Despite the myriad of strategies used to manage congestion in urban areas in both high and low levels of development, the effects may not be that of the desired level of the urban planners.

Body Paragraphs:

TS1: To cope with traffic congestion, urban authorities often need to devise short term solutions to ease the situation with more immediate effects. Supplying new roads is a strategy used to manage traffic congestion in cities. It is based upon the assumption that cars can travel to places using different routes. When new roads are supplied, carrying capacity of the roads also increase – alleviating problems of congestion in the short run. To alleviate the traffic congestion issue in Bangkok, urban authorities have seek to increase road supply and one latest project is the construction of the Sirat-western Bangkok expressway – which has recently opened [Need a home tutor? Visit sirachon16.com](https://www.sirachon16.com) long link. The 32-billion-baht project intends to relieve traffic congestion in western

Bangkok. In the short run, such solutions do help to alleviate congestion in the older roads to a large extent.

TS2: However, to deem such short term solutions as successful in alleviating traffic congestion will be myopic. This is because whilst authorities have been building more roads to ease congestion, it has become increasingly apparent to transport planners that the growth in traffic is outstripping their ability to supply new road space, i.e. new roads do not appear to reduce congestion. Furthermore, there is considerable evidence that new roads actually encourage the growth of traffic volumes instead of spreading the volume. Statistics show that in the last ten years, Shanghai's road capacity increased by 1.2 times (representing a combination of new roads and the addition of new lanes to existing roads) while the number of cars went increased fivefold. Even cities in the more developed countries face the same long term problem of demand of roads outstripping its supply despite sophisticated freeway networks. For example, despite the fact that American cities have sophisticated freeway networks designed to allow an average speed of 50 to 70 mph, it was estimated that congestion in California's urban areas was costing \$6 million a day in delays and fuel wastage in 1995. It was also estimated that by the early 1990s, road networks in half of the 50 largest cities in the USA had reached saturation point. Thus, short term solutions to ease traffic congestion can only be successful to a small extent if one were to evaluate the effects of this strategy in the long run.

TS3: With increasing wealth in cities, strategies that target demand of roads via controlling the number of cars can be limited in its success to ease congestion as well. Strategies that restrict the number of cars on the road via the Certificate of Entitlement (CoE) such as in Singapore and the pico y placa strategy in Bogota, Columbia can be effective to a small extent. Taking the pico y placa strategy from Bogota, for example, the system works in a way such that it restricts vehicles with license plate numbers ending in certain digits from traveling the streets between certain times of the day. The system has been successful as the number of cars on the road had been reduced by 15% since the implementation. As a result, traffic congestion is reduced and other countries had adopted the pico y placa system after the successful implementation in Bogotá. However, the pico y placa system has its flaws too. While it restricts vehicles with license plate numbers ending in certain digits, it does not stop the wealthier people from getting multiple cars as they have the ability to afford it. Hence it does not deter the wealthier groups from commuting in automobiles which would then lead to pollution and congestion all over again. Therefore, the pico y placa system is not successful in the sense that it gives rise to the purchase of a second privately owned automobile which in return, contributes to air pollution and congestion.

TS4: Longer term strategies to alleviate congestion seems more feasible in the long run but can be difficult to achieve as it involves not only huge capital investment in infrastructure but also a shift in mindset in the commuters. Usually, mass public transport will reduce the number of vehicles on the road. However, if people are to be attracted on to public transport in greater numbers it is vital that public transport is seen to have advantages over private cars. For mass transit to work, urban planners should aim to build their cities with greater mixed-use and high-density development, integrating the use of transport considerations directly into land-use planning with the aim of enabling individuals to sustain their mobility, but to do so with fewer vehicle trips. With a pro-transit government, Singapore has produced one of the most efficient transit-land use symbioses in the world. The urban planners in Singapore have been able to integrate transport planning in their land-use deliberations. The initial Concept Plan in 1971 provided for decentralisation of population from overcrowded inner urban areas to a series of high-density new towns served by an efficient transit system comprising the Mass Rapid Transit (MRT) and feeder bus lines. The 1991 revised Concept Plan envisaged future urban growth based on further development of new towns in a hierarchy of centres linked by the MRT in a pattern of 'concentrated decentralisation'. By 2030, it is the

government's aim to let its residents to be able to walk to the nearest train station in 10 minutes and have been increasing its rail network density to alleviate congestion problems on the road. Because of these transportation services, the traffic congestion and air pollution had been reduced significantly in Singapore.

Conclusion:

Upon adopting a holistic point of view, transport problems can be reduced successfully with the right management strategies. While each strategies has its own flaws, other strategies can cover its flaws when implemented together. Therefore, to achieve the optimum results of reducing transport problems, a combination of strategies would do the job. However, these strategies cannot be implemented permanently as car ownership patterns change over time. As such, the strategies must be reviewed and change accordingly.

- 6 (a) Explain the issues affecting the elderly in the city.

[9]

I: Explain

R: What are the issues affecting the elderly in the city?

A:

Introduction

Age generally refers to how old a person is. From a biological and physiological perspective, age brings about inevitable physical changes in one's outlook and behaviour. But age, from a critical perspective, is also one that is "socially constructed". Saying that age is socially constructed suggests that a person's chronological age is affected by societal norms attached in age groups which in turn means that each group is expected to behave a certain way and to have to a certain role. The elderly population living in cities today face and experience a range of issues and challenges.

Body

TS1: The elderly population in cities today frequently face issues of spatial exclusion and segregation.

Our cities are designed for a "mythical average person" – super-mobile, literate, without dependants or disabilities. This person is more likely to be young than old. Spatial exclusion can be witnessed in the context of Singapore where elderly who only speak dialects and mother tongues face issues orientating in urban environments that cater predominantly to English speakers. Lack of intelligible signage discourage elderly from exploring far from their familiar home and neighbourhood, physically excluding them from many urban experiences. The "social construct" that elderly do not belong to many urban spaces have also restricted their mobility. Urban spaces such as "fashion stores" in shopping malls are often seen as "young". Elderly who are observed "shopping" in a "youthful" shop are thus deemed as out of place – suffering from gazes and stares. Such "social construct" that elderly do not belong to many urban environments discourage them from exploring far from their familiar home and neighbourhood, excluding them from many urban experiences. A secondary implication of spatial exclusion brought about by elderly unfriendly urban design is segregation – whereby "self-imposed house arrest" of the elderly have meant that city centres have become age-cleansed youth enclaves. A city that excludes certain social groups is an unjust and unliveable city.

TS2: Additionally, the elderly population in cities today also face issues of economic marginalisation.

Capitalism promotes people who are productive and independent. It is likely that the elderly population are unable to meet the requirements of an "ideal citizen" in a capitalistic economy. The elderly population are not able to work as efficiently as the young. They may also experience health limitations and are unable to perform types of work that demand physical strength. These biological and physiological restrictions also reduce their mobility, a feature commonly desired by employers. Economic marginalisation of the elderly is also perpetuated by the "social construction" of old age associating elderly population with characteristics of "physical decline", "immobility" and "unproductivity". In addition, there is also a belief that elderly are outdated and unable to master the techniques of handling modern technologies. While such associations are gross generalisations, they have reduced the elderly population's economic mobility and chances. A case in point is Australia. Based on a research from the Australian Human

Rights Commission, it is documented that 27% of Australians aged 50 years and above have had experienced some form age discrimination at workplace in the last two years.

TS3: It is however important to note that the experiences and issues face by the elderly population is not homogeneous across and within cities.

At a global level, varying perceptions of “old age” across cultures have translated into different experiences for the elderly. For instance, much of East Asian’s (Chinese, Korean etc.) regard for “old age” is rooted in the Confucian principle of filial piety, a fundamental value dictating that one must respect one's parents. Younger members of the family have a duty to care for the older members of the family. And even outside the family unit, East Asians are socialized to respect and show deference to older individuals. This contrasts starkly with western capitalist cultures where old age is dominantly associated with “physical decline”. “Old age” also intersects with other identity markers such as race, ethnicity, religion, gender, sexuality etc. to create varying levels of marginalisation for elderly. For instance, a research performed by Ontario Human Rights Commission of old age experiences in Toronto, Canada has found out that while older men do experience particular concerns, the unique and often compounded disadvantage experienced by older women needs to be recognised. Owing to a number of factors including longer life expectancy, labour force participation patterns, wage inequality, social programs and systems designed primarily from a male-centred or gender-neutral perspective, older women are more likely to experience poverty. This reflects how “old age” can compound with other identity markers (gender in this case) to create different levels of marginalisation and urban experiences.

- (b) Assess the extent to which strategies employed to manage issues affecting different social groups in the city have been effective. [16]

I: Assess

R: To what extent have the strategies used to cater to different needs of social groups in cities been successful?

A:

Introduction:

In each city, there would be different proportions of social groups with a variety of needs which city planners and authorities would try to satisfy. For this essay, the social groups which will be discussed would be the elderly and the migrants residing in the cities. Although there are subjective interpretations as to what constitute as elderly and the idea of it as a social construct and subjected to many interpretations, for the purpose of this essay, elderly is defined as those living beyond the age of 60. The other group in question would be the migrants, who can be broadly categorised into economic migrants who are skilled and unskilled, political and environmental refugees. Strategies catering to the needs of different social groups in cities have been **effective to a small extent**. This can be due to a variety of reasons ranging from insufficient economic capacity to sustain these strategies for the long run, inability to meet the diverse needs of the different social groups, or having to face difficulty in bringing about a change of perceptions which are often ingrained in people's minds or that strategies themselves bring about other sets of unintended social consequences. However, strategies to cater to the needs of different social groups in cities may be effective if they cater to the essential needs of these social groups.

Counter paragraph 1

Some strategies do cater to the essential needs of these social groups, improving their quality of life. Migrants and refugees should be assisted in overcoming difficulties in accessing basic essential needs such as water, shelter and food, to empower and improve their quality of life. For elderly, their needs may include the freedom to access places in the city and for them to have a permanent housing or shelter close to areas with healthcare services and for active ageing to take place. For instance, in Britain, economic aid was given to asylum seekers in the form of weekly allowance and more for women who are pregnant or with children. For active ageing, there should be optimised opportunities for healthcare services, participation in social networks, sense of security with community support with respect and inclusion. Therefore, strategies catering to the needs of the elderly should enhance the enablement for elderly. In this aspect, Singapore has developed 39 new Senior Care centres by 2016 to meet increasing demand for aged care in the heartland communities. These senior care centres provide day care, dementia day care, day rehabilitation services and basic nursing services and over time, may even begin the delivery of home care services. These services have been well received by the elderly and are also very much welcomed by the families of the elderly. Hence, the strategies that cater to the needs of the different social groups may be effective if they are able to provide the essential needs.

Support Paragraph 1:

However, in retrospect, due to the fact that these social groups are within themselves too diverse for states and planners to adequately cater to the large diversity of needs that these groups may require, it may not be possible to satisfy all their needs. Every social group is often generalised and seen as one where they might face the same generic problems and therefore face the same needs. As a result, it creates a lack of understanding by the government and urban authorities when in fact they could have offered more assistance if they further narrow down their definition of social groups. In other words, a social group's needs can be further assessed when it is associated with religion, gender status and culture. For example, a research performed by Ontario Human

Rights Commission of old Age experiences in Canada has found that while older men do experience particular concerns, the unique and often compounded disadvantage experienced by older women needs to be recognised. Owing to a number of factors including longer life expectancy, labour force participation patterns, wage inequality, social programmes and systems designed primarily from a male-centred or gender-neutral perspective, older women are more likely to experience poverty. This reflects how old age can be compounded with other identity markers to create different levels of marginalisation and urban experiences. Going back to the example mentioned above on Senior Care Centres, there still exist the problem of elderly who are living in poverty or who are disabled and may not be able to make it to the senior care centres or afford to go for these senior care centres. The problem is the same for the strategy on improving bus transport system to enable elderly to get out and about on their own by providing bus information and disabled friendly facilities on the roads. This still do not cater to the needs of the elderly living in poverty who might not even have the monetary means to pay for public transport on their own. Therefore, whilst generic issues may be addressed by strategies, the many facets of issues faced by the diversity within each social groups will impede the authorities' effectiveness to cater to each and every single need.

Support Paragraph 2:

Moreover, for some countries, even strategies to meet the basic needs of socials may not be feasible or successful as such strategies demand for a strong political commitment, economic capacities and planning capabilities from the government to successfully plan and implement it at the community level for the different social groups. Developed countries and their cities have the fundamental infrastructure and capital and are striving towards green issues as opposed to developing countries that have yet to meet their basic needs and are struggling with a range of other brown issues. Therefore, in many of these developing countries, or even in poorer cities within developed nations such as Texas will have problems providing even basic needs for migrants and/or elderly. In Turkey, more than 1.8 million refugees are living along its borders and is said to put a strain on Turkey as it has already spent more than 6 million dollars on refugee camps and providing them with food. This highlights how the city's budget allocation is insufficient to alleviate their economic strain, exceeding their financial capacity and even planning capabilities to cater to the enlarging group of refugees and migrants in the cities. Going back the previous example of providing information on transport options to influence elderly's use of public transport, it is a costly system which Singapore and Himeji, Japan are currently using and this will not be possible to be emulated in cities struggling with brown issues. Therefore, strategies to cater to the needs of the social groups may be met with financial constraints and planning blight which further reduce the strategies' success.

Support Paragraph 3:

Strategies to cater to different social groups have been effective to a small extent as they often do not change the negative perceptions of social groups and hence do not solve the root cause behind their marginalisation. These perceptions are often ingrained social constructs which may take generations of educating the young to finally be eradicated to a certain extent. Over the past years, both elderly and migrants have been associated with negative connotations in the society. These stigma and labellings may directly or indirectly affect the effectiveness of strategies such as the ones which attempt to provide opportunities for integration into the mainstream society and for these groups to feel included in the city. For example, promoting a culture of respect and social inclusion is taken by the Tripartite Alliance for Fair and Progressive Employment Practices (TAFPE) in Singapore to promote the adoption of fair, responsible and progressive employment practices. Today, TAFEP has been producing advertisements and running campaigns aimed at convincing employers and employees to look beyond their age biases, and see the elderly's abilities and the value they bring to the organisation. However, such campaigns and advertisements may not guarantee the change in perceptions of the

society. It is still hard to convince employers to retain these older worker in the companies especially in the face of economic recession and cost-cutting measures need to be undertaken. Therefore, whilst strategies targeting a change in mindset and attitude towards certain social groups are essential, it may take long time for them to take effect and still does not alleviate unfair work practices and uneven power relations in the workplace in the short run.

Support Paragraph 4:

Finally, strategies to cater to different social groups may bring about other sets of unintended social or economic consequences. It is sometimes hard, or even too demanding for strategies to be able to cover all economic, social and cultural grounds for a 'holistic' approach. For example, to cater to the needs of migrant workers in Singapore, the government has commissioned for Workers' dormitories to be built in areas like Tuas and Tampines. These self-contained workers' dormitories include services such as remittance services, mini food court, barbers and facilities such as basketball courts and kitchens. This provides a basic level of services and facilities to cater the essential needs of the migrant workers. However, in doing so, some are arguing that this adds to the further socio-spatial segregation of these workers as these self-contained dormitories would mean they do not need to travel out of the dormitories. This impedes chances for mutual understanding between the locals and the migrants, and misunderstandings and misconceptions about them may not be easily eradicated or be reduced. As such, for the state or authorities to be able to cater the needs of the social groups for all their needs without some consequences would therefore be impossible, unless certain complementary policies are put in place, which brings about the question of inter-agency cooperation and its effectiveness.

Conclusion

In the final analysis, it is almost impossible to cater to the needs of each and every single individual in these social groups as their needs differ according to their identities, level of income and differing backgrounds. It is also important to bring in the fact that the idea of catering to the needs of different social groups in the context of liveable cities is fluid and means different things to different individuals. Therefore, whilst the cities gear towards liveability for all, one must acknowledge the difficulty in trying to satisfy all the different needs of these individuals at the government or planning authorities' level. Sometimes, it is up to us individuals to make the changes from bottom-up approach to try and make the city a comfortable and liveable place for everyone.

Copyright Acknowledgements

Question 1 Resource 1	https://www.google.com/earth/ (last accessed 20 Aug 2018)
Question 1 Resource 2	Copyright Millennia Institute
Question 2 Resource 3 & 4	https://www.csgmidwest.org/publications/may2011populationtrends.aspx (last accessed 20 Aug 2018)
Question 2 Resource 5	https://www.clickondetroit.com/real-estate/bedrock-gets-final-approval-on-4-major-redevelopment-projects-in-downtown-detroit (last accessed 20 Aug 2018)



NANYANG JUNIOR COLLEGE

Year 2 Preliminary Examination

H1 GEOGRAPHY

8813/01

Paper 1

14 September 2018

3 hours

Additional Materials: Answer Paper
 1 Insert
 World outline map

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. You and a group of classmates were tasked with undertaking a fieldwork exercise to investigate the influence of land use on infiltration rates in Singapore. The group was divided up into teams of four to measure the infiltration rate at various sites.

Two sites were chosen to conduct their group investigation. Site A is located at Upper Pierce Reservoir Park, found within the Central Catchment Nature Reserve of Singapore. Site B is located at the Braddell Heights residential estate.

The investigation was conducted over four consecutive Sunday mornings between 8 – 11am in May 2018.

The infiltration rate is measured using an infiltrometer and by timing the speed at which the water level in the infiltrometer falls. The following equipment and materials were used to measure infiltration rate at the two different land use sites.

- Single-ring infiltrometer of a height of 30 cm and a diameter of 30 cm.
- Plentiful supply of water
- A 30cm ruler
- Hammer
- Stopwatch

The following steps were taken:

At the respective sites, the infiltrometer was driven to about 15 cm deep into the ground using the hammer. A 30cm ruler was placed vertically inside the ring to measure the fall in the water level.

Start the test by pouring water into the ring until the depth is approximately 70-100 mm. Record the clock time when the test begins and note the water level on the ruler.

After 1-2 minutes, record the drop in water level in the infiltrometer on the ruler and add water to bring the level back to approximately the original level at the start of the test. Record the water level. Continue the test until the drop in water level is the same over the same time interval.

Take readings frequently (e.g. every 1-2 minutes) at the beginning of the test, but extend the interval between readings as the time goes on (e.g. every 20-30 minutes).

Resource 1 shows the land use associated with each site (Site A and B). Resource 2 shows the location where the group investigation was carried out (Site A and B). Resource 3 shows the data collected to calculate the infiltration rates at Site A.

- (a)** With reference to Resources 1 and 2, suggest a suitable hypothesis for your group's investigation. [1]
- (b)** Suggest ways to ensure the safety of you and your classmates in the conduct of this investigation. [6]
- (c)** Suggest a limitation of the data representation method shown in Resource 3 and sketch a line graph to represent the infiltration rates over time. [4]
- (d)** Your group concluded that some of the infiltration data collected may not be completely reliable and / or accurate. Explain how the process of planning and data collection could be improved. [6]
- (e)** Assess the usefulness of this investigation in helping you to understand the factors influencing infiltration rates. [8]

Section B**Theme 2: Urban Change****Sustainable urban development in India**

2. Resource 4 shows the waste found along the banks of Yamuna River in New Delhi. Resource 5 shows the water quality status of Yamuna River. Resource 6 is an article on pollution in India.
- (a) With reference to Resource 4, describe the composition of waste found along the banks of Yamuna River. [2]
 - (b) With reference to Resource 5, describe the extent of the pollution in Yamuna River. [4]
 - (c) With reference to Resource 6 and your own knowledge, suggest reasons to explain the state of pollution in India. [6]
 - (d) With reference to Resources 5 and 6, suggest **three** possible strategies to help combat the pollution problems in India. [6]
 - (e) Using all resources, explain how pollution affects sustainable urban development in India. [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 impacts of El Nino and La Nina in countries at low levels of development. [9]
- 3 (b)** To what extent are global solutions more effective than local ones in the management of global warming? [16]
- 4 (a)** Explain the influence of tropical climates in affecting channel processes. [9]
- 4 (b)** Assess the strategies used to predict, mitigate and respond to the effects of flooding. [16]

Theme 2: Urban Change

- 5 (a)** Explain the reasons for traffic congestion in cities with fast growing economies. [9]
- 5 (b)** Assess the effectiveness of different attempts made to ease traffic congestion in large urban areas. [16]
- 6 (a)** Explain how the different sources of fear can affect the liveability of cities in economically developed countries. [9]
- 6 (b)** Discuss how strategies to cope with fear in cities have been successful in improving liveability. [16]



NANYANG JUNIOR COLLEGE

Year 2 Preliminary Examination

H1 GEOGRAPHY

8813/01

Paper 1

14 Sept 2018

3 hours

INSERT

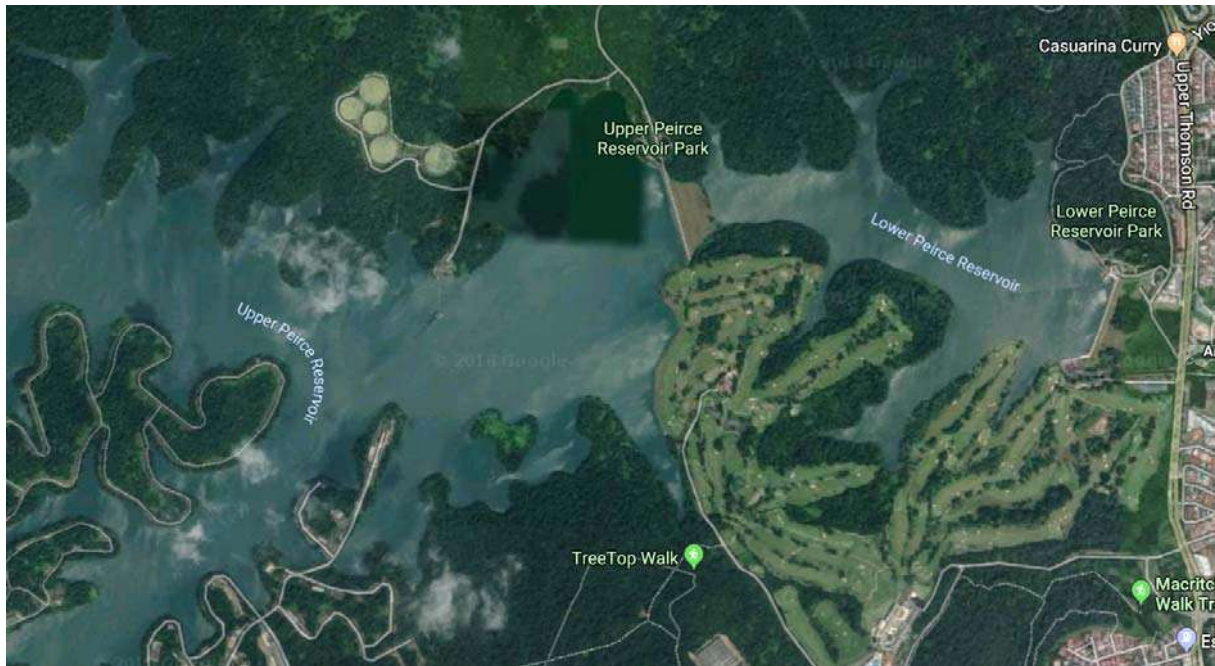
READ THESE INSTRUCTIONS FIRST

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

Resource 1 for Question 1

Land use associated with site A and site B

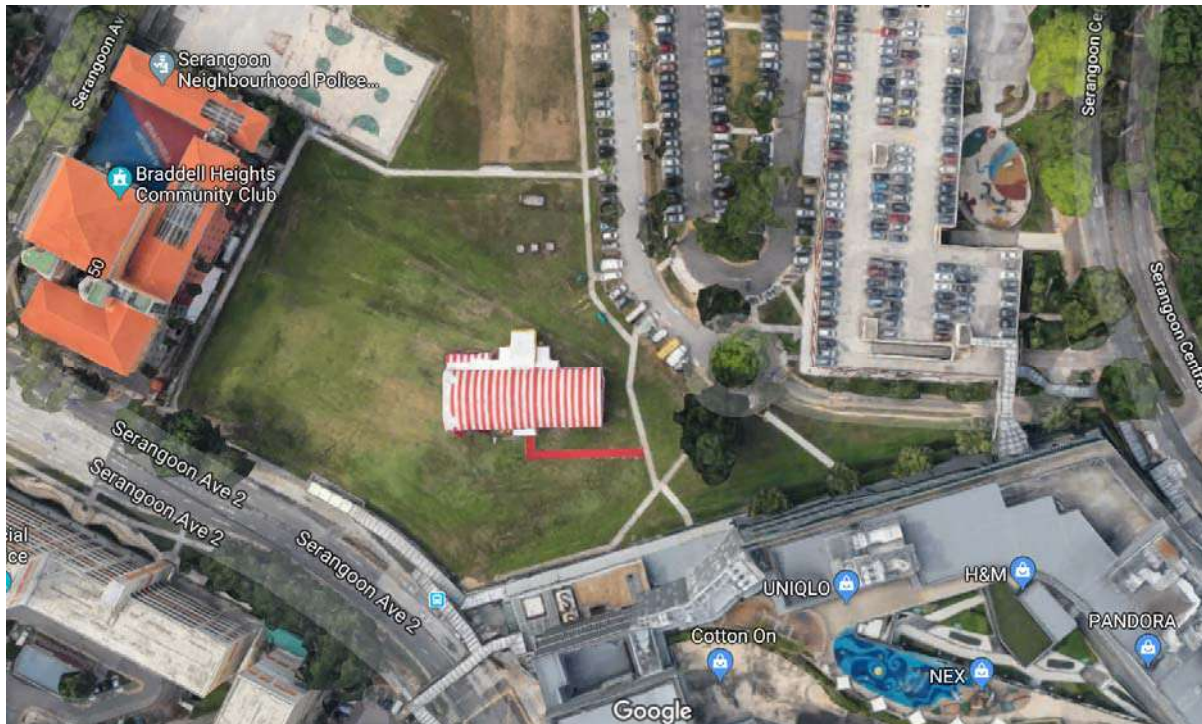
Site A



Source:

<https://www.google.com/maps/place/Upper+Peirce+Reservoir+Park/@1.3675558,103.8104646,2607m/data=!3m1!1e3!4m5!3m4!1s0x31da1130db42d2e7:0xbf28593be65d1c05!8m2!3d1.3746589!4d103.8112464>

Site B



Source: <https://www.google.com/maps/@1.351602,103.8711973,228m/data=!3m1!1e3>

Resource 2 for Question 1

Site A



Source: https://www.yelp.com.sg/biz_photos/upper-peirce-reservoir-park-no-title?select=01KTzRUGvkG4nZtx39lp7A

Site B



Source:
<https://www.google.com/maps/@1.3512452,103.8704922,3a,75y,43.45h,83.24t/data=!3m6!1e1!3m4!1srX6-oHxdrdte6LwtGMe2FA!2e0!7i113312!8i6656>

Resource 3 for Question 1

Data collected from Site A

Reading on the clock	Time diff	Water level readings [Before filling mm]	Water level readings [After filling mm]	Infiltration mm	Infiltration rate mm/min	Infiltration rate mm/hour
0900	0		100			
0902	2	92	100	$100 - 92 = 8$	$8/2 = 4.00$	240
0905	3	93	99	$100 - 93 = 7$	$7/3 = 2.33$	140
0910	5	89	101	$99 - 89 = 10$	$10/5 = 2.00$	120
0920	10	84	100	$101 - 84 = 17$	$17/10 = 1.70$	102
0930	10	89	102	$100 - 89 = 11$	$11/10 = 1.10$	66
0940	10	95	101	$102 - 95 = 7$	$7/10 = 0.7$	42
1000	20	92	100	$101 - 92 = 9$	$9/20 = 0.45$	27*
1020	20	91		$100 - 91 = 9$	$9/20 = 0.45$	27*

Resource 4 for Question 2**Waste found along the banks of Yamuna River in New Delhi**

Source: <https://e360.yale.edu/features/dying-waters-india-struggles-to-clean-up-its-polluted-urban-rivers>

Resource 5 for Question 2

Water quality status of Yamuna River

Sewage Generated	Total Sewage	Sewage Treated	Remarks
Daily Sewage Generated in Delhi	2871 million litres	1478 litres	Remaining sewage goes into the Yamuna through the 17 drain
TDS	Quantity	Permissible Limits	Remarks
Content of Suspended Solids in Yamuna	1000-10,000 mg/L	100 mg/L	
BOD	Quantity	Permissible Limits	Remarks
Biochemical Oxygen Demand (BOD)	15-30 mg/L	3 mg/L	
Coliform Level	Quantity	Permissible Limits	Remarks
Coliform Level in Yamuna	11.8 Crore per 100 ml of water	5000 per 100 ml of water	Coliforms causes many serious diseases relating to the digestive system
Dissolved Oxygen	Quantity	Normal Oxygen Level	Remarks
Dissolved Oxygen Level	0 mg/L	4 mg/L	The dissolved oxygen level is critically important for water plants and fish

Source: https://file.scirp.org/pdf/JWARP20100500012_66973799.pdf

Note: Biochemical Oxygen Demand (BOD) refers to the amount of dissolved oxygen used by microorganisms in the biological process of metabolizing organic matter in water. The more organic matter there is (e.g., in sewage and polluted bodies of water), the greater the BOD; and the greater the BOD, the lower the amount of dissolved oxygen available for higher animals such as fishes.

Resource 6 for Question 2**Article on pollution in India**

Of the over 16 billion gallons of sewage that India produces every day, 62% ends up on nearby water bodies untreated, according to the Central Pollution Control Board, a federal pollution monitor.

Many Indian cities that built wastewater treatment systems don't fully use them because of electricity shortages or other problems. Several others haven't built them at all.

On top of that, damage from India's industrialization is accumulating, just as Prime Minister Narendra Modi promotes a "Make in India" campaign to accelerate its growth as a manufacturing nation. Industries India has fostered, such as leather tanneries, are heavy polluters, while the national power grid is weighted toward coal.

Although India has only 22 motorized vehicles per 1,000 people, versus 118 in China and 821 in the U.S., the numbers are growing fast. India rolled out new emission-control norms in 2010, but lax enforcement means many drivers continue to violate them.

A senior official with the prime minister's office said that the government's growth policy wouldn't have any harmful impact on the environment.

The Yamuna river—which touches the lives of more than 100 million people through northern India—is a classic example of how India's unresolved poor-nation problems are combining with modernity to create an environmental nightmare.

Source: <https://www.wsj.com/articles/the-worlds-next-environmental-disaster-1508511743>

NYJC JC2 H1 Geog Prelims 2018 Mark scheme

Section A

Theme 3 – Geographical Investigation

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Resource 1 shows the land use associated with each site (Site A and B). Resource 2 shows the location where the group investigation was carried out (Site A and B). Resource 3 shows the data collected to calculate the infiltration rates at Site A.

(a) With reference to Resources 1 and 2, suggest a suitable hypothesis for your group's investigation. [1]

Possible hypothesis

- Site A has a higher infiltration rate than site B.
- A natural environment, such as site A, has a higher infiltration rate than a built-up residential area, such as site B.

(b) Suggest ways to ensure the safety of you and your classmates in the conduct of this investigation. [6]

Indicative Content

- Register at the ranger station at Upper Pierce Reservoir Park in case the group gets lost. Do not wander too far off from the marked pathway to avoid getting lost
- Wear light coloured clothing to stay cool, with long pants and covered footwear. Apply insect repellent.
- Bring along communication devices such as hand phones and/or a whistle in case of the need to seek help
- Bring along a portable first aid kit for treating minor cuts.
- Restrict the fieldwork to during daylight hours. Get out of the reserve before sunsets
- Be on the lookout for animals such as wild boars and otters
- Stay hydrated as fieldwork will be done in the open under the scorching sun
- Cordon off the area for field investigation i.e. inform the public to stay away to avoid getting hurt.

[Point marked]

(c) Suggest a limitation of the data representation method shown in Resource 3 and sketch a line graph to represent the infiltration rates over time. [4]

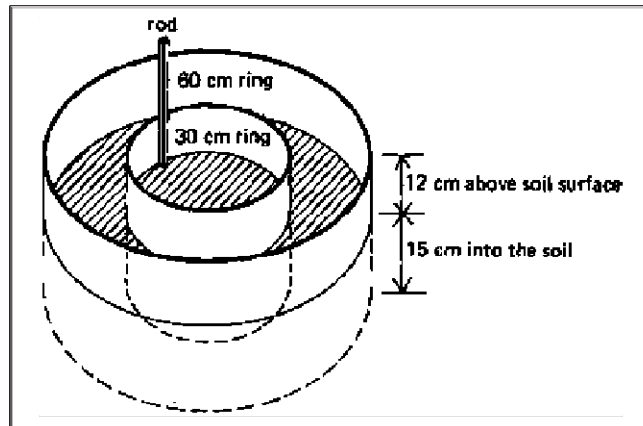
Indicative Content

- Difficult to visualise the changes in infiltration rate over time. [1]
- Line graph [3]

- (d) Your group concluded that some of the infiltration data collected may not be completely reliable and / or accurate. Explain how the process of planning and data collection could be improved. [6]

Indicative Content

- Add an outer ring (60cm) and drive it deeper into the soil as compared to the smaller ring (30 cm) to prevent lateral flow of water from the latter



- As the water level falls when the test has begun, so too does the water pressure. This alone will reduce the infiltration rate which may produce misleading results. Prevent this by topping up the water quickly and record the amount.
- The person holding on to the stopwatch must be alert to keep track of the time passed to ensure reliability.
- Reading of the ruler should be done at the same angle /position and by the same person to overcome possible parallax errors.
- Conduct investigations at different times of the year instead of the 4 consecutive Sunday mornings only e.g. during the dry and wet seasons. This will help to even out the effect of antecedent soil moisture on infiltration rates.
- Add 2 more field sites, e.g. a nature reserve and a residential estate, to the list of investigative areas to obtain a better average infiltration rate.
- Soil samples can be collected from Sites A and B (and the 2 additional sites) to understand the influence of geology in influencing the infiltration rates.

[Levels marked]

Level	Marks	Descriptors
3	5-6	Response demonstrates accurate knowledge of data collection methods, issues with both accuracy and/or reliability of these and relevant improvements. Reflects a good understanding of the context of the investigation and of data collection techniques.
2	3-4	Response demonstrates good knowledge of the data collection methods. Provides an explanation of issues relating to reliability and/or accuracy with some reference to possible improvements. Description may be limited in depth and detail or apply mostly to one aspect of the investigation only. Some of the response may focus on generic fieldwork issues and improvements and not be relevant to the context of the investigation.

1	1-2	Response shows some knowledge of relevant data collection methods. Some reference is made to issues with accuracy and reliability but may recommend inappropriate or irrelevant improvements or provide incorrect explanation of methods. Response may be of limited relevance to the given context.
0	0	No creditworthy response.

(e) Assess the usefulness of this investigation in helping you to understand the factors influencing infiltration rates. [8]

Indicative Content

- **Land use** is only one of the many factors affecting the rates of infiltration. An urbanised area (Site B) or deforested area with a lower vegetation cover tends to reduce infiltration rates whilst promoting surface runoff as compared to the undisturbed nature reserve (Site A).
- Other physical factors that affect infiltration include:
 - **climatic characteristics** – precipitation type (rainfall or snow), intensity and duration
 - **drainage basin characteristics**:
 - **Geology** – permeability and porosity. Loamy soil at Site A encourages greater infiltration as the pore spaces are larger and well-connected hence promoting greater ease of vertical movement. Although Clay (Site B) has higher porosity, it is not permeable as the pore spaces are too minute. Water is held by surface tension.
 - **Soil structure** – joints and bedding planes provides passages for water to infiltrate
 - **Topography** - steep and shorter slopes reduce infiltration rates whilst gentle and longer slopes gives time for infiltration to occur
 - **Depth of water table** – if water table is near the surface, the soil will become quickly saturated and the rate of infiltration will decrease rapidly
 - **Time** – infiltration decreases over time

[Levels marked]

Level	Marks	Descriptors
3	7–8	Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides a logical and well-developed evaluation that reflects strong critical thinking skills and a good understanding of the requirements of the question.
2	4–6	Response demonstrates good knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides an evaluation, which may be limited in depth and detail. Response reflects critical thinking skills in general but may not always be relevant to the question.
1	1–3	Response shows inadequate knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides a little or no evaluation. May include material that is irrelevant to the question.
0	0	No creditworthy response.

Section B

Theme 2: Urban Change

Sustainable urban development in India

2. Resource 4 shows the waste found along the banks of Yamuna River in New Delhi. Resource 5 shows the water quality status of Yamuna River. Resource 6 is an article on pollution in India.

- (a) With reference to Resource 4, describe the composition of waste found along the banks of Yamuna River. [2]**

Indicative Content

- Solid waste found along the banks of Yamuna River include: non-biodegradable plastic bags, religious/worship materials, floral offerings, broken wooden furniture, clay idols, broken pieces of pottery ware, paper packaging etc.

- (b) With reference to Resource 5, describe the extent of the pollution in Yamuna River. [4]**

Indicative Content

- Daily sewage generated in Delhi amounted to 2871 million litres. However, only a tiny fraction of 1478 litres of sewage are treated. The remaining sewage goes into the Yamuna River through 17 drains. This suggests that the pollution is extremely high.
- There are about 1000 – 10,000 mg/L of suspended solids in Yamuna River. This is about 10 – 100 times more than the permissible limit of 100mg/L. The river is just too grossly polluted.
- The permissible Biochemical Oxygen Demand (BOD) is only 3mg/L. The actual BOD is 15 – 30mg/L which is 5 – 10 times higher than the permissible level. This means that the Yamuna River is highly polluted with a lot of organic matter.
- This is supported by another evidence in Resource 5 that there is zero dissolved oxygen left in the river. The river is so polluted that aquatic plants and fishes cannot survive.

- Resource 5 also shows that the coliform level is 11.8 Crore (10 million) per 100 ml of water. This is extremely high compared to the permissible limits of 5000 per 100 ml of water.
- Resource 5 shows that Yamuna River is in critical condition and the river water is unfit for any use.

[Point marked]

(c) With reference to Resource 6 and your own knowledge, suggest reasons to explain the state of pollution in India. [6]

Possible reasons:

- According to Resource 6, sewage ends up in rivers untreated either because there are no treatment systems available or that wastewater treatment plants are not operating at their maximum potential due to electricity shortages.
- It is also stated in Resource 6 that the Prime Minister's "Make in India" campaign resulted in the proliferation of many heavy and pollutive industries such as the leather tanneries. Many tanneries are located along the banks of rivers so that they can flow their wastewater directly into the rivers.
- Since the country's economy is very much dependent on its industrialisation programme, the "national power grid is weighted toward coal" (Resource 6) which is a cheap source of power for many small industries. When coal is burned, it releases a number of airborne toxins and pollutants. They include mercury, lead, sulfur dioxide, nitrogen oxides, particulates, and various other heavy metals. Coal-fired power plants also produced tonnes of coal ash which often ends up in rivers, landfills and other sites.
- According to Resource 6, new emission-control norms are not being enforced strictly. This means that vehicles may not be fitted with catalytic converters and pollutant emission is high from the internal combustion of engines. Emission of nitrogen oxides can result in acid rain.
- The statement by the senior official with the prime minister's office seems to indicate that the government is in denial of the unintended impacts of their growth policy. This could have contributed to the lax enforcement which contributed to the state of pollution in India.
- There are other reasons of pollution (in Yamuna River). The superstitious mindset of the people led thousands of people to take a dip in the river and leave behind their worship materials, which increases the suspended materials in the river.
- There aren't many sanitation facilities so many people use the river for defecation, which causes pathogenic and organic contamination.
- The people also have the habit of dumping unburnt bodies of human beings and animals into the river.

[Levels marked]

Level	Marks	Descriptors
3	5 – 6	Response shows accurate knowledge of the reasons for the state of pollution in India. References made to both Resource 6 and own knowledge and relevant information from both sources are used to substantiate response well. Response is clearly focused on the question throughout with a detailed explanation of the reasons.
2	3 – 4	Response shows adequate knowledge of the reasons the state of pollution in India. Explanation is valid but may be somewhat limited in relevance and detail and may refer to either Resource 6 or own knowledge. Response may lack detail and depth or lack a clear focus on the question.
1	1 – 2	Response shows limited knowledge of the reasons the state of pollution in India. Little or no use of the resource. Use of resource where present will lack accuracy. Response lacks details and focus on the question.
0	0	No creditworthy response

(d) With reference to Resources 5 and 6, suggest three possible strategies to help combat the pollution problems in India. [6]

Possible strategies:

- Stricter enforcement
- Promote wastewater treatment and technologies
- Public education
- Use of alternative energy instead of coal
- Recycling and reuse of wastewater
- Upgrading the sewage treatment plant
- Solid waste management (collection, disposal, reduction)
- Building of public toilets
- Create holy bathing ponds
- Taxation (business)

[Point marked]

(e) Using all resources, explain how pollution affects sustainable urban development in India. [7]

Possible ways

- Sustainable urban development is development that meets the needs of the future without compromising the needs of the current.
- Pollution of the air, water and soil is an important threat to sustainable urban development in India.

How pollution affects the environmental aspects of sustainable development

- The amount of uncollected waste found along the banks and in the Yamuna River shown in Resource 4 demonstrates a lack of solid waste management.
- Dumping of waste on ground surface shown in Resource 4 can result in leachate, which ultimately find its way to the groundwater, causing further contamination and affects people's health (social too).
- Water pollution destroys the natural habitat and leads to a loss of marine output and species. The lack of dissolved oxygen shown in Resource 5 means that life below the water is probably non-existent.
- Polluting sulphur dioxide and nitrogen oxides released from industries can result in acid rain. Excessive acid rain can cause damage to plants and soil.
- Pollution directly affects the environment via increased emissions of greenhouse gases depleting of ozone layer that repel high frequency ultraviolet radiation.

How pollution affects the social aspects of sustainable development

- The water quality status of Yamuna River shown in Resource 5 and the lack of wastewater treatment systems in Resource 6 demonstrates India's challenge to meet the target of SDG 6, which is to improve the water quality by eliminating dumping, minimizing release of hazardous chemicals, and halving the proportion of untreated wastewater.
- Water pollution also causes great numbers of deaths. Water pollution could be due to biological pollutants (sewage), lead pollution, chemical toxins such as mercury and pesticides.
- Occupational exposure to pollutants in industries means that low skilled workers are not being protected or given the necessary welfare/ social protection that they deserve. Social protection is an important aspect of poverty reduction in developing countries such as India. Sick workers may have difficulty working and will result in lost income for the family (economic too).
- Pollution is a major health risk (SDG 3) as it can reduce a human's mental and physical performance. The extremely high coliform level shown in Resource 5 is a cause of diseases relating to the digestive system and subsequent deaths.
- Air pollution deaths are caused by ambient particulate matter pollution emitted by vehicle exhaust (Resource 6), factories, garbage burning etc.

How pollution affects the economic aspects of sustainable development

- Manufacturing is a principal driver of economic development and employment. However, pollution from manufacturing industries may destabilise development process and competitiveness of India whose economies depend on natural resources. The government's growth policy through heavy pollutive industries proves to be going backwards against sustainable development.
- Economic as well as human development are being constrained by pollution-related issues such as pollutive industries (Resource 6), lack of fresh water resource (Resource 5), poor human health (Resource 5) etc.
- For example, low skilled workers in pollutive industries (leather tanneries in Resource 6) are often exposed to higher levels of pollutants/chemicals. These workers are not protected by labour rights to work in a safe environment, which is an important sustainable development goal to promote decent work for all.
- Achieving sustainable development will require strong action to reduce exposure to pollution.

[Levels marked]

Level	Marks	Descriptors
3	6 – 7	Response demonstrates accurate knowledge of the ways in which pollution can affect sustainable development. Reference is made to all resources where relevant information is used to substantiate response well. Explanation is detailed, thorough and shows focus on the question.
2	3 – 5	Response demonstrates knowledge of the ways in which pollution can affect sustainable development. Reference made to some of the resources and may be incomplete or lack clarity. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question.
1	1 – 2	Response demonstrates limited or no knowledge of the ways in which pollution can affect sustainable development. Explanation lacks detail and makes little or no reference to the relevant resources. Overall the response does not address the context of the question.
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 the impacts of El Nino and La Nina in countries at low levels of development. [9]

Indicative content

Students will explain the reversal of weather conditions between the West and the East Pacific when an El Nino happens. West Pacific becomes a drier region as compared to East Pacific. As for La Niña, it relates to the strengthening of the Walker circulation. Students will have to articulate the differing impacts on West and East Pacific during El Nino and La Niña events respectively. The impacts will include how weather changes affect the economic and social aspects of human activities; both positively and negatively, dependent on which part of the Pacific and event (El Nino or La Nina) per se.

A higher response will include students recognising how impacts of El Nino and La Nina can affect other parts of the world (countries at low levels of development) beyond the south Pacific. These include areas affected by the tropical monsoon climate as well as places impacted by hurricanes such as the Gulf of Mexico.

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

3 (b) To what extent are global solutions more effective than local ones in the management of global warming? [16]

Indicative content

The impacts of climate change have resulted in formidable economic, social and political challenges to all governments and other policy-makers. One set of solutions is to mitigate through attempts to reduce the rate of climatic change via the management of its drivers. The second set of solutions is to adapt which refers to the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In answering the question, students will first discuss the effectiveness of efforts taken at the global scale e.g. controlling the rate of deforestation worldwide, afforestation programs, provide financial aid to enable developing nations to build high-efficiency power plants rather than conventional facilities, Geoengineering and international agreements in reducing GHGs emissions. However, these global efforts have faced limited success due to a lack of a concerted effort and finance to implement the strategies. This is seen particularly in the strategy of international agreements as world leaders have met biennially to discuss about climate change since the 1992 Earth summit but progress has remained slow. Students will articulate the challenges faced in international cooperation - states being sovereign and the absence of a world government, DCs not taking the lead and controversies and uncertainty surrounding global warming with some arguing for it to be part of the natural long term climatic fluctuation. Stalemate at the global scale would hence require solutions at the local scale e.g. national efforts,

corporate, community and individual which proved to be more successful. Examples have to be included to support or refute the stand.

A higher level response will involve a holistic package to managing climate change by including adaptation strategies as well as the switch to cleaner energy sources such as HEP and Nuclear energy. Overall, it is important for students to acknowledge that mitigation measures; let alone international agreements will not be able to solve this global issue.

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

4 (a) Explain the influence of tropical climates in affecting channel processes. [9]

Indicative content

Students will provide a brief description of tropical climates noting that they are similar in terms of temperature patterns but have a greater contrast in terms of precipitation patterns even within the Humid tropics. Indeed, climate has a direct impact on channel processes via the amount of discharge. The latter affects the velocity of the river to do its work – erosion, transportation and deposition. Students will make reference to the Hjulstrom curve to explain the concepts of erosional velocity and fall velocity to show the influence of discharge and velocity in affecting erosion, transportation and deposition of different particle size. Thereafter, students will have to contextualise how differences in precipitation pattern in the tropics will affect discharge (perennial, intermittent and ephemeral) and the resultant channel processes. In the humid tropics as discharge is more perennial, channel processes will be able to operate almost at full capacity. In contrast, the absence of discharge in arid conditions makes channel processes almost non-existent till the infrequent and short-lived convective storms.

A higher response will include students going one step further to differentiate between A_r , A_m and A_w owing to a greater seasonality in discharge for the latter two. Reference should also be made to which type of erosional and transportational processes that will occur at different discharge levels i.e. abrasion, hydraulic action and traction will be more active in A_r and during the wet season of A_m and A_w .

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

4 (b) Assess the strategies used to predict, mitigate and respond to the effects of flooding. [16]

Students will need to explain and evaluate the methods of prediction, mitigation and response in terms of their effectiveness, costs and benefits in reducing the impacts of flooding. For prediction, a discussion on the deterministic approach and probabilistic approach could be compared for their strengths and limitations. In terms of mitigation methods, a cost and benefit analysis could be performed for hard and soft engineering ones including floodplain zonation and community preparedness. As for response measures, they include both 'immediate response' which is indeed 'search and rescue' often in helicopters and boats as well as community aid and insurance. Important for students to articulate that response solutions whilst important offer only short gap measures. For longer term effectiveness, countries have to make the effort to predict and

mitigate. Students need to contextualise each strategy with documented example(s) to show if the strategy has achieved its desired results i.e. helping to reduce the impact of flooding.

A higher response will recognise the challenges faced by low income countries in their attempt to manage floods as compared to the higher income ones in relation to the ability to predict and implement hard engineering methods. Yet, it is also important to acknowledge that high income countries are also confronted with their own set of challenges such high flood magnitudes, high population densities as well as the increase in extreme events due to climate change.

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

Theme 2: Urban Change

5 (a) Explain the reasons for traffic congestion in cities with fast growing economies. [9]

Indicative Content

Candidates should be able to explain a variety of reasons for traffic congestion contextualized to cities with fast growing economies. Reasons include high population and the rise of middle-income, increasing private car ownership, insufficient transport infrastructure, uncontrolled growth of private vehicles, poor public transport system, poor road discipline, paratransit etc. Cities with fast growing economies are generally from China, India, Vietnam, and some African nations such as Ethiopia.

A higher level response should identify traits or characteristics associated with cities with fast growing economies and make explicit links to how these traits or characteristics contribute to traffic congestion or exceptions.

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

5 (b) Assess the effectiveness of different attempts made to ease traffic congestion in large urban areas. [16]

Indicative Content

Assessment should consider the extent of effectiveness of strategies to ease traffic congestion in the context of large urban areas. Candidates should discuss the strategies with reference to more than one large urban area. There should be mention of empirical results to substantiate arguments. The effectiveness of the strategies should be discussed in relation to a criterion/criteria.

A higher level response could apply a set of criteria or a criterion (e.g. vehicle speed, traffic volume etc.) consistently to evaluate different strategies. Another approach could be to consider what had been achieved given the challenges specific to the context.

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

6 (a) Explain how the different sources of fear can affect the liveability of cities in economically developed countries. [9]

Indicative Content

There are several sources of fear in the city (e.g. crime, terrorism, epidemic outbreaks, disasters). Fear may be derived from known or actual risk, for example in relation to the experience of crime or the interpretation of published crime statistics, or in terms of the perception of crime. Perception depends on the interplay of elements including the characteristics of the individual, the physical environment, past experience, and representation in the media etc.

A higher level response should cover how the liveability of cities in economically developed countries can be affected as a result of different sources of fear. Candidates should explain how the different sources of fear affect the physical environment as well as people's perception of the urban conditions in economically developed countries.

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

6 (b) Discuss how strategies to cope with fear in cities have been successful in improving liveability. [16]

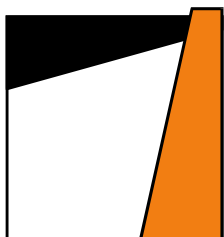
Indicative Content

Candidates should discuss a range of strategies to cope with fear in cities and how these strategies have been successful in improving liveability. Strategies to cope with fear include changes in urban design, intensifying controls, building systems and defensive structures, enhancing the legal powers of law enforcers, public education and building resilience in businesses and communities etc.

The challenge is that the liveability of cities can be a result of individual preference or constraints imposed by others such as absence of defensive structures. This means that even as city authorities try to implement strategies to cope with fear so as to improve its liveability, it is unlikely that everyone will be equally satisfied.

A higher level response could analyse the application of selected strategies in different cities and account for their success(es) and failure(s) in improving liveability. There should be a balance of breadth and depth, with the help of examples.

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



PIONEER JUNIOR COLLEGE

JC2 Preliminary Examination

Higher 1

GEOGRAPHY

8813/01

Paper 1

14 September 2018

3 hours

Additional Materials: Answer Paper
 1 Insert
 World outline map

READ THESE INSTRUCTIONS FIRST

Write your Name, Class and Index Number on the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Answer **ALL** questions.

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

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

Section A

Theme 3: Geographical Investigation

- 1 A group of 8 students were tasked to undertake a primary fieldwork on investigating infiltration on different landuse. The group selected a study area in Coney Island with possible sites of varying landuse.

The group was divided up into two teams of four to measure the infiltration rates at two different sites. One site (Site A) was a site covered with grass. The other site (Site B) was located on a beach with sandy soil. Both teams carried out the primary investigation at sites A and B as seen in Resource 1 on 3rd September 2018 (Monday).

Teams were each given the following equipment to gather primary data on infiltration rates:

- Milo Tin (as infiltration tube)
- Ruler
- Stop watch
- Water

The infiltration rate was calculated by finding out the time it took for water level in the cylinder to fall by 1cm. The time taken for the water level to drop by 1cm was defined using a ruler and personal observation. The data collected was recorded using a data collection sheet.

Resource 1 shows the map of both Sites A and B. Resource 2 shows the land use associated with each site. Resource 3 shows the data collected by one of the teams to calculate the infiltration rates associated with each site.

- (a) With reference to Resource 2, suggest a suitable hypothesis and provide **two** reasons why it is at a suitable scale. [3]
- (b) Explain how both teams can minimise the risks in carrying out their primary investigation at Sites A and B as shown in Resource 2. [4]
- (c) With reference to Resources 1 and 2, explain how the students might have carried out their primary fieldwork on investigating infiltration on different landuse. [7]
- (d) Suggest **two** other pieces of information that may be useful in understanding infiltration rates at both sites. [5]
- (e) The group concluded that data collected as shown in Resource 3 may not be completely reliable and/or accurate. Explain how the process of data collection can be improved. [6]

Section B**Theme 2: Urban Change**

- 2** TransMilenio is a Bus Rapid Transit (BRT) system that serves Bogotá, the capital of Colombia which is a Less Developed Country in South America. Resource 4 shows the layout of the TransMilenio network. Resource 5 shows the TransMilenio's effects on journey times. Resource 6 shows a photograph of the BRT during the morning rush hour.
- (a) Describe the feeder routes shown in Resource 4. [3]
- (b) Suggest **two** reasons for the absence of TransMilenio routes in 2008 in the area marked X on Resource 4. [4]
- (c) Explain how the BRT system depicted in Resource 6 can ease traffic congestion. [5]
- (d) Explain why cities face challenges in implementing public transport measures such as the BRT system as shown in Resource 6. [5]
- (e) Bogotá's policy of urbanisation includes meeting the needs of the city's 3 million poor. To what extent do Resources 4 and 5 support the view that the TransMilenio has met the needs of the poor? [8]

Section C

Answer two questions from this section. Either Question 3 or Question 4 and Either Question 5 or Question 6.

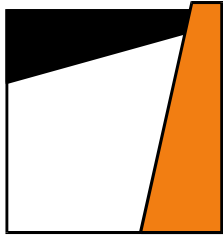
Theme 1: Climate Change and Flooding

- 3 (a) Explain how human activities influence climate change in countries at high level of development. [9]
- (b) 'Alternative energy sources are the best solutions to mitigate the effects of climate change.' To what extent do you agree? [16]
- 4 (a) Explain the characteristics of flash flood hydrographs in the tropics. [9]
- (b) 'The pathways and stores in a drainage basin are largely influenced by climate.' To what extent do you agree? [16]

Theme 2: Urban Change

- 5 (a) With reference to cities at high levels of development, explain the factors affecting urban liveability. [9]
- (b) Evaluate the strategies that have been undertaken to improve the liveability of cities for one social group. [16]
- 6 (a) Explain how the issue of either crowding or fear is produced in cities in countries at high levels of development. [9]
- (b) Assess the success of strategies used to mitigate the issue of either crowding or fear in the city. [16]

END OF PAPER



PIONEER JUNIOR COLLEGE
JC2 Preliminary Examination
Higher 1

GEOGRAPHY

8813/01

INSERT

14 September 2018

READ THESE INSTRUCTIONS FIRST

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

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

Resource 1 for Question 1

Need a home tutor? Visit smiletutor.sg

Site A and Site B on the map of Coney Island



Resource 2 for Question 1

Site A



Site B



Resource 3 for Question 1

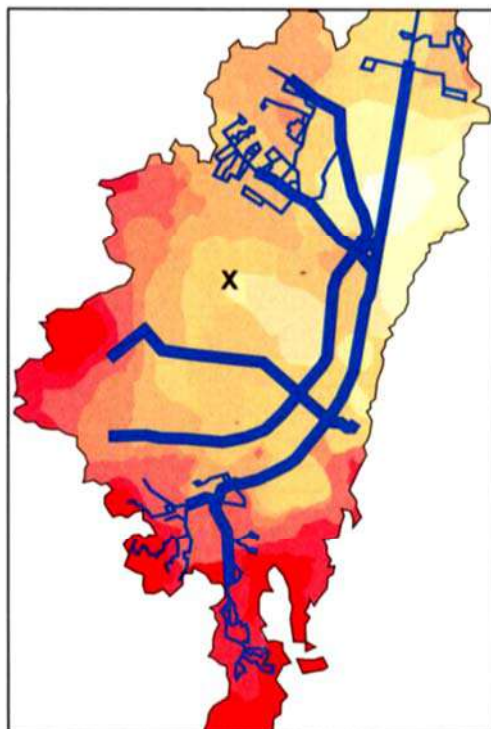
Data collected to calculate the infiltration rate of Sites A and B

	Site A	Site B
Fall Unit (cm)	Grass Patch	Sandy n minimum vegetation cover
1	1:20 min = 80 sec	20.05 sec
2	3:53 min = 233 sec	27.36 sec
3	5:23 min = 323 sec	39.75 sec
4	13:19 min = 799 sec	40.18 sec
5	16:02 min = 962 sec	42.58 sec

Resource 4 for Question 2

Resource 5 for Question 2

The TransMilenio network

**Key**

— TransMilenio route

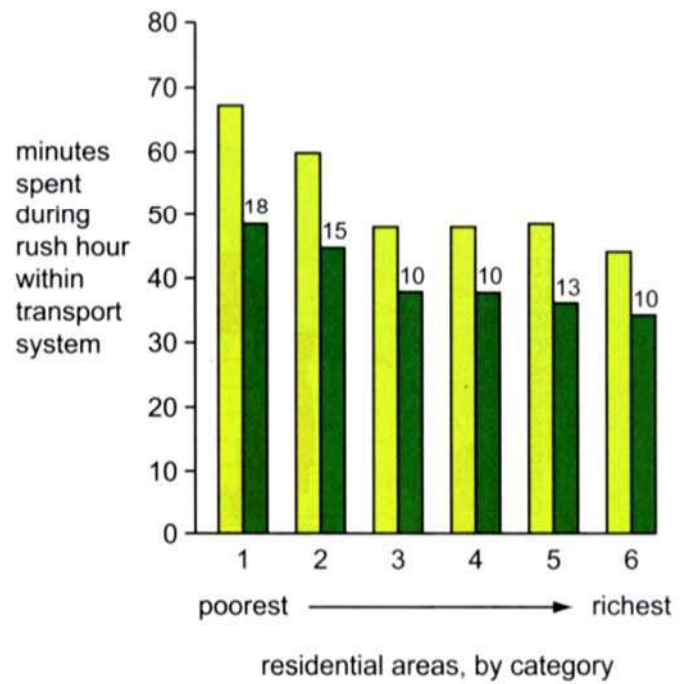
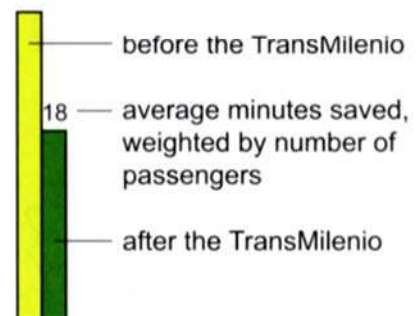
— feeder route

— city boundary

residential poverty



Effects on journey times

**Key**

Resource 6 for Question 2

Photograph of the BRT during morning rush hour



END OF INSERT

**JC2 H1 Geography Prelim Exams
Marking Guide**

Section A

Theme 3: Geographical Investigation

- 1 A group of 8 students were tasked to undertake a primary fieldwork on investigating infiltration on different landuse. The group selected a study area in Coney Island with possible sites of varying landuse.

The group was divided up into two teams of four to measure the infiltration rates at two different sites. One site (Site A) was a site covered with grass. The other site (Site B) was located on a beach with sandy soil. Both teams carried out the primary investigation at sites A and B as seen in Resource 1 on 3rd September 2018 (Monday).

Teams were each given the following equipment to gather primary data on infiltration rates:

- Milo Tin (as infiltration tube)
- Ruler
- Stop watch
- Water

The infiltration rate was calculated by finding out the time it took for water level in the cylinder to fall by 1cm. The time taken for the water level to drop by 1cm was defined using a ruler and personal observation. The data collected was recorded using a data collection sheet.

Resource 1 shows the map of both Sites A and B. Resource 2 shows the land use associated with each site. Resource 3 shows the data collected by one of the teams to calculate the infiltration rates associated with each site.

- (a) With reference to Resource 2, suggest a suitable hypothesis and provide **two** reasons [3]
why it is at a suitable scale.

Award 1 mark for any testable and sensible related to type of landuse and the infiltration rate.

Possible response include:

- Hypothesis: Infiltration rate is lower at Site A, which is a vegetated area, compared to that on Site B, which is a sandy beach.
- It is at a suitable scale as it has a clearly defined research areas – the role of landuse in affecting the infiltration rate
- Sites of differing landuse – sandy beach and vegetated area
- 2 sites which are of close proximity
- Task is within the capability of the students

Point Marked

- (b) Explain how both teams can minimise the risks in carrying out their primary investigation [4]
at Sites A and B as shown in Resource 2.

Possible responses include:

- Risk: General safety

- Do a reconnoitre trip to map out places of potential hazards and places that can give first aid (e.g. clinics) – also to identify a shelter area during the bad weather conditions
- Check weather forecast and to do data collection on another day if the event of bad weather.
- Ensure that there is first-aider and first aid kit for both teams
- Wear proper footwear to protect from sharp objects
- Wear hats or use umbrella when the weather is too hot and have proper hydration
- Risk: Water safety at Site B
 - Check high tide and low tide time and be aware of the high tide mark on the beach at Site B
- Risk: Timing of primary data collection
 - Ensure that the data collection is done in the morning and avoid afternoon when it could be too hot and possible problem of dehydration
 - Stop investigation before sunset as the late timing may lead to students reaching home very late, issues of safety

Award 2 marks for a strategy to minimize the risk identified.

- (c) With reference to Resources 1 and 2, explain how the students might have carried out their primary fieldwork on investigating infiltration on different landuse. [7]

Indicative Content:

- **Developing a plan:**
- **Data:** establish the data needed to prove the hypothesis, e.g. primary data (quantitative) of infiltration rates will have to be collected at each site
- **Timing:** to conduct the investigation on one weekday afternoon
- **Data Collection:**
- **Sampling method:** random stratified sampling with the selection of two sites – Site A, a vegetated area and Site B on a sandy beach
- **In the field:**
 - Mark the inside of the milo tin with a line for every 1 cm, up to 15cm.
 - At the respective sites, twist the milo tin (which is the infiltration tube) 10-15cm into the soil
 - Place a ruler inside the milo tin to measure the fall in water level.
 - Pour water into the milo tin to a depth of 10 cm
 - As the water level decreases by every 1cm, take a recording of the time elapsed.
 - Record the data in the recording sheet.
 - Repeat two times to get an average timing for each site.
- **Consider research ethics:** e.g. to obtain permission to conduct the investigation in coney island, consideration for the other park users; minimize noise disturbance, avoid littering, minimise the effects of trampling on the vegetated areas, fill up any voids caused by the investigation
- **Consider limitations:** e.g. the tools used, limitations of data collected, e.g. one area may not be conclusive to prove the relationship between landuse and infiltration rate
- **Present and analyse data collected:** establish a data representation method e.g. line graph to represent the infiltration rates. Compare the line graphs between the two sites. Interpret the data in relation to the hypothesis posed

Levels marked:

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	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

- (d) Suggest **two** other pieces of information that may be useful in understanding infiltration rates at both sites. [5]

Possible responses include:

- Data on rainfall; relate to soil antecedent moisture condition
- Soil samples; relate to soil type and its characteristics, e.g. permeability and porosity
- Anthropogenic activity, e.g. frequency and type of human activities on both sites

Levels marked:

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of factors that can affect infiltration rate. Insightful explanation of the factors with references to characteristics of both sites.
2	3 – 4	Response demonstrates good knowledge of other factors that can affect infiltration rate. Explanation may be limited in depth and detail. Some references made to the context of both sites.
1	1 – 2	Response shows some knowledge of factors that can affect infiltration rate. Inappropriate or incorrect explanation of factors. Response may be of limited relevance to the given context.
0	0	No creditworthy response.

- (e) The group concluded that data collected as shown in Resource 3 may not be completely reliable and/or accurate. Explain how the process of data collection can be improved. [6]

Indicative Content:

- **Data collected:**
 - The data collected may not be sufficient to provide a good overview of how varying landuse can affect infiltration rate as only 2 varying landuse were considered. Can expand investigation to areas of other landuse, e.g. construction site
- **Timing:**

- The collection of data is only taken once at one particular point at each site. Repeated measurements (at least 2) and taking the average can reduce the margin of error.
- To conduct the fieldwork on another day at the same timing so that it is more representative of finding out the infiltration rate in the day
- Try to conduct the measurement on a day with no rain so as to eliminate the influence of the soil antecedent moisture from the rainfall
- **Human Error:**
- Ensure the same person is reading the data so as to eliminate the element of human error
- Try to read the reading at the eye level to reduce parallax error.
- **Equipment:**
- Proper equipment, an infiltrometer, should be used to collect data to increase the accuracy of data

Levels marked:

Level	Marks	Descriptors
3	5-6	Response demonstrates accurate knowledge of data collection methods, issues with both accuracy and/or reliability of these and relevant improvements. Reflects a good understanding of the context of the investigation and of data collection techniques.
2	3 – 4	Response demonstrates good knowledge of data collection methods. Provides an explanation of issues relating to reliability and/or accuracy with some reference to possible improvements. Description may be limited in depth and detail.
1	1 – 2	Response shows some knowledge of relevant data collection methods. Some reference is made to issues with accuracy and reliability but may recommend inappropriate or irrelevant improvements or provide incorrect explanation of methods. Response may be of limited relevance to the given context.
0	0	No creditworthy response.

Section B

Theme 2: Urban Change

- 2 TransMilenio is a Bus Rapid Transit (BRT) system that serves Bogotá, the capital of Colombia which is a Less Developed Country in South America. Resource 4 shows the layout of the TransMilenio network. Resource 5 shows the TransMilenio's effects on journey times. Resource 6 shows a photograph of the BRT during the morning rush hour.

- (a) Describe the feeder routes shown in Resource 4. [3]
- Possible responses can include:
- Network of feeder routes do not cover the entire city, only a dense network at Northwest part of the city and South & Southwest part of the city
 - Northern part of the city is where the residential poverty is moderate whilst Southern part of the city, residential poverty is high
 - Central portion of Transmilenio route is not supported by feeder routes.
 - At the northern portion, feeder routes are more grid like and more complex in pattern whilst in the Southern portion, it is more branch like

Award 1 mark for each valid point.

- (b) Suggest **two** reasons for the absence of TransMilenio routes in 2008 in the area marked X on Resource 4. [4]

Possible responses can include:

- The area marked X is a place of low residential poverty which may be home to high income earners. Bus rapid transport may perhaps be secondary or insignificant to them as they may have private car ownership. This therefore defeats the purpose of establishing the bus transit
- Could be a very low residential population making investment in the TransMilenio there not worthwhile
- Environmental reason for its absence from X, such as a protected environment, or steep terrain making construction difficult.

Award 2 marks for each elaborated reason.

- (c) Explain how the BRT system depicted in Resource 6 can ease traffic congestion. [5]

Indicative content:

- Dedicated bus lanes for BRT system → eases traffic congestion as traffic flow is not impeded by other vehicles
- BRT → can accommodate more people on the buses (seen in resource with a larger sized bus, many buses in line) → less people using private transport → less congestion
- Overhead pass to direct passengers to board buses → reduces human traffic on the roads → may ease traffic congestion

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of BRT system and traffic congestion. Explanation is detailed, thorough and relevant. Reference made to resource in response and information from resource used to substantiate response.
2	3-4	Response demonstrates adequate knowledge and understanding of BRT system and traffic congestion. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question. Limited reference made to resource,
1	1-2	Response demonstrates limited or no knowledge and understanding of BRT system and traffic congestion.. Explanation lacks detail. Overall the response does not the address the context of the question. No reference made to resource.
0	0	No creditworthy response

- (d) Explain why cities face challenges in implementing public transport measures such as the BRT system as shown in Resource 6. [5]

Indicative content:

- Challenges in accommodating to populations in cities, especially those with rapidly growing populations in less developed countries. As seen in the resource, long queues of people for the buses
- Challenges in maintaining the BRT system due to need for financing and manpower as large volumes of buses are needed and they need to be serviced regularly
- Challenges in convincing people to use the system as it requires a mindset change from people able to afford private vehicles

Level	Marks	Descriptors
3	5	Response demonstrates accurate knowledge of implementation of public transport. Explanation is detailed, thorough and relevant. Reference made to resource in response and information from resource used to substantiate response.
2	3-4	Response demonstrates adequate knowledge and understanding of implementation of public transport. Explanation is valid but may be somewhat limited in relevance and detail. Some of the response may not fully address the context of the question. Limited reference made to resource,
1	1-2	Response demonstrates limited or no knowledge and understanding of implementation of public transport. Explanation lacks detail. Overall the response does not address the context of the question. No reference made to resource.
0	0	No creditworthy response

- (e) Bogotá's policy of urbanisation includes meeting the needs of the city's 3 million poor. To what extent do Resources 4 and 5 support the view that the TransMilenio has met the needs of the poor? [8]

Indicative content:

- Needs of the poor can be partly met by a well developed public transport system. In Resource 4 the TransMilenio serves areas inhabited by moderate poverty in the North and high poverty in the South. In Resource 5, no feeder routes are reaching out to the higher income residential areas. In Resource 5, the poorest saved more minutes off their journeys (18) than the richest (10)
- However in Resource 4 some of the areas of highest residential poverty (the red) were not served by the TransMilenio at all, such as in the extreme west and the extreme south of Bogotá. Also using Resource 5 journey times remained significantly longer for the poor (approximately 48 minutes) than for the rich (36 minutes), even though they had been shortened; or that categories 3, 4 and 6 all saved 10 minutes' journey time.
- Resources are limited to support the view (giving time but not cost information); or the use of averages, such as the lived experience of the poor or the rich may be much better or worse than that given.
- Moreover, needs of poor are multifaceted and meeting the needs involves improvement in social, economic aspects as well as living environment. Data on transport alone are insufficient

Section C

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

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

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 support 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 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.

Theme 1: Climate Change and Flooding

- 3 (a) Explain how human activities influence climate change in countries at high level of development. [9]

Indicative content:

- Candidates to make the link between the impact of climate change and the different anthropogenic activities that are taking place in countries of high levels of development
- High consumption and production patterns will involve high usage of fossil fuels and industrial, household levels
- Affluence at the individual level can also lead to high carbon footprint e.g. cars, electronic devices
- A higher level response will identify traits or characteristics associated with cities at high levels of development and make explicit links to how these contribute to and/or slow down climate change

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

- (b) 'Alternative energy sources are the best solutions to mitigate the effects of climate change.' To what extent do you agree? [16]

Indicative content:

- Candidates to show understanding of the various strategies to combat climate change at the different levels: global, regional and local
- There is a need to address alternative energy sources as it is the given content in the question and discuss the relevance and limitation of the strategy and evaluate its importance at the national platform.
- Strategies to address the different effects of climate change such as sea level rise, more intense rainfall (environment), effects on crop yields(economic), heatwaves raising social issues, health, death
- Higher level responses should look at other strategies at varying scales to have an integrated approach to mitigate the different nature of effects of climate change.

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

- 4 (a) Explain the characteristics of flash flood hydrographs in the tropics. [9]

Indicative content:

- Candidates to show accurate knowledge on the characteristics of flash flood hydrographs in the tropics; very steep rising limb, extremely short lag time, sharp falling limb. Accurate diagrams of flash flood hydrographs will be credited.
- Responses to make the links between occurrence of flash floods in the arid tropics; largely due to climate and soil/geology
- Higher responses will consider the influence of anthropogenic activities on flash floods in the urban environments.

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

- (b) 'The pathways and stores in a drainage basin are largely influenced by climate.' To what extent do you agree? [16]

Indicative content:

- Candidates to show understanding in the differences in characteristics of the various pathways and stores in a drainage basin due to the influence of natural factors (e.g. climate, vegetation cover, soil) and anthropogenic activities
- Candidates to show understanding of specific aspects of climate impacting on basin hydrology. Climate characteristics (e.g. large diurnal temperature range, annual rainfall, seasonal rainfall, wind direction, wind speed) can influence the different aspects (flows, stores when input and output is affected) of basin hydrology.
- Higher level responses will acknowledge spatial variation in the basin hydrology in the tropics and evaluate the factors with at least 2 criteria (space, time) where both physical and human factors will result in more/less surface and/or sub-surface stores and flows, faster/slower flow to the channel storage and more/less likely to flood. The water balance equation can be used to illustrate how stores can have surplus and deficit in the different contexts.

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

Theme 2: Urban Change

- 5 (a) With reference to cities at high levels of development, explain the factors affecting urban liveability. [9]**

Indicative content:

- Responses should make reference to the variety of factors that can affect urban liveability, including environmental (air/noise pollution), social (income level) and political (urban planning/governance) aspects. Candidates should make reference to examples from different cities to highlight variations in liveability.
- A higher level response should acknowledge that liveability as a concept is difficult to be defined and thus the factors will vary for different subgroups in society as it is highly subjective. Another possible approach could be to analyse/weigh the influence of the various factors in affecting liveability.

- (b) Evaluate the strategies that have been undertaken to improve the liveability of cities for one social group. [16]**

Indicative content:

- Candidates can choose either the elderly or disabled/migrants in order to discuss the strategies undertaken which can include aspects such as transport, living environment, employment etc
- Specific examples must be given of cities and strategies must be evaluated for effectiveness
- Reference to criterion such as scale, sustainability, spatial variations should be made to evaluate the strategies.
- Higher level responses should acknowledge spatial variations in these strategies with cities at lower level of development having less of such comprehensive strategies due to different developmental priorities. They could also incorporate intangible aspects such as inclusivity within the city which can affect the liveability of a social group as well and which are more difficult to be addressed.

- 6 (a) Explain how the issue of either crowding or fear is produced in cities in countries at high levels of development. [9]**

Indicative content:

For fear in the city:

- Answers may consider how cities at high levels of development (e.g. economic, social, environmental) may host factors which contributes to fear. There are several sources of fear in the city (e.g. crime and terrorism).
- Fear may be derived from known or actual risk, for example in relation to the experience of crime or the interpretation of published crime statistics, or in terms of the perception of crime. Perception depends on the interplay of elements including the characteristics of the individual, the physical environment, past experience, the representation of crime in the media, etc.

- Fear of terrorism may be associated with particular strategic locations, such as government buildings or airports; with certain religious or cultural activities; or be identified with certain groups of city residents or city visitors.
- Fear in the city may also be defined in part in relation to gender, such as for a woman travelling around or living in the city on her own, and age, where the young and the elderly may be less secure and more vulnerable to fear.
- A higher level response will identify traits or characteristics associated with cities at high levels of development and make explicit links to how these contribute to fear in cities. For instance, a city with a high level of economic development may raise the international profile of the city and makes it a possible target for terrorists and hence increased fear amongst residents in the city.

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

(b) Assess the success of strategies used to mitigate the issue of either crowding or fear in the city. [16]

Indicative content:

Having established the factors which contribute to fear in the city in part (a), candidates would now explain how to better cope with fear.

- For fear in the city, strategies to cope with fear include public information services, and control of the media; enhanced legal powers and law enforcement; and public safety strategies, from a visible presence of armed police on city streets and at airports and seaports, to investment in 'safe' living environments such as the provision of street lighting/street cameras to reduce crime or strengthened border controls to seek to reduce the threat of terrorism.
- Answers should include a discussion of both successes and failures in mitigating the chosen issue (crowding or fear).
- Reference to criterion such as scale, spatial variations, temporal elements should be made to assess the strategies.
- A higher level response could look at the effectiveness of strategies with reference to 1-2 specific case studies. Another possible approach could be to analyse the application of selected strategies in different cities and account for their success(es) and failure(s).

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



SERANGOON JUNIOR COLLEGE
JC2 PRELIMINARY EXAMINATION 2018
Higher 1

GEOGRAPHY

8813/01

Paper 1

Thursday
13 Sept 2018
3 hours

Additional materials: Writing Paper
1 Insert

READ THESE INSTRUCTIONS FIRST

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

Answer **four** questions in total.

Section A

Answer Question 1.

Section B

Answer Question 2.

Section C

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

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

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

Section A

Theme 3 : Geographical Investigations

- 1** A group of ten university students undertook a fieldwork exercise to investigate the elderly's fear of crime in public spaces.

Fear of crime is a factor undermining urban liveability. Fear of crime is defined as the perception of a threat to personal well-being due to crime.

The students carried out their data collection at Hässelgarden senior housing in Hässelby district in the outskirts of Stockholm municipality (Sweden). Hässelgarden senior housing is low-cost rental housing for those aged 65 and above. The estate consists of 5 blocks of 4-storey flats.

Their mode of data collection was a questionnaire survey, consisting of a series of questions about the occupants' health, use of space, safety and previous victimisation of crime. Surveys were conducted via face-to-face interviews. Overall, 27 questionnaire surveys were completed. As part of the survey, the residents were asked to draw a route on a map of their surroundings by which they satisfied their daily needs. They were asked to identify specific places along this route that they identified as the most/least fearful.

Resource 1 shows the demographic characteristics of the participants in the survey. Resource 2 shows a section of the questionnaire survey. Resource 3 shows one sample of a mental map, with annotations gathered from selected residents.

- (a)** With reference to the context provided, select and describe sampling method(s) that the students could have used to identify participants for their survey. [3]
- (b)** Suggest how the fear of crime can be shaped by demographic characteristics reflected in Resource 1. [5]
- (c)** Outline the strengths and limitations of the section of the questionnaire survey shown in Resource 2. [6]
- (d)** Explain how the group may overcome ethical concerns they face in their collection of primary data for this investigation. [4]
- (e)** With reference to Resource 3 and your own knowledge, explain how the data collected can help in understanding the needs of the elderly in Hässelgarden senior housing and suggest how this investigation on fear of crime may be extended. [7]

Section B

Theme 1 : Climate Change and Flooding

Flooding in Mumbai (India)

- 2** Mumbai is the main commercial and financial centre of India. It is prone to flooding. In July 2005, the city experienced the worst flooding in its recorded history. On July 26 2005, the highest ever rainfall was recorded for a single day (944mm) in the last 100 years in the country. The continuous rainfall that followed resulted in urban flash flooding affected many areas in the city.

Resource 4 shows a map outlining the extent of the 2005 flood, juxtaposed with a land use map of Mumbai. Resource 5 shows land use changes (%) in a Mumbai catchment between 1966 and 2005. Resource 6 shows some human features commonly found along rivers in Mumbai. Resource 7 is a map of 20 coastal cities around the world that are ranked by the World Bank as having high rates of flood risk, measured as Average Annual Loss (AAL) as a percent of GDP.

- (a)** Using Resource 4, describe the spatial distribution of the 2005 Mumbai flood. [4]
- (b)** Describe and explain how land use changes between 1966 and 2005, as shown in Resource 5, have increased the vulnerability of Mumbai to floods. [5]
- (c)** With reference to Resource 6, explain how these human features could have contributed to a flood event. [4]
- (d)** Explain why an integrated flood risk management, consisting of structural and non-structural measures, is necessary to reduce flood risk in locations such as that shown in Resource 6. [7]
- (e)** Using the given resources and your own knowledge, give reasons why extreme flood events could result in high annual flood costs in coastal cities, as shown in Resource 7. [5]

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 types of evidence that are available for the study of climate change in the tropics since the Pleistocene. [9]
- (b) To what extent should adaptation efforts be focused only on rural regions and mitigation efforts only in urban areas in countries of low level of development? [16]
- 4 (a) Explain the distribution, frequency and effects of tropical cyclones. [9]
- (b) To what extent is the occurrence of the tropical monsoon system the result of differential heating between the land and sea? [16]

Theme 2 : Urban Change

- 5 (a) Compare the impacts of traffic congestion in cities in countries at different levels of development. [9]
- (b) "Although there are solutions to managing traffic congestion, these solutions often bring other problems". With reference to cities in developed countries, discuss this statement. [16]
- 6 (a) Explain the indicators used to measure the management of non-hazardous waste in cities in developed countries. [9]
- (b) "Waste should be viewed as a potential resource, not a problem". Discuss. [16]

End of paper



SERANGOON JUNIOR COLLEGE
JC2 PRELIMINARY EXAMINATION 2018
Higher 1

GEOGRAPHY

8813/01

INSERT

Thursday
13 Sept 2018
3 hours

READ THESE INSTRUCTIONS FIRST

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

This document consists of **8** printed pages.

[Turn over
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Resource 1 for Question 1

Demographic characteristics of the participants for the survey

Characteristics		<i>N</i> = 27
Gender	Female	17
	Male	10
Age	65–69	6
	70–74	7
	75–79	2
	80–84	3
	85+	5
Marital status	Married	4
	Widowed	20
	Divorced	1
	Others	2
Ethnicity	Native Swedish	22
	Foreign-born	5
Time of residence	Less than 1 year	8
	Between 1 and 5 years	14
	More than 5 years	5

Resource 2 for Question 1

A section of the questionnaire survey

PART 1 : PERSONAL PARTICULARS

Q1 : How old are you ?

- 65-69
- 70-74
- 75-79
- 80-84
- 85+

Q2 : Gender

- Male
- Female

Q3 : Marital Status

- Married
- Widowed
- Divorced
- Others

Q4 : How would you describe your ethnic background?

- Native Swedish
- Foreign Born

Q5 : How long have you lived in this housing estate?

- Less than a year
- Between 1 - 5 years
- More than 5 years

PART 2 : PAST FEAR OF CRIME

Q6 : In your previous residence/neighbourhood, how worried were you about being a victim of crime?

Not at all worried	Not very worried	Neither worried nor not worried	A little worried	Very worried

Q7 : In your previous residence/neighbourhood, how likely did you think you would be a victim of crime?

Very unlikely	Not very likely	Neither likely nor unlikely	Quite likely	Very likely

Q8 : Have you ever been a victim of crime in your previous residence/neighbourhood?

Yes
No
Do not know

PART 3 : PRESENT FEAR OF CRIME

Q9: Have you been a victim of a crime since you moved to this neighbourhood ?

Yes
No
Do not know

Q10 : During your time living in this neighbourhood, how likely do you think you will be a victim of crime ?

Very unlikely	Not very likely	Neither likely nor unlikely	Quite likely	Very likely

Q11 : In your current residence/neighbourhood, how worried are you about being a victim of crime?

Not at all worried	Not very worried	Neither worried nor not worried	A little worried	Very worried

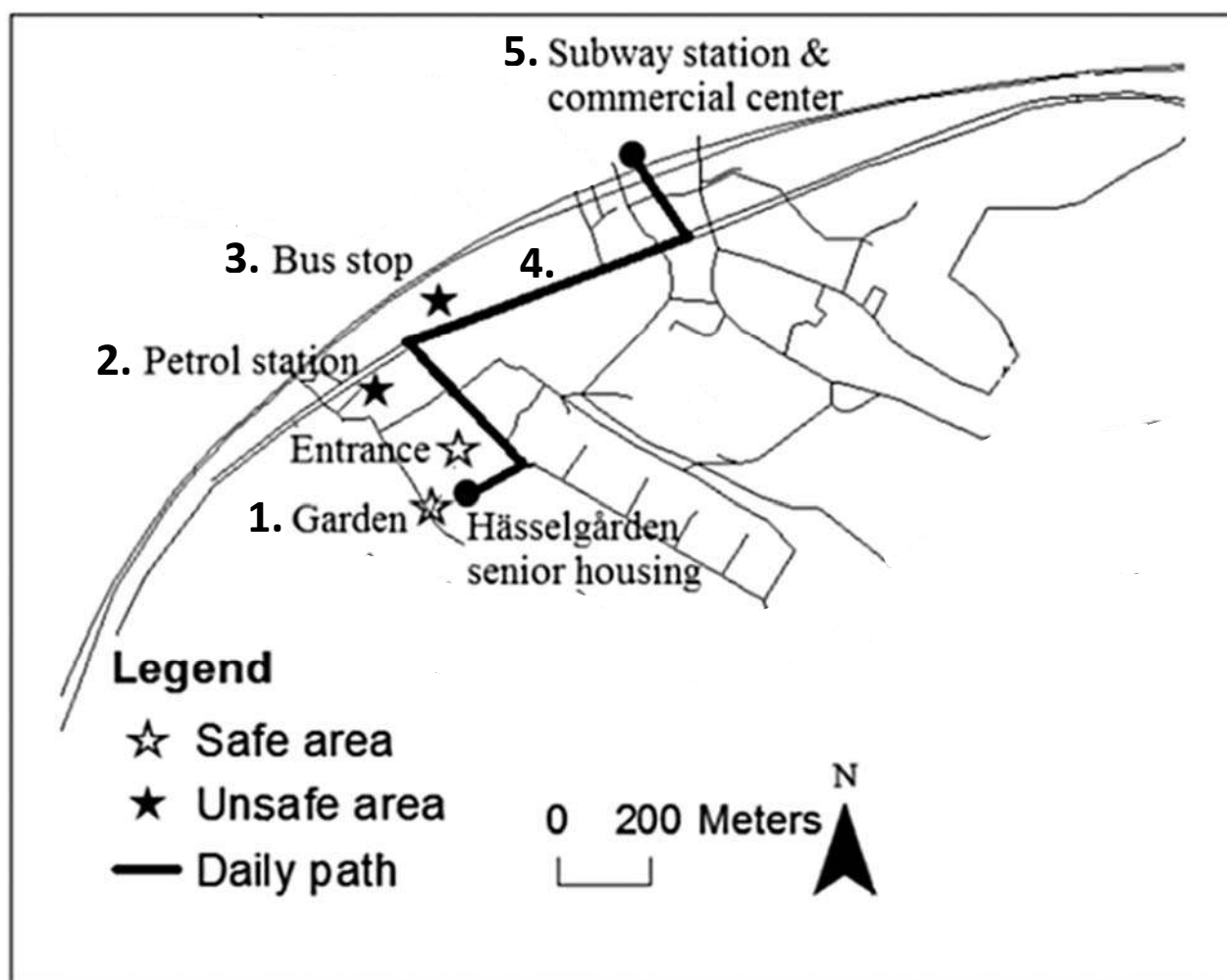
PART 4 : QUALITY OF LIFE

Q12 : How much is your quality of life affected by fear of crime? Please indicate your response on a scale from 1 to 10.

1 (Quality of life not affected at all)	2	3	4	5	6	7	8	9	10 (Quality of Life totally affected)

Resource 3 for Question 1

Sample of a mental map with annotations



Responses from selected residents

1. **Garden** : This is where I can see all my neighbors and chat with them
2. **Petrol station** : The station is unsafe as it is always deserted
3. **Bus Stop** : The bus stop can be quite deserted. I might get mugged or robbed by an oncoming motorcyclist.
4. **Route to subway station** : The route is difficult for me as there are no benches for resting and no clear paths separating motorists from pedestrians. I might get knocked down.
5. **Subway station and commercial center** : The subway station and commercial center is very crowded and I might get pickpocketed. I don't know most of the people there so I can't ask for help.

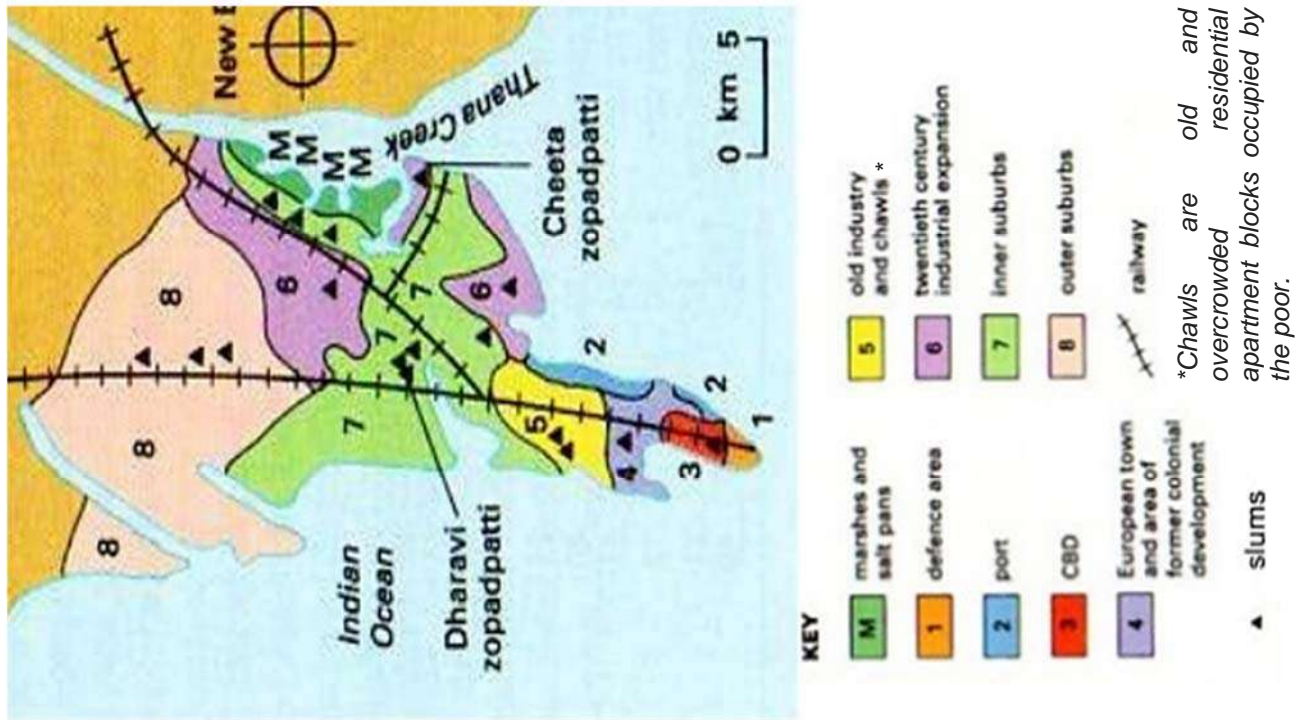
Other comments from residents :

- I don't go out at night ; the lighting is not good
- Sometimes if the commercial center is too busy, I'd walk further out to another shop where there are fewer people.

Resource 4 for Question 2

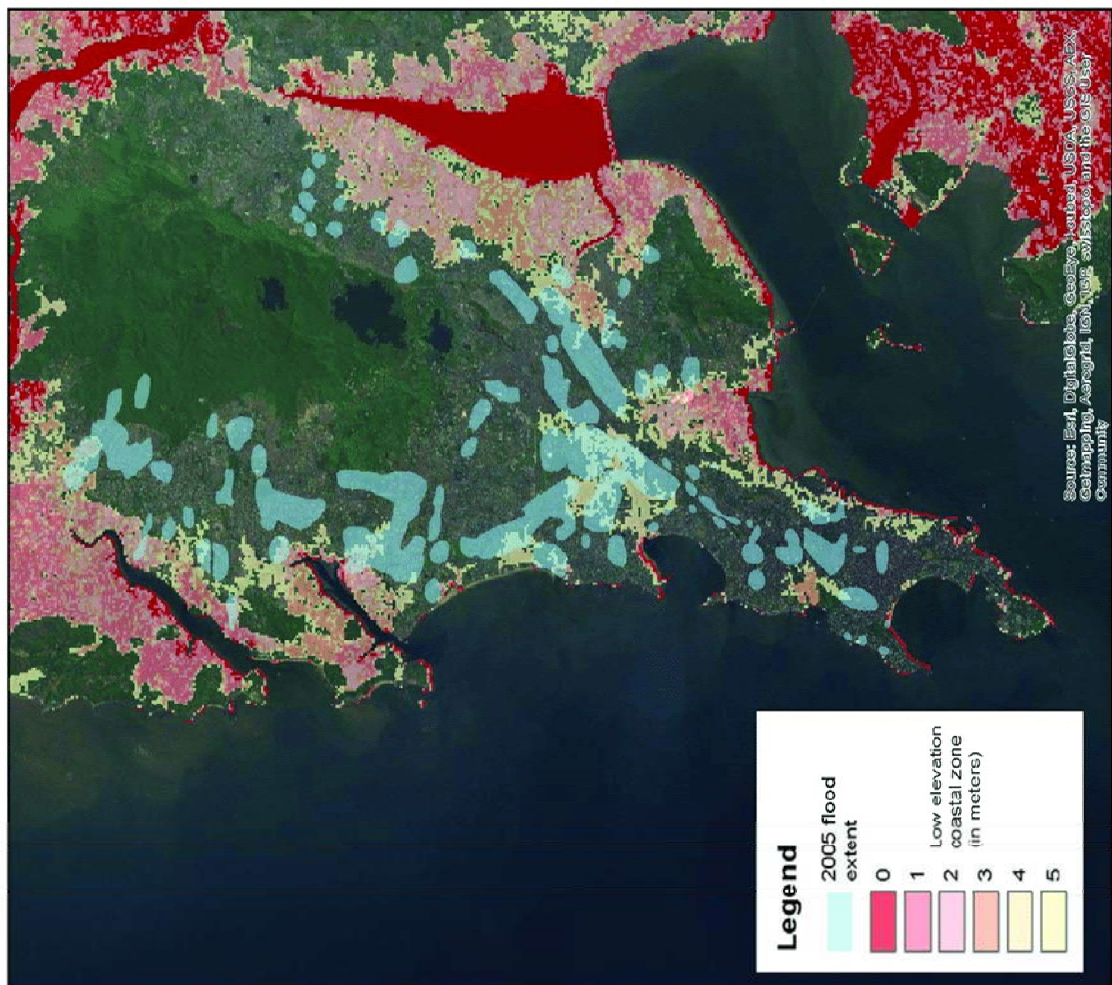
Extent of 2005 Mumbai flood and Land use map of Mumbai

Resource 4b
Land use map of Mumbai flood



Resource 4a

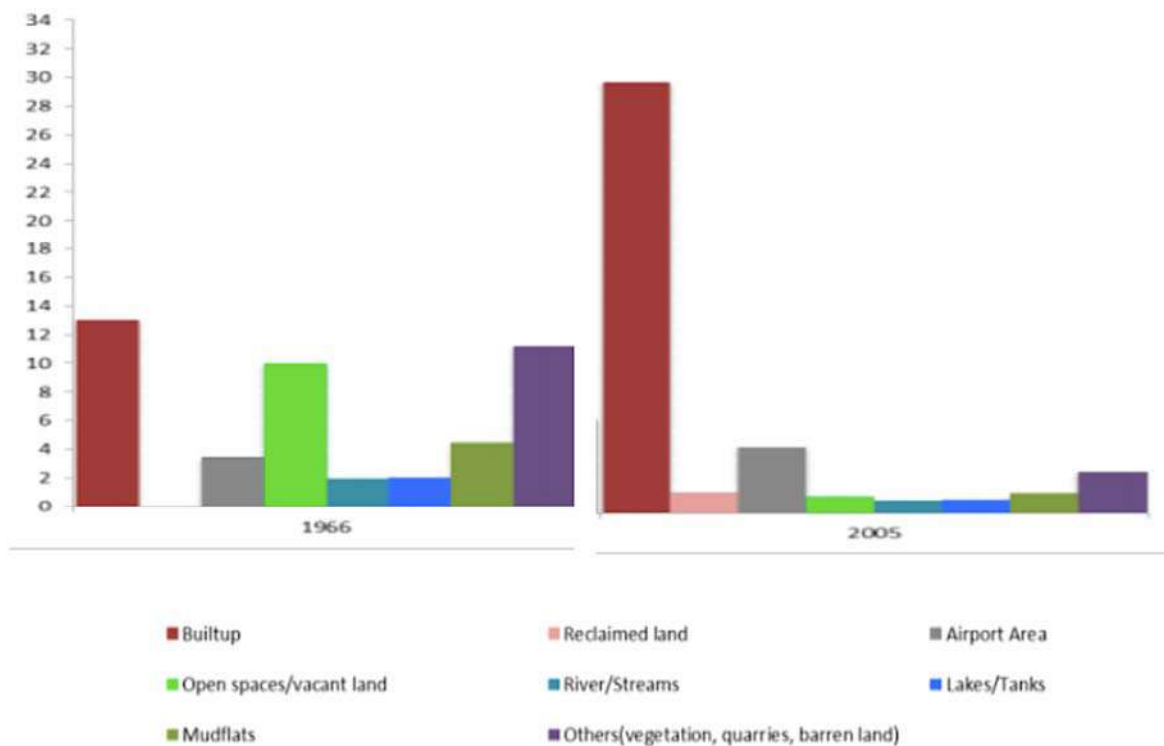
Extent of 2005 Mumbai flood



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Resource 5 for Question 2

Land use changes (%) in a Mumbai catchment between 1966 and 2005



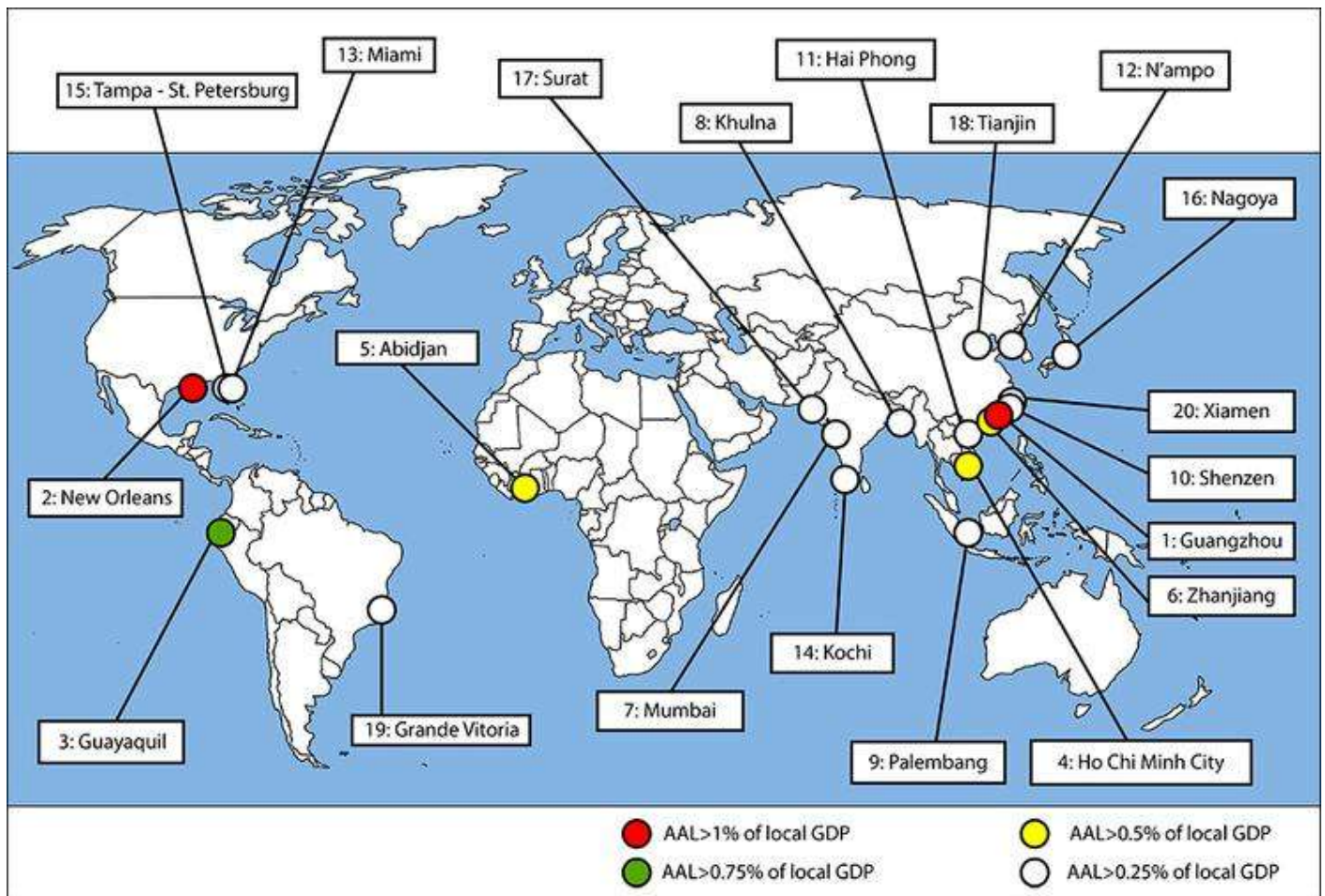
Resource 6 for Question 2

Some human features commonly found along rivers in Mumbai



Resource 7 for Question 2

Map of 20 coastal cities around the world that are ranked by the World Bank as having high rates of flood risk, measured as Average Annual Loss (AAL) as a percent of GDP



End of Insert

Name: _____

CG: _____

Date: _____

SERANGOON JUNIOR COLLEGE
JC2 H1 GEOGRAPHY
2018 Preliminary Examination Answer Scheme

Section A

DRQ 1

Rubric <i>Criteria to hit</i>	Marks	Reflection <i>(i) How different is my answer from the rubric?</i> <i>(ii) Why is it different?</i>
<p>(a) With reference to the context provided, select and describe sampling method(s) that the students could have used to identify participants for their survey</p> <ul style="list-style-type: none">• Use random sampling to identify specific blocks (number all blocks, use a number generator to select 3 blocks out of 5 blocks)• Use systematic sampling to identify specific floors in each block, followed by specific units in each floor (for instance, select alternate floors such as the 1st and 3rd floors, then select alternate units on each floor)	[3]	
<p>(b) Suggest how the fear of crime can be shaped by demographic characteristics reflected in Resource 1.</p> <ul style="list-style-type: none">• Gender – Females may have a greater fear of crime than men due to perceived notions of physical vulnerability. Females may also have a greater fear of specific crimes (such as sexual assault). Gender likely to be significant in influencing fear of crime in the given investigation due to the higher proportion of females in the sample (17 out of 27).	[5]	

<ul style="list-style-type: none"> • Age – Third agers (60s to 70s) who are more physically fit and mobile may feel less vulnerable and hence less fear, compared to fourth agers (80s and above) who are physically less mobile • Ethnicity – Native Swedish may feel more fear as they may believe they are targeted by “minority” groups. • Time of residence – Residents who stay longer may feel less fear due to greater levels of familiarity with the environment and its residents • Marital status – Widowed individuals may experience more fear as they do not have a partner watching out for their safety. The fear is likely to be amplified by gender, as most widowed individuals are likely to be female (as females tend to outlive their male partners). 		
<p>(c) Outline the strengths and limitations of the questionnaire survey (shown in Resource 2).</p> <p><u>Strengths</u></p> <ul style="list-style-type: none"> • For sensitive demographic information, categories are provided • Use of semantic scale for most question enables responses to be more focused • Questions are worded clearly, with specific emphasis on fear of crime (which is the focus of the investigation) <p><u>Limitations</u></p> <ul style="list-style-type: none"> • Can be specific in defining “crime in public spaces”, as the perception of crime may vary across residents • Can be more specific in identifying the type of crime, and different crime elicits different levels of fear • Most of the questions appear to be close-ended questions, may limit the range of qualitative responses • Q13 is highly ambiguous as the impacts of crime on quality of life isn’t clarified. In addition, the scale of 1-10 is too broad and participants may have issues 	[6]	
<p>(d) Explain how the group may overcome ethical concerns they face in their collection of primary data for this investigation.</p> <ul style="list-style-type: none"> • Informed consent – Before the session, the participant should be informed of the research focus, demands and risks associated with the interview 	[4]	

<ul style="list-style-type: none"> • Be respectful when speaking to participants – do not pass judgment or make jokes about what they share • Do not ask sensitive information – Avoid asking personal information such as income, employment, specific age. As the focus of the investigation is on fear of crime, be wary when probing on past victimisation encounters. 		
<p>(e) With reference to Resource 3 and your own knowledge, explain how the data collected can help in understanding the needs of the elderly in Hässelgarden senior housing and suggest how this investigation on fear of crime may be extended.</p> <p><u>How the data can help us understand the needs of the elderly</u></p> <ul style="list-style-type: none"> • Social/emotional needs : <ul style="list-style-type: none"> ➤ From the mental map, it is evident that places deemed as unsafe are places with “less familiar people”. Social connections to a community is hence an important factor in reducing fear. ➤ The mental map clearly shows that “fearful places” are locations that lack “natural surveillance” (ie: deserted). Some pedestrian flow is hence needed to give the elderly a sense of security. • Physical needs : <ul style="list-style-type: none"> ➤ Places deemed to be unsafe are places that limit mobility, in terms of visual navigation (ie: illumination) or physical navigation (ie: no clearly defined paths, too crowded). Hence the elderly requires changes to the physical environment to facilitate mobility. ➤ The mental map shows a clear distance decay effect, where places nearer to home are deemed as safer. This suggests that higher levels of liveability for the elderly can be achieved by placing amenities and services closer to their homes. <p><u>Extending this investigation on fear of crime</u></p> <ul style="list-style-type: none"> • Investigating different locations beyond Hasselgarden senior housing and do a comparative study 	[7]	

- | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| <ul style="list-style-type: none">• Investigate perception of fear among other demographic groups (such as higher-income aged communities)• Explore differences in perception of fear at different times of the day (night versus day) | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|

DRQ 2

<p>Rubric <i>Criteria to hit</i></p>	<p>Marks</p>	<p>Reflection <i>(i) How different is my answer from the rubric? (ii) Why is it different?</i></p>
<p>(a) Using Resource 4, describe the spatial distribution of the 2005 Mumbai flood.</p> <ul style="list-style-type: none"> - Uneven spatial distribution with the highest concentration on the western coast and south central of Mumbai while the interior is relatively intact. - In terms of land use, the worst affected are the inner and outer suburbs - Flooded areas follow the alignment of the railway system. 	<p>[4]</p>	
<p>(b) Describe and explain how land use changes between 1966 and 2005, as shown in Resource 5, have increased the vulnerability of Mumbai to floods.</p> <p>Land uses which have increased the vulnerability</p> <ul style="list-style-type: none"> - Build up areas increased by about 16% between 1966 to 2005. Larger impermeable surfaces (bitumen, concrete) in the forms of pavements, car parks, roads, highways which prevent infiltration of rainwater. With greatly reduced infiltration capacity, there is quick generation of overland flow when it rains. Higher population in urban areas means more people are at risk of flooding. - Airport and reclaimed land are also largely impermeable surfaces and with their compacted and flat surfaces mean greater likelihood of quickflow and inundation. - Removal of vegetation : means reduced interception storages, infiltration and percolation. This encourages overland flow at the expense of the slower baseflow. Greater proportion of the water will arrive at the channel and if the bankfull discharge is exceeded, flood ensues. A flashier response 	<p>[5]</p>	

-Rivers/Streams are reduced. With fewer channelized pathways to transport floodwater away, rainwater accumulates quickly on urban surfaces resulting in pluvial flooding		
<p>(c) With reference to Resource 6, explain how these human features could have contributed to a flood event.</p> <p>- Riverside settlements (slum by the river banks) – constitutes obstruction to river flow. Channel flows at these banks are constricted . the impermeable surfaces (roads, paved surfaces, rooftops) of these houses encourage rapid runoff of rainwater to the channel where a rapid rise means overtopping of excess water onto the land (floodplains).</p> <p>- Support pillars of the water/sewage pipes) also acts as physical barriers to the unhindered channel flow.</p> <p>- The huge amount of garbage (plastic etc.) can also obstructs the natural flow of river . They clog they clog, reduce the channel capacity to hold water and cause water to back up during rainfall, flooding the surrounding area.</p>	[4]	
<p>(d) Explain why an integrated flood risk management, consisting of structural and non-structural measures, is necessary to reduce flood risk in locations such as that shown in Resource 6.</p> <p>Flood risk = Impact (severity) X Likelihood</p> <p>Structural – involves physical construction – generally to reduce severity of flood</p> <p>- channelization (deepen, widen, smoothened, straightened)</p> <p>- floodwalls</p> <p>- network of drains</p> <p>- river embankments, dyes to prevent overflow to floodplain settlement</p> <p>- diversion canals/spillways</p>	[7]	

<p>- detention ponds</p> <p>Non-structural – generally to reduce likelihood of flood</p> <ul style="list-style-type: none"> -relocation to higher grounds - clean up river of garbage, dredging of silt to restore capacity of river - flood hazard mapping – land use planning forbidding risky assets/infrastructure from locating near river - Education on anti-littering, community preparedness on what to do during a flood - Early warning system via SMS, radio/TV broadcast of impending flood - afforestation - river restoration – bringing back the natural state of river with its larger floodplain which can hold more water <p>Evaluation : Consider the Pros and cons of these measures</p> <p>A: Structural</p> <p>(+) effective if well planned and maintained, gives a sense of security to riverside communities , short time to implement unless massive like a dam</p> <p>(-)</p> <ul style="list-style-type: none"> - can fail catastrophically, flood effects can be worst than if measure was not adopted e.g. artificial levees of New Orleans during Hurricane Katrina. - Channelisation means channels are now efficient in transferring flood water and causing flood downstream - Climate change with its new normal of extreme weather phenomena means greater uncertainty as to whether these structures can cope with exceptionally intense rainfall events and the deluge of water. Drains and channelized canals become underdesigned. <p>B: Non-structural</p> <p>(+) cheaper, more sustainable in the long run, less harm to the natural environment (eco friendly)</p> <p>(-)</p> <ul style="list-style-type: none"> - some take a long time to take effect and it is land intensive e.g. afforestation, - floodplain zoning laws difficult to implement in countries like India where dwellers have occupied the land for generations and where there are no alternative sites to go to in a resettlement exercise 		
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<p>- false alarm of flooding warning when no flooding actually occurs, which causes unnecessary panic, or warning of the wrong intensity such as a warning of a flood alert when a severe flood warning is more appropriate will still leave people unprepared for the real severity of flooding</p> <p>Conclusion : There is no one-size-fits all solution to address the risk of floods. Hence, a holistic and integrated approach embodying both structural and non-structural measures to fit the local conditions is necessary and would be judicious for the authorities.</p>		
<p>(e) Using the given resources and your own knowledge, give reasons why extreme flood events could result in high annual flood costs in coastal cities, as shown in Resource 7.</p> <p>- Coastal cities are the economic hubs and the main engine of economic growth in their countries Locations of CBD, transport/communication hubs. Extreme floods will cause disruption to businesses, services and manufacturing, reduce productivity of firms and their workers.</p> <p>- Spatial concentration of high valued assets and critical infrastructure. Residential properties, office buildings, industrial complexes, power lines, transport system, airport. If destroyed or disrupted, there are high economic costs in the forms of insurance, repair, and the indirect effect of business/factory closures, unemployment, fall in income and GDP to national economy</p> <p>- Frequent floods will damage the reputation of such cities as places to invest, visit and live.</p>	<p>[5]</p>	

3 (a) Explain the types of evidence that are available for the study of climate change in the tropics since the Pleistocene. [9]

Indicative content

Cite Geomorphological evidence , **Hydrological** evidence, **Botanical** remains and archaeological evidence

3 (b) To what extent should adaptation efforts be focused only on rural regions and mitigation efforts only in urban areas in countries of low level of development? [16]

Indicative content

P1 : Why adaptation should be focused in rural areas

P2 : Why cities should also adapt

P3: Why mitigation efforts should be focused on Urban areas

- Climate justice : Cities cover around 2% of the Earth's surface but produce up to 70% of anthropogenic greenhouse gas emissions. Mainly from fossil fuel consumption from the high-consumption lifestyles of the wealthy and the production and transport systems are one of the primary causes of climate change. This has been exacerbated by the rapid rate of development, including accelerated industrialisation of the developing countries

- Cities are wealthier with most of the national wealth (GDP) concentrated there. Able to adopt and fund measures and technological solutions to reduce carbon emissions : green infrastructure, energy-efficient buildings, public transport system, electric cars, bike-friendly cities, greening of city, and promoting the use of renewable energy technologies and able to reach out to a more literate population on the need for energy conservation..

A well-planned, well-managed cities can play a central role in helping to mitigate against climate change

Cities have a key role to play in addressing climate change.

P4 : Why rural areas should also mitigate

- People living in rural settings are significant contributors to GHGs. High-carbon fuels are still used intensively. Many poor villagers burn charcoal, wood, or other biomass to cook and heat their homes. GHG emissions also come from farm practices such as wet rice cultivation (methane), fertiliser application (nitrous oxides) and deforestation which produces CO₂ and removes a vital carbon sink.
- Rural areas (plains, open land, hills, coastal) often have the best possible conditions to harness wind and solar energy. These energy plants are land-intensive. Egypt has some of the best wind energy locations in the world. The Zafarana wind farm is the largest in Africa.
- The long term impact of climate change will be most felt by the rural residents who often are the worst affected. They can play their part in mitigation so that every bit they do now will hopefully help to reduce the future severity of the impact.

CONCLUSION

Negative impact of climate change does not respect geographic space, as they will affect all communities regardless of whether they are in rural or urban areas. It is not only the rural regions that will have to adapt and face the brunt of climate change neither is it the responsibility of cities alone to mitigate. Because of the speed at which climate change is happening due to global temperature rise, it is urgent that mitigation and adaptation need to be addressed simultaneously by human communities at all places. Delaying action can lead to irreversible consequences for humankind.

4 (a) Explain the distribution, frequency and effects of tropical cyclones. [9]

Indicative content

Refer to lect book

4 (b) To what extent is the occurrence of the tropical monsoon system the result of differential heating between the land and sea? [16]

Indicative content

P1 : Differential heating and cooling of land and water

creates low pressure on the landmass while the seas experience comparatively high pressure.

Due to different thermal capacities of land and sea. Sea heats up more slowly in summer (in N) and cools more slowly in southern hemisphere (winter) as more heat is retained in oceans.

Pressure gradient difference develops which triggers air mass movements from high to low pressure.

P2 : Shift of the position of the ITCZ across the equator

The alternate development of the high and low pressure systems and hence the reversal of winds is dependent on the migration of the thermal equator (ITCZ) which moves with the seasons.

Movement of the overhead sun towards the tropics of Cancer (NH) and Capricorn (SH) takes the zone of maximum insolation to these regions.

In spring, intense heating of the land begins, setting up a 'thermal low' over N.India, which begins to cause a reversal in the wind direction, drawing in moist air from the SW. In early summer, the southern jets begin to break down, allowing the movement northwards

P3 : Influence of the jet streams

P4 : Other factors for a fuller understanding of the tropical monsoon

- Mountainous terrain of the Himalayas and the Tibetan plateau.
etc

Conclusion :

Differential heating of the land and sea only offers a partial explanation. It is a necessary but insufficient condition to fully understand the mechanism of tropical monsoon.

To understand fully the mechanism of the monsoons, other factors such as the position of the ITCZ, upper westerlies and mountainous terrains have to be considered.

5 (a) Compare the impacts of traffic congestion in cities in countries at different levels of development. [9]

Indicative content

	HIC cities	LIC cities
Environmental problems	<ul style="list-style-type: none"> In both cities, congestion releases pollutants into the air. Other than the sheer density of traffic, stop-and-start traffic (during traffic gridlock) means alternating between braking and accelerating. That burns more gas, spewing more toxic fumes into the air, contributing to air pollution. 	
	<ul style="list-style-type: none"> Less severe than LIC cities 	<ul style="list-style-type: none"> More severe than HIC cities : <i>According to research done by Green Peace in 2017, all top three cities with worst air quality are from LICs (1st : Jakarta, 2nd: Beijing, 3rd : Dhaka) . Exhaust fumes from vehicles are a key culprit.</i>
Social and economic problems	<p>More of economic and social costs associated with long hours in traffic</p> <ul style="list-style-type: none"> 	<p>Beyond economic and social costs associated with long hours in traffic, LIC cities experience social and economic problems that tend to threaten <u>CURRENT WELL-BEING</u> such as :</p> <ul style="list-style-type: none"> Air pollution and associated health problems

5 (b) “Although there are solutions to managing traffic congestion, these solutions often bring other problems”. With reference to cities in developed countries, discuss this statement. [16]

Indicative content

P1 : Problems associated with supply fix policies

P2 : Problems associated with demand management policies

P3 : Problems associated with other strategies

P4 : However, can be argued that some of these problems are short-term and can be easily reversed with specific policies

P5 : Despite these limitations, there are also strategies that bring benefits (positive externalities?) beyond curbing congestion

6 (a) Explain the indicators used to measure the management of non-hazardous waste in cities in developed countries. [9]

Indicative content

For developed countries, the key waste management issue is the **excessive generation of waste**. High-income regions tend to consume more, thus producing more waste. Thus, sustainability indicators to measure the management of non-hazardous solid waste revolve around measuring the extent/volume of waste generated.

P1 : Ecological footprint

P2 : Volume of waste generated

P3 : Waste diversion indicators

- This measures the volume of waste re-directed away from landfills.
- Possible indicators include : percentage of waste directed for energy recovery, percentage of organic waste that is composted, percentage of waste that is recycled
- The higher the percentage of waste diversion, the lower the volume of waste directed to landfills – this suggests higher levels of sustainability and a shift towards a circular economy

6 (b) “Waste should be viewed as a potential resource, not a problem”. Discuss [16]

Indicative content

P1 : Recycling transforms waste into a resource

P2 : Recovery transforms waste into a resource

P3: Waste industry provides many job opportunities

P4 : However, in many contexts, waste can be more of a problem than a resource

Conclusion (Is waste a resource or a problem?)

- Waste should be considered a resource because of reusing, recycling and recovery efforts. However, the benefits of waste are not mobilized in all contexts. In fact, mounting volumes of waste are posing more of a problem than a resource in many cities worldwide
- Hence, it is evident that various factors are needed to transform a waste into a resource : beyond technology, political will and community engagement is also important.
- With mounting waste problems in both HIC and LIC cities, imperative for cities to invest in sustainable policies to manage waste.



ST ANDREW'S JUNIOR COLLEGE
Preliminary Exam
Higher 1

GEOGRAPHY
Paper 1

8813/01

13 September 2018

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.

[Turn Over

Section A**Theme 3: Geographical Investigation**

- 1** As part of a geographical investigation project in Kuala Lumpur, Malaysia, a group of 20 18-year-old students were tasked to ascertain the flood risk of the area in the vicinity of the confluence of Klang River and Gombak River.

In their background research, they came across photographs of the confluence that showed significant changes made to the river channel between 1977 and the present day (see Resource 1). The group intended to conduct a survey to find out the public's views on whether the risk of flooding has been reduced after these changes were put in place.

The group divided themselves into teams of four and planned to survey 50 members of the public. They were told to conduct the investigation on two weekdays, between 5 pm and 7 pm on each day.

Resource 1 shows the past and present photographs of the confluence of the Klang River and Gombak River. Resource 2 shows a map of the confluence of Klang River and Gombak River, and its vicinity. The blue circle delimits the area within 300 m radius from the confluence, and is where the survey will take place. Resource 3 shows the questionnaire for flood risk survey which the group has crafted to gather data from the survey respondents.

- (a)** With reference to Resource 1, describe the main changes made to the river channel, and explain why these are meant to reduce flooding. [5]
- (b)** With the help of Resources 1 and 2, suggest a research question for the group to guide them in their investigation, and briefly explain why it is of a suitable scale. [3]
- (c)** With the help of Resource 2, outline the steps necessary for the students to obtain a representative sample they require for the survey. [4]
- (d)** Explain the strengths and limitations of the data that will be collected using the questionnaire shown in Resource 3. [5]
- (e)** Evaluate this investigation about flood risk in the area shown in Resources 1 and 2, and explain how it could be improved and extended. [8]

Section B

Theme 2: Urban Change

Waste Management in Vancouver

- 2 Vancouver is the third largest city in Canada. It has a vision of reducing its volume of solid waste by half by 2020, and becoming a zero waste community by 2040.

Resource 4 shows a factfile on the ecological footprint of Vancouver, recently published in a study. Resource 5 shows how the total amount of solid waste disposed would increase from 2016 to 2040 if current waste reduction efforts remain unchanged. Resource 6 shows selected posters used by Vancouver to educate its citizens on waste management.

- (a) With the help of Resource 4, explain **one** usefulness and **one** limitation of *ecological footprint* as an indicator of sustainable urban development. [4]
- (b) With reference to Resource 5, describe the projection of Vancouver's waste disposal to 2040 if current waste reduction efforts remain unchanged. [2]
- (c) Suggest **three** reasons why it will be difficult for Vancouver to achieve its goal of producing zero waste by 2040, as seen in Resource 5. [6]
- (d) With the help of Resource 6, explain the extent to which public education as a strategy can help Vancouver to reduce waste. [6]
- (e) Using the resources and your own knowledge, suggest and explain why waste reduction is deemed a major part of Vancouver's plans for sustainable urban development. [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) With the help of flood hydrographs, explain the role of climate in influencing their characteristics. [9]
- (b) To what extent can the tropical rainforest climate represent the climate zones in the humid tropics? [16]
- 4 (a) Explain how climate change can negatively impact human activity in countries at low levels of development. [9]
- (b) Assess the effectiveness of human responses to climate change. [16]

Theme 2: Urban Change

- 5 (a) Explain why urban population increase is faster in developing countries than in other parts of the world. [9]
- (b) Assess the effectiveness of attempts to manage the consequences of rapid urbanisation in developing countries. [16]
- 6 (a) Explain how the issue of crowding **OR** fear is produced in cities in countries at high levels of development. [9]
- (b) Assess the success of strategies used to **EITHER** lessen crowding **OR** cope with fear in the city. [16]



ST ANDREW'S JUNIOR COLLEGE
Preliminary Exam
Higher 1

Geography

8813/01

Paper 1

13 September 2018

3 hours

INSERT

READ THESE INSTRUCTIONS FIRST

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

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

[Turn over

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Resource 1 for Question 1

Photographs showing the confluence of the Klang River and Gombak River
in Kuala Lumpur, Malaysia

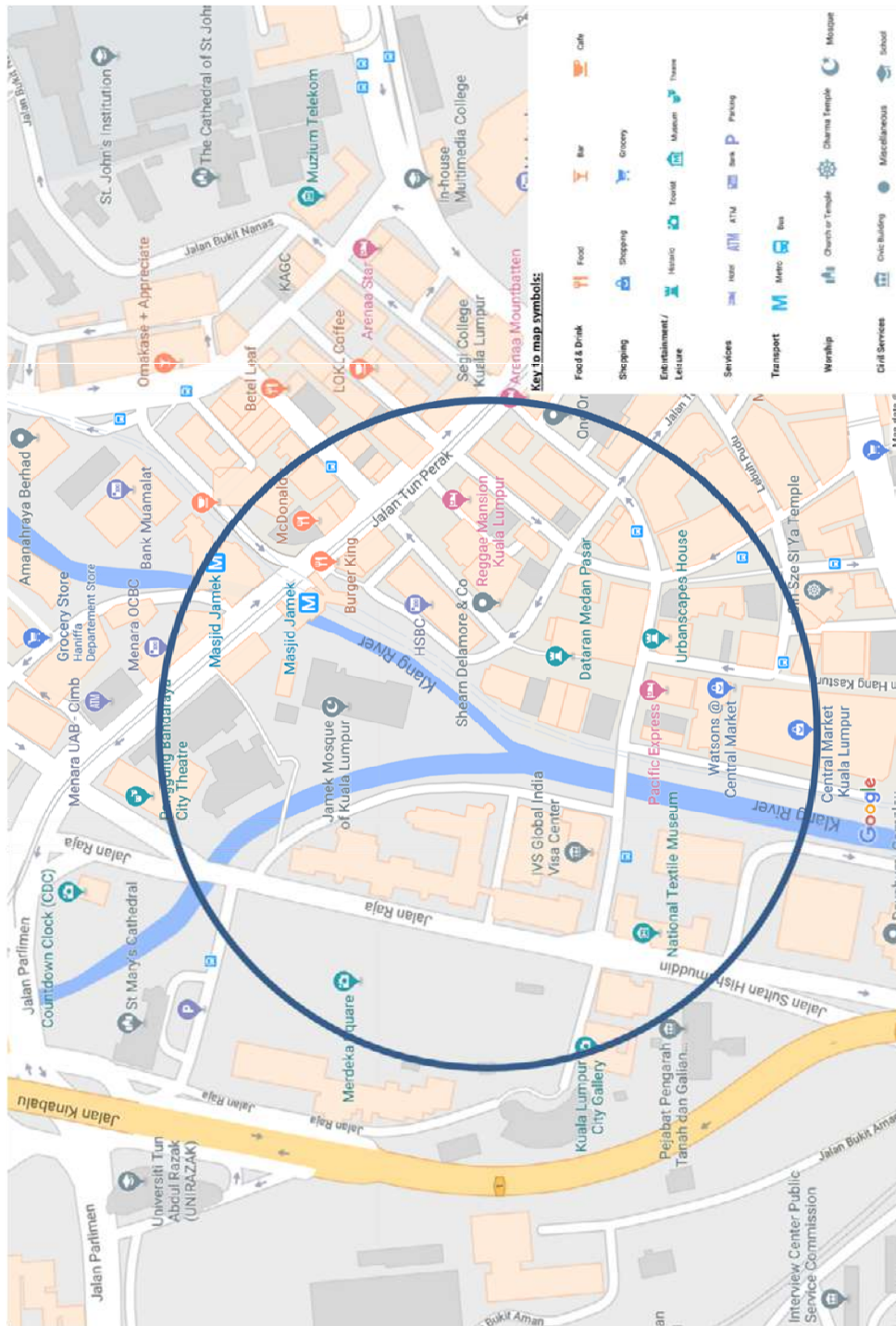
1977

Present



Resource 2 for Question 1

Map showing the location of the confluence of Klang River and Gombak River and its vicinity



Resource 3 for Question 1

The flood risk questionnaire used by the students

1. How long have you living and/or working in this area?

Less than 1 year 1–5 years 6–10 years 11–20 years more than 20 years

2. On a scale of 1 (not at all concerned) to 4 (very concerned), how concerned are you about the risk of flooding in this area?

1

2

3

4

3. From what you can remember, has this area ever been flooded in the past? YES/NO

If YES, please tell us briefly when, and what caused the flood?

4. On a scale of 1 (very low) to 4 (very high), what is your current understanding of the risk of this area being affected by flooding?

1

2

3

4

5. What do you think is the most likely way that you might be affected by flooding? (tick one)
☐ River/surface water overflowing

☐ Sewers overflowing

☐ Water flowing over the land/down roads

☐ Water rising out of the ground

☐ Others: (please elaborate)
6. Which of the following measures do you think would be the best way to minimise future flood risks, without stopping further development in this area? (tick one)
☐ Build more/larger sewers

☐ Plant more trees

☐ Make more surfaces permeable (so rain/floodwater can seep through)

☐ Create more green spaces in new developments to absorb rain/floodwater

☐ Build flood barriers at key points along the river

☐ Others: (please elaborate)
7. For recording purposes only and if you don't mind, what is your postcode/road name?

Thank you for your help.

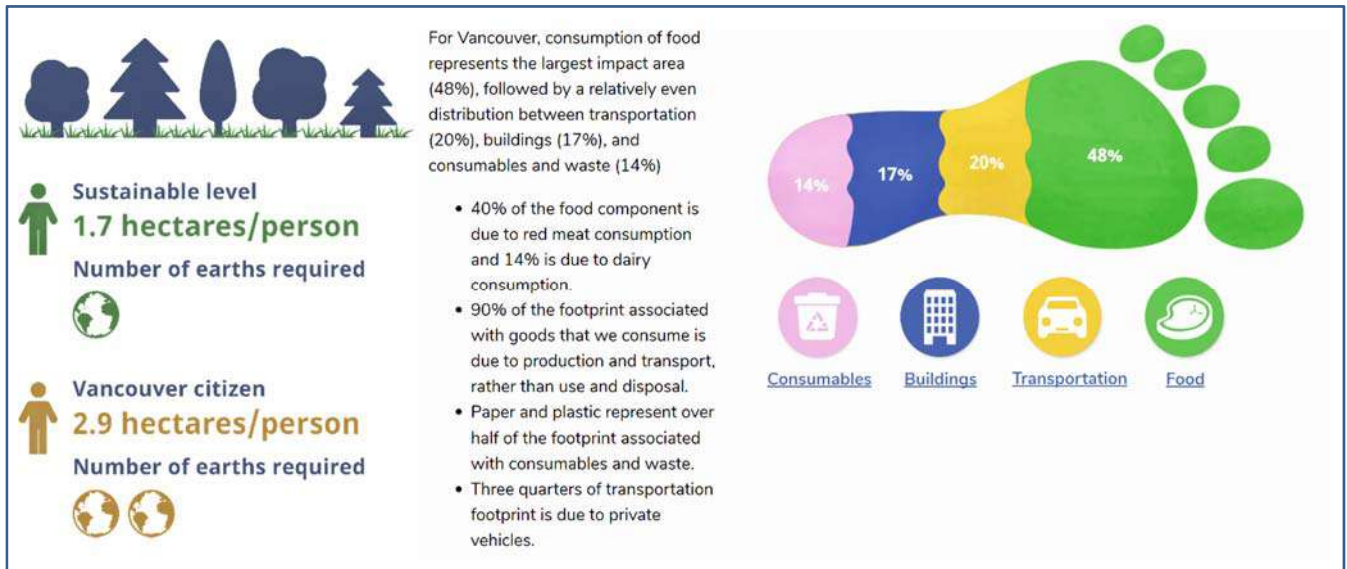
Without asking, record the following:

Gender: M/F

Age range: 16–25 26–35 36–50 50–64 65+

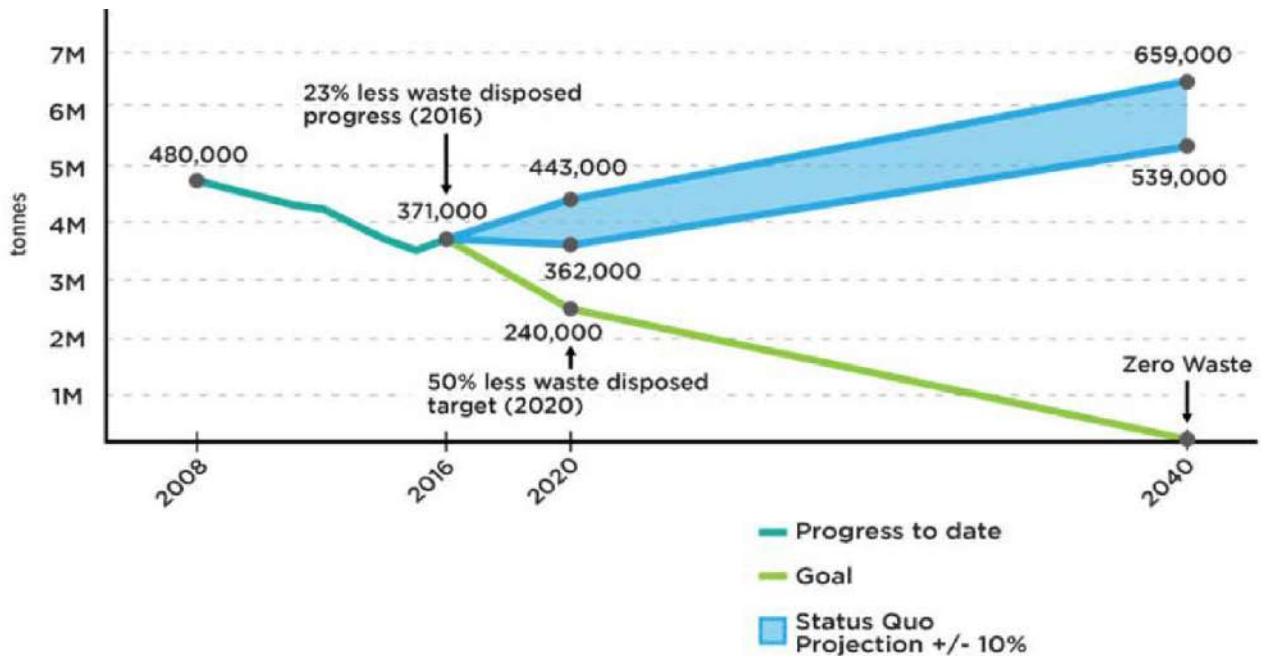
Resource 4 for Question 2

Factfile on Vancouver's Ecological Footprint



Resource 5 for Question 2

Vancouver Waste Disposal* Projection to 2040



* Vancouver disposes its solid waste using landfills and incineration.

Section A

Theme 3: Geographical Investigation

1

- (a) With reference to Resource 1, describe the main changes made to the river channel, and explain why these are meant to reduce flooding. [5]

Changes	Reduce flooding because...
<ul style="list-style-type: none"> Vegetation on the river banks have been removed, and replaced by concrete [1m] 	<p>Speeds up the flow, such that flood waters can be removed quickly (i.e. more efficient) downstream:</p> <ul style="list-style-type: none"> Reduction of friction between water and the banks (i.e. lowers roughness) Concrete lining prevents bed or bank erosion, lowers sediment load of the river [2m]
<ul style="list-style-type: none"> The river has been widened (note that the natural river banks have been “pushed back” to closer to the buildings) [1m] 	<ul style="list-style-type: none"> Capacity of the river has been increased, allowing more water to be contained within the channel, helping to prevent bankfull discharge from being exceeded [1m]

- (b) With the help of Resources 1 and 2, suggest a research question for the group to guide them in their investigation, and briefly explain why it is of a suitable scale. [3]

Possible research question: [1m]

- To what extent has the channelisation at the confluence of Rivers Klang and Gombak reduced the perception of flood risk among users of the area in its vicinity?

Considerations: [not creditable directly, but must be reflected in the research qn]

- Fixed variable – channelisation*
- Variable to be tested – perception of flood risk*
- Where? – Confluence of the rivers*
- Who? – Users of the area in the vicinity of the confluence (defined here as within 300m radius)*

Why it is of a suitable scale: [2m]

- Geographical area is small, only 300m radius, which is a little over 0.28km²
- There is sufficient resources in terms of manpower (20 students) that can be divided into enough teams (5 teams of 4) to be spread out within this area
- A total of 4 hours over two evenings is reasonable amount of time to survey 50 members of the public (average one team surveys 5 respondents every evening)

- (c) With the help of Resource 2, outline the steps necessary for the students to obtain a representative sample they require for the survey. [4]

There is no fixed way of sampling, but explanations should be given for the suggested approach. Considerations should include:

- Where to conduct the survey (e.g. stratified sampling to select five locations based on characteristics such as distance from the confluence; landuse; etc)

- Who to find as respondents (e.g. a blend of quota and convenience sampling to obtain sampling profile that is reflective of actual population by age, gender, etc)

Level	Marks	Descriptors
2	3-4	Response demonstrates good to very good knowledge of sampling method(s). Outlines a clear plan with reference to data collection, methods, and may consider limitations. Response is relevant to context of question but may lack clarity and coherence for lower end of the level.
1	1-2	Response demonstrates limited or no knowledge of sampling methods. Outline of method 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.

- (d) Explain the strengths and limitations of the data that will be collected using the questionnaire shown in Resource 3. [5]

Strengths may include:

- Breadth of coverage – perception of risk (Q2 to Q4), cause (Q5), suggestions on mitigation measures (Q6), profile of the respondents (Q1, Q7 and items at end)
- Clarity of questions – generally clear, unlikely to cause misunderstanding and hence collect invalid and unreliable information

Limitations may include:

- There was no question on comparing between the before and after of the channelisation efforts. This is a major limitation because the investigation was intended to investigate whether flood risks have been reduced *because* of channelisation.
- There is an assumption that respondents are familiar with the mechanisms of flooding in the area (see Q5) and thus be able to identify solutions (see Q6)

Level	Marks	Descriptors
3	5	Response demonstrates excellent ability to identify and explain both strengths and limitations of the questionnaire used. There would be meaningful references to the features of the questionnaire and whether these relate well to the context of the investigation.
2	3-4	Response demonstrates good to very good ability to identify and explain both strengths and limitations of the questionnaire used. References to the questionnaire may not be consistent, and/or at parts, the connections between the questionnaire and the context of the investigation not well considered. Lower end of the level may be answers with an emphasis on only strengths or limitations.
1	1-2	Response demonstrates weak ability to identify and explain either or both strengths and limitations. No or minimal references to the questionnaire features, and at the lower end of the level, the context of the investigation is ignored.

- (e) Evaluate this investigation about flood risk in the area shown in Resources 1 and 2, and explain how it could be improved and extended. [8]

Indicative content:

Strengths

- Flood risk is more commonly understood in terms of whether a river floods frequently and the magnitude of the floods. Investigating through the perceptions of the public is often overlooked, so this investigation will contribute a very useful piece of information from the users' views.

Limitations

- However, studying only the perception of the public makes it a very narrow study. Flood risk of an area extends beyond perception of the public.
- Difficult to obtain perceptions of respondents who have lived in the area before and after channelisation.

Improvements and extension

- To more fully meet the investigation's objective to ascertain flood risk of the area, there are other considerations, including flood recurrence history stretching to in the 1970s, climatic data, landuse change over time, infiltration rates, etc
- Flood risk study could consider the various social, economic and environmental costs that could be brought to the area
- Channelisation in this area may result in flooding further downstream, so a study can be carried out for lower stream areas.

Section B

Theme 2: Urban Change

Waste Management in Vancouver

- 2 Vancouver is the third largest city in Canada. It has a vision of reducing its volume of solid waste by half by 2020, and becoming a zero waste community by 2040.

Resource 4 shows a factfile on the ecological footprint of Vancouver, recently published in a study. Resource 5 shows how the total amount of solid waste disposed would increase from 2016 to 2040 if current waste reduction efforts remain unchanged. Resource 6 shows selected posters used by Vancouver to educate its citizens on waste management.

- (a) With the help of Resource 4, explain **one** usefulness and **one** limitation of *ecological footprint* as an indicator of sustainable urban development. [4]

Usefulness: [2m]

- The larger the EF, the less sustainable a city is. In Vancouver, EF is 2.9 gha/pax, which is above the ideal size (1.7 gha) that will help make it more sustainable. It suggests that if everyone uses resources like Vancouver, 2 Earths are required, and clearly, this is not possible.
- The calculation of EF reveals which aspects of resource use could have more scope for reduction. In this case, Vancouver's food consumption is responsible for about half of its EF, so more can be looked into how the footprint linked to food can be reduced. Similarly, the use of paper and plastic, and private transport, all need to be reviewed as possible areas in which Vancouver can reduce reliance on to achieve SUD.

Limitation: [2m]

- The calculation of ecological footprints for cities may obscure the fact that particular groups of city dwellers contribute disproportionately to these footprints. For example, the poorest segment of Vancouver's population would very likely be much less than that of its wealthiest.
- The meaning of EF depends on the quality and range of statistics from which it is calculated. Resource 4 shows us the range of considerations, and it is reasonable to question the reliability of the data for each of the category, such as food and waste.

- (b) With reference to Resource 5, describe the projection of Vancouver's waste disposal to 2040 if current waste reduction efforts remain unchanged. [2]

Current waste production: 371,000 tonnes

Projection by 2020 if efforts remain unchanged:

- Could drop to 362,000 but may also rise to 443,000 tonnes

Projection by 2040 if efforts remain unchanged:

- Waste will be increased, to a value in the range of 539,000 to 659,000 tonnes, an increase of 45-77% from 2016.

- (c) Suggest **three** reasons why it will be difficult for Vancouver to achieve its goal of producing zero waste by 2040, as seen in Resource 5. [6]

Possible reasons [2m each]:

- Reduce waste production is difficult especially in a population that is rich and large. Resource 5 suggests that waste production will actually increase if nothing more is done to reduce them, so the inclination of the city is to produce more waste. Hence, waste reduction is actually "going against the grain".
- Achieving this goal will require alignment across all sectors of society, not just individuals but businesses as well. Mindsets and behavior of everyone can take a long time to change towards waste reduction, and reusing and recycling resources. Use of laws and policies may not sit well with people, and education efforts may only show after many years.
- Infrastructure and technology in waste management may not be fast enough to meet the continued waste production among its citizens.

- (d) With the help of Resource 6, explain the extent to which ~~of~~ public education as a strategy can help Vancouver to reduce waste. [6]

Indicative content

Helpful - Education aims to change mindsets, and in turn, the behavior of its citizens. Reaches out to a variety of segments in the population. Allows a host of platforms and approaches, such as through posters that can be placed in a variety of places, and also can include elements to reach out to the public and stimulate their imagination. etc

Not very helpful - Whether these messages would ever reach the target audience remains a question (e.g. these posters can be ignored, vandalised, etc). Humans may need more active motivation from the authorities than passive messaging. Other means such as financial incentives to encourage waste reduction, reusing and recycling would be required to complement public education. etc

Level	Marks	Descriptors
3	5-6	Response shows the ability to consider the usefulness of public education from more than one perspective, and is able to explain convincingly why it is only to some extent that this strategy can be relied on. The use of examples, though not necessary, may be a feature in the best answers.
2	3-4	Response offers a balanced account on the usefulness of public education to help reduce waste, although it may be that only one-sided view is presented but explained well.
1	1-2	Response provides a simplistic and one-sided view on the use of public education to help reduce waste. There would be little to none of explanation of its chosen stand.

- (e) Using the resources and your own knowledge, suggest and explain why waste reduction is deemed a major part of Vancouver's plans for sustainable urban development. [7]

Indicative content

- Protecting the **Environment**: reducing EF of Vancouver (currently two times larger than Earth can sustain), addresses climate change and other environmental impacts (pollution, GHGs from decomposition of waste, etc), pushes the city towards circular metabolism
- Contribute to **Economic** well-being: waste can become a resource that support new business opportunities, reducing the need for increasingly scarce materials and inputs; new business models and technology that will bring the linear economy towards a more circular one; new jobs that are 'green', reduced waste disposal costs, reduced household costs by avoiding buying and replacing short-lived consumer goods, etc.
- Benefitting **Society**: Strengthening community connections in a society that is diverse (becoming a zero waste community provides the opportunity for all Vancouver residents to be more connected through programs involving repair, sharing, and reuse), Recovery of products that are reusable and rescuing food that is edible can provide employment across different segments of society, especially for the lower income groups.

Level	Marks	Descriptors
3	5-7	Response considers fully the dimensions (i.e. breadth) that help a city achieve SUD, and shows convincingly how waste reduction contributes to these (i.e. depth). Examples may be used, though not necessary.
2	3-4	Response provides a partial account of the relationship between waste reduction and SUD. May have only breadth or depth.
1	1-2	Response lacks both breadth and depth, and sketchy on why waste reduction has a key role to play in SUD.

Section C

Answer **two** questions from this section.

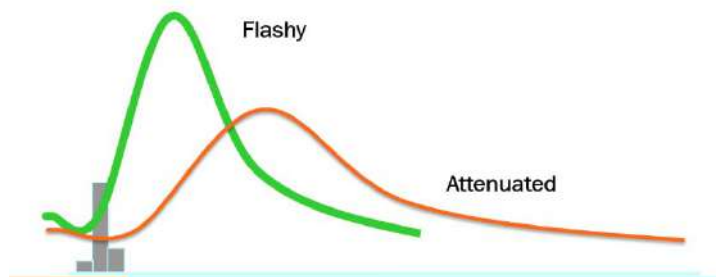
Either Question 3 **or** Question 4 and **Either** Question 5 **or** Question 6.

Theme 1: Climate Change and Flooding

- 3 (a) With the help of flood hydrographs, explain the role of climate in influencing their characteristics. [9]

Indicative content:

- Flood hydrographs (also known as storm hydrographs) measures the discharge of a river at a specific gauging station over time, and typically after a rainfall event.
- For the “characteristics” of flood hydrographs, students should examine the key components of rising and falling limbs, lag time and peak discharge and the shape of the hydrograph.
- Essentially, for the purpose of this question, there two main shapes of flood hydrographs i.e. flashy and attenuated. (Students are strongly encouraged to draw the different shapes of hydrographs; refer below) We also assume that human influences are minimal so that the effect of climate is clearer.
- Conceptually, the best answers will be aware of the various flows that contribute to these components and how these components vary.



- (b) To what extent can the tropical rainforest climate represent the climate zones in the humid tropics? [16]

In this question, students should show awareness that the context of the essay discussion should include all the three climatic zones within the humid tropics i.e. Af, Aw and Am. The details of the characteristics of the three climatic zones i.e. temperature and rainfall data should be mentioned. Students to identify the similarities and differences of these three climatic zones to ascertain the extent in which the tropical rainforest climate could represent the climates zones in the humid tropics.

Argument 1: The tropical rainforest climate can represent the climate zones in the humid tropics if only temperature characteristics are considered.

Argument 2: However, the tropical rainforest climate is limited in representing the climate zones in the humid tropics when we consider the rainfall patterns in these three zones.

- 4 (a)** Explain how climate change can negatively impact human activity in countries at low levels of development. [9]

It would be useful to classify effects of climate change on the lives of people by dimensions – economic (e.g. agriculture as livelihood), environmental (e.g. sea level rise affecting coastal settlements and tourism) and social (e.g. health and vector-borne diseases). These effects will affect immensely the lives of people living in countries at low levels of development. Lack of financial support, poor governance, lack of technical knowhow, pressure of growing population will make difficult in the developing countries. Use of located examples would gain credit.

- (b)** Assess the effectiveness of human responses to climate change. [16]

Human responses to climate change may be categorised as mitigation or adaptation. According to IPCC, mitigation measures are “human intervention to reduce the sources or enhance the sinks of greenhouse gases”. Need to mention the point that reduction strategies are to reduce or minimise carbon dioxide and other GHG emissions – this is the criteria for success. These aim to reduce the severity of the impacts brought about by climate change.

Adaptation measures form “the process of adjustment to actual or expected climate and its effects”. Hence, these help societies to live with the impacts of climate change, so as to become more suited to a changing environment.

Effectiveness of strategies will depend on willingness of the country, financial condition of the country or level of economic development, technical knowhow, the scale of application etc.

Both mitigation and adaptation are complementary, so they are often adopted together. They represent a two-pronged approach to the challenge of climate change. Combining strategies of mitigation and adaptation will be the best way of dealing with climate change because all strategies have their strengths and limitations.

To note that the crux of the question is not to produce a catalogue of responses, but assessing their effectiveness by looking at whether they have served their objectives. Hence, examples of named locations for adaptation and named policies/schemes for mitigation must be mentioned and assessed.

Theme 2: Urban Change

5 (a) Explain why urban population increase is faster in developing countries than in other parts of the world. [9]

- Although urban population is high in countries at high levels of development i.e. developed countries, the pace at which this is increasing is much faster in countries at low levels of development i.e. developing countries.
- Reasons for urban population increase being faster in developing countries include **rural-urban migration** and **natural increase**. For example, in countries such as India, the attraction of the city has remained very strong and the rural areas have not been able to provide sufficient opportunities to retain young adults. Elaborate on the push-pull factors.
- Reasons for slower urban population increase in developed countries has to do with an already high urbanisation level (hence low rural-urban migration), low natural increase (e.g. women unwilling to have more babies), and counter-urbanisation (e.g. the appeal of the rural, the negative experience of urban living, the improved transport networks, etc).

(b) Assess the effectiveness of attempts to manage the consequences of rapid urbanisation in developing countries. [16]

This question allows a wide range of approaches, letting you use your materials flexibly. The 'consequences of urbanisation' would include traffic congestion, waste management and housing problems (best exemplified through slums in developing countries). It would be good to approach this question by considering at least two of the 'consequence' (e.g. slums and waste) and select associated attempts for assessment of the effectiveness. Use of examples will be needed to help illustrate and deepen assessment.

The best answers are done thoroughly with a balance between the problems and the solutions and an awareness of the relative success of the management strategies put in place. There may even be offer of further solutions or improvements that can be made for the future. The best answers will use detailed examples to illustrate the points. Evaluation is an integral part of the answer.

- 6 (a) Explain how the issue of crowding OR fear is produced in cities in countries at high levels of development. [9]

Indicative content

For fear in the city:

Answers may consider how cities at high levels of development (e.g. economic, social, and environmental) may host factors which contribute to fear. There are several sources of fear in the city (e.g. crime and terrorism). Fear may be derived from known or actual risk, for example in relation to the experience of crime or the interpretation of published crime statistics, or in terms of the perception of crime. Perception depends on the interplay of elements including the characteristics of the individual, the physical environment, past experience, the representation of crime in the media, etc. Fear of terrorism may be associated with particular strategic locations, such as government buildings or airports, with certain religious or cultural activities; or be identified with certain groups of city residents or city visitors. Fear in the city may also be defined in part in relation to gender, such as for a woman traveling around or living in the city on her own, and age, where the young and the elderly may be less secure and more vulnerable to fear.

A higher level response will identify traits or characteristics associated with cities at high levels of development and make explicit links to how these contribute to fear in cities. For instance, a city with a high level of economic development may raise the international profile of the city and makes it a possible target for terrorists and hence increased fear amongst residents in the city. (Note, we are also just as interested in parts of a city)

- (b) Assess the success of strategies used to EITHER lessen crowding OR cope with fear in the city. [16]

Having established the factors which contribute to crowding in the city or fear in the city in part (a), you would now explain how to either lessen crowding or better cope with fear.

Indicative content

Answers should include a discussion of both successes and failures in mitigating the chosen issue (crowding or fear). You should address more than one strategy to mitigate crowding/fear. For the former, the answer could include urban design improvements. For the latter, they could discuss enhancing legal powers of law enforcers.

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).



VICTORIA JUNIOR COLLEGE
JC 2 PRELIMINARY EXAMINATION 2018
HIGHER 1

H1 GEOGRAPHY

8813/01

Paper 1

3 hours

READ THESE INSTRUCTIONS FIRST

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

Answer **four** questions in total.

Section A

Answer Question 1.

Section B

Answer Question 2.

Section C

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

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

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

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

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

Section A

Theme 3: Geographical Investigation

- 1 A group of 6 student researchers from the Research Institute of Hyderabad conducted a study in the vicinity of Wailepalle Village in Andhra Pradesh, India to assess the variables affecting infiltration in the area of study.

The researchers carried out infiltration measurements at 6 study sites. Study Sites A-E were randomly selected and were located close together. Study Site F was selected to compare with findings from Site A – E. Study Site F was located in Wailepalle Village and downslope of Study Sites A – E.

Infiltration measurements were taken over a period of 4 days at Study Sites A – E and 2 months later at Study Site F. At each study site, measurements were taken over 3 hours using the same double ring infiltrometer.

Resource 1 shows a map of the study area. Resource 2 shows a table of the infiltration rate measurements (mm/h) for Study Sites A – E. Resource 3 shows a photograph of the equipment setup for the infiltration measurements used at all study sites.

- (a) With reference to Resource 1, explain why it is appropriate to select Site F for comparison with Sites A – E.
[5]
- (b) With reference to Resources 2 and 3, explain the possible measures taken by the group of researchers to improve the reliability of their data.
[4]
- (c) Suggest additional measures the researchers can take to improve the reliability of their data.
[3]
- (d) With reference to Resource 2, explain the strengths and limitations of the data presentation technique shown.
[5]
- (e) With reference to Resources 1, 2 and 3, evaluate the accuracy of the data collected.
[8]

Section B**Theme 2: Urban Change****Urban trends in USA**

- 2** Resource 4 shows the changes in the percentage of the population living in urban and rural areas in the USA between 1900 and 2010. Resource 5 shows the 10 largest international migrant groups in New York City, USA in 2015. Resource 6 shows the elderly population (aged 65 and above) in New York City from 1990 to 2011. Resource 7 shows the socio-economic characteristics of selected groups in New York City in 2015.
- (a) With reference to Resource 4, describe the changes in the level of urbanisation in the USA between 1900 and 2010. [3]
- (b) With reference to Resource 5, describe the trends in international migration to New York City. [4]
- (c) With reference to Resource 6, describe the changes in the elderly population (aged 65 and above) in New York City between 1990 and 2011. [4]
- (d) With reference to Resource 7, explain the possible issues that immigrants from the Dominican Republic might face in New York City. [6]
- (e) With reference to Resources 5, 6, 7 and your own knowledge, discuss the challenges that the New York City authority might face in catering to the needs of migrants in the city. [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 factors that contribute to storm runoff generation in the tropics. [9]
- (b) Discuss the factors that contribute to the development of tropical cyclones. [16]
- 4 (a) Explain the fluvial processes in the tropics. [9]
- (b) To what extent is the El Nino Southern Oscillation an important factor influencing rainfall patterns in the tropics? [16]

Theme 2: Urban Change

- 5 (a) Explain the factors that affect urban liveability in cities in countries at high levels of development. [9]
- (b) To what extent can the same strategies be used to manage traffic congestion in cities in countries at different levels of development? [16]
- 6 (a) Explain the concepts of *needs* and *limitations* in sustainable development for urban areas in countries at low levels of development. [9]
- (b) Discuss the issues that the elderly living in the city may face. [16]



VICTORIA JUNIOR COLLEGE
JC 2 PRELIMINARY EXAMINATION 2018
HIGHER 1

H1 GEOGRAPHY

8813/01

Paper 1 INSERT

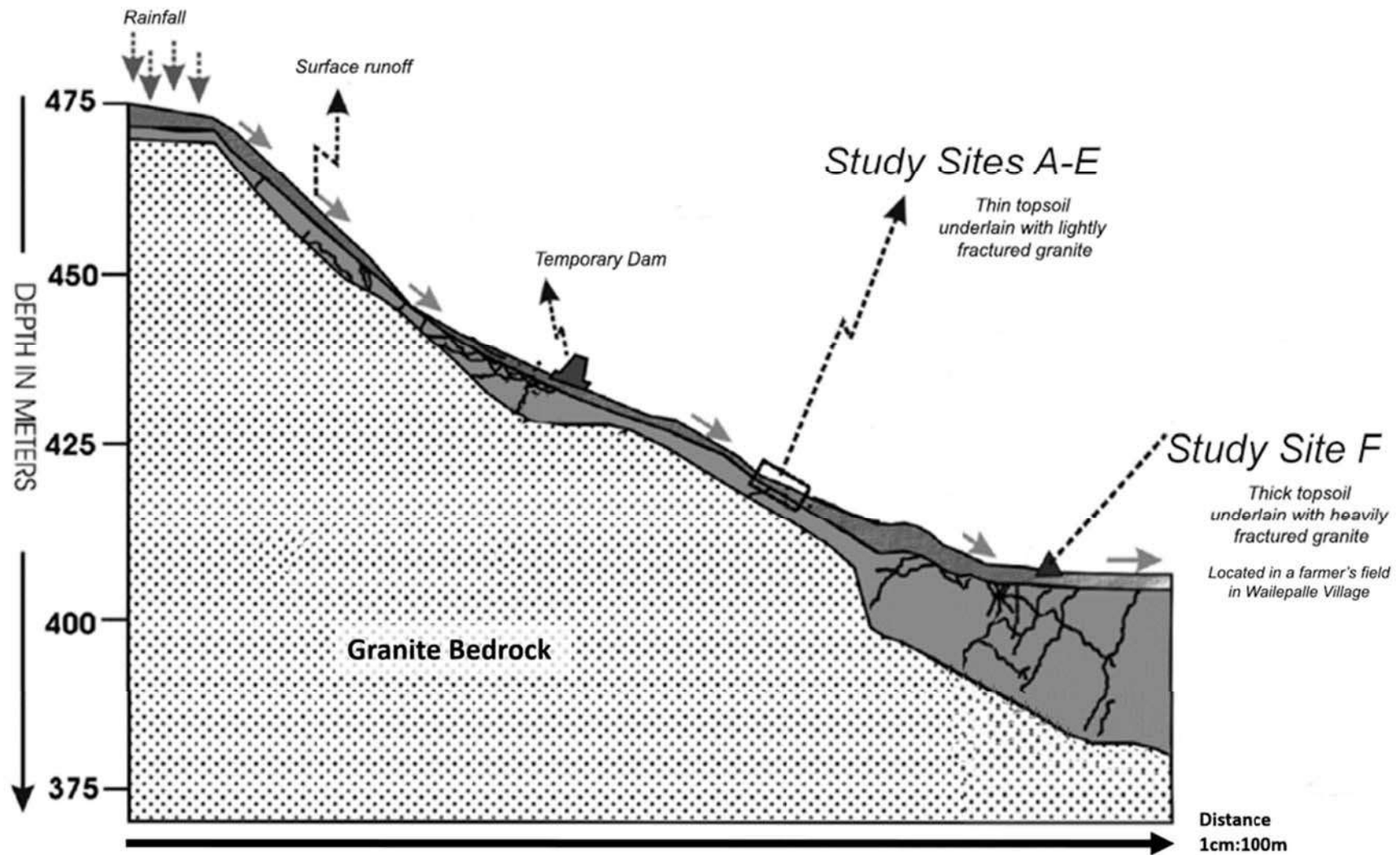
3 hours

READ THESE INSTRUCTIONS FIRST.

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

Resource 1 for Question 1

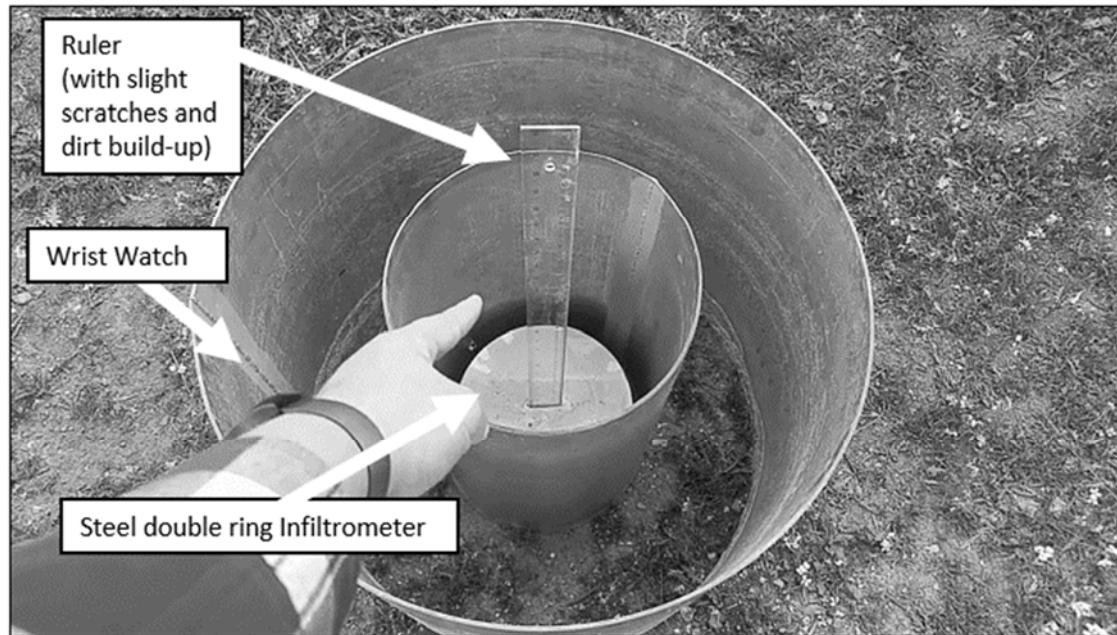
Map of the study area



Resource 2 for Question 1

Table of the infiltration rate measurements (mm/h) for Study Sites A – E

Time interval (min)	Study Site A	Study Site B	Study Site C	Study Site D	Study Site E
0	15 May 2005	16 May 2005	17 May 2005	17 May 2005	18 May 2005
2	545.45	1500.00	545.45	1813.95	270.00
4	545.45	1500.00	590.91	1813.95	315.00
6	554.55	1545.45	636.36	1813.95	405.00
8	545.45	1618.18	636.36	1813.95	405.00
10	527.27	1636.36	618.18	1813.95	405.00
15	436.36	1818.18	501.82	1770.42	338.40
20	436.36	1818.18	509.09	1451.16	338.40
25	436.36	1818.18	509.09	1451.16	338.40
30	436.36	1818.18	509.09	1451.16	338.40
40	363.64	1272.73	509.09	1451.16	331.20
50	363.64	1272.73	501.82	1451.16	331.20
60	363.64	1272.73	501.82	1451.16	331.20
80	272.73	1145.45	490.91	1052.09	302.40
100	272.73	1145.45	490.91	1052.09	304.20
120	272.73	1145.45	490.91	1052.09	304.20
150	242.42	872.73	490.91	1052.70	304.80
180	242.42	872.73	Not measured	Not measured	Not measured

Resource 3 for Question 1**Equipment setup for the infiltration measurements used at all study sites****Resource 3A**

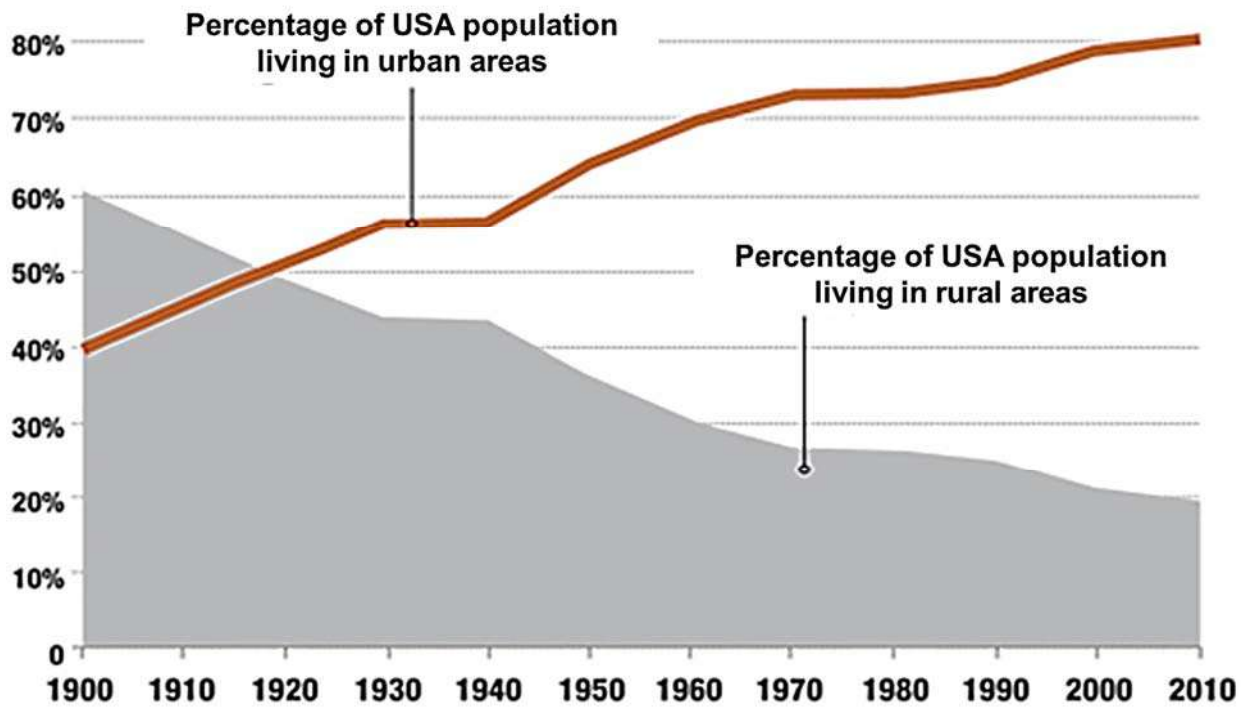
Infiltrimeter setup for the infiltration measurements used at all study sites.
Time intervals for Study Sites A – E were measured using a wrist watch.

**Resource 3B**

A stopwatch used to measure time intervals
for Study Site F.

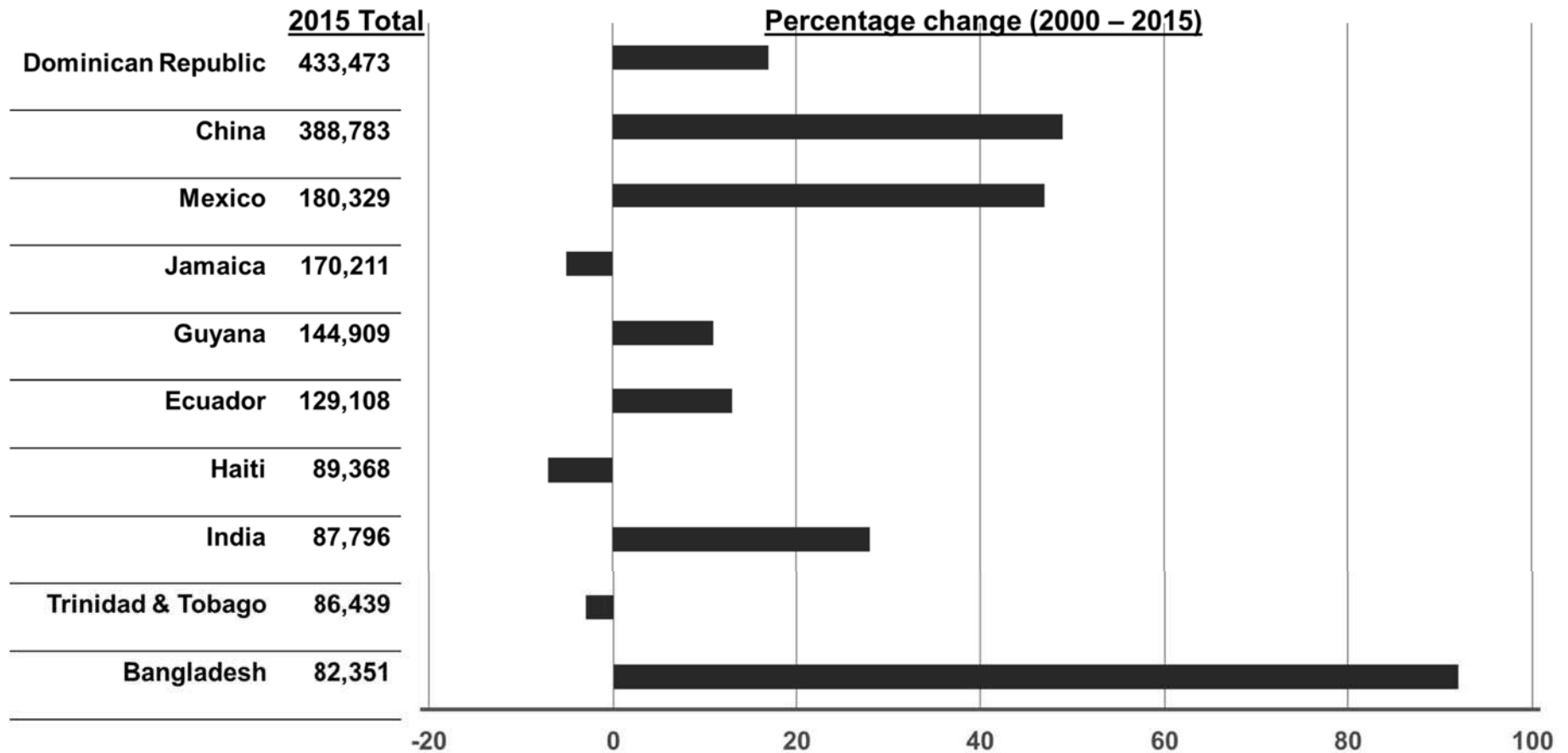
Resource 4 for Question 2

Changes in the percentage of the population living in urban and rural areas in the USA between 1900 and 2010



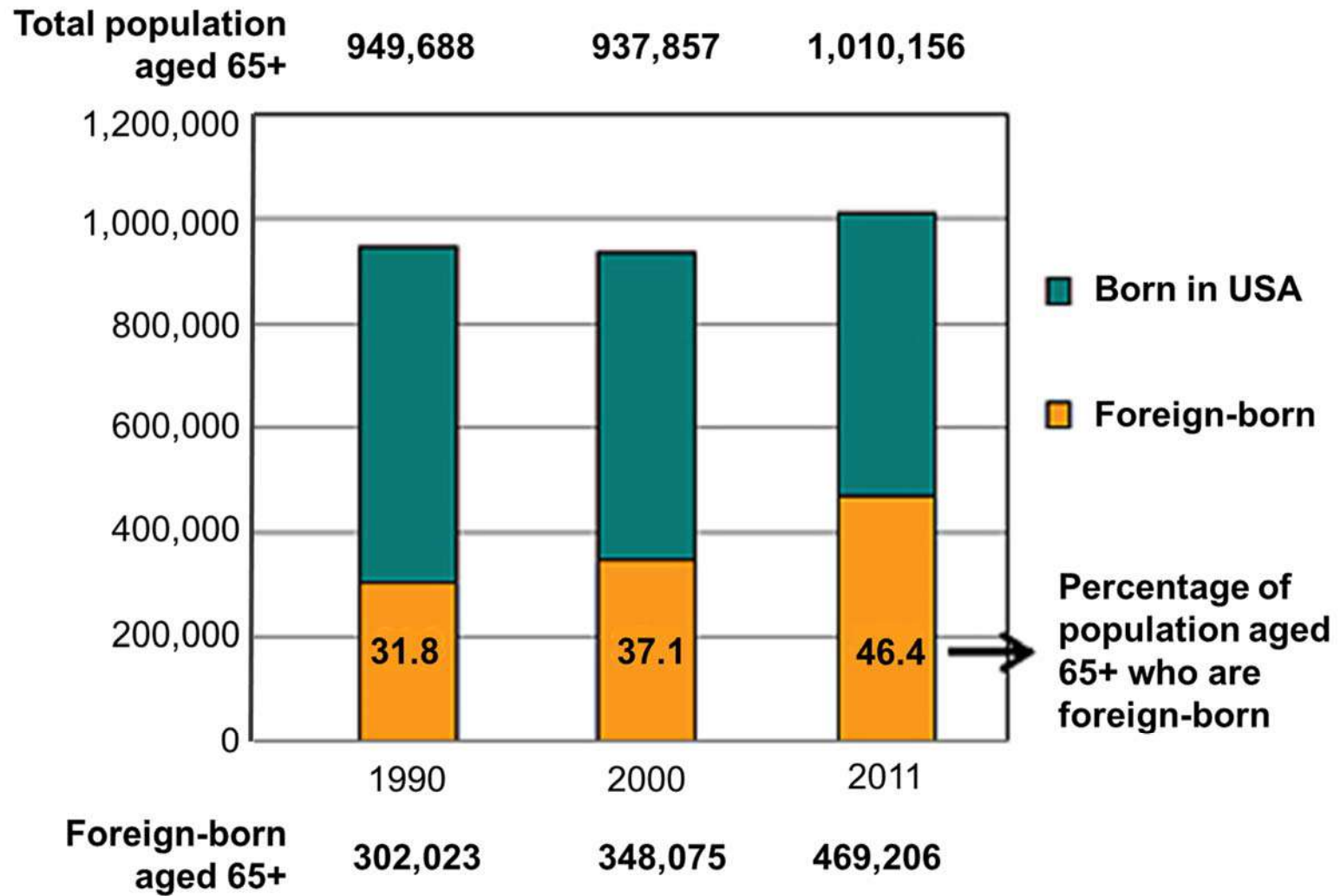
Resource 5 for Question 2

10 largest international migrant groups in New York City in 2015



Resource 6 for Question 2

Elderly population (aged 65 and above) in New York City from 1990 to 2011



Resource 7 for Question 2

Socio-economic characteristics of selected groups in New York City in 2015

	Median age (years)	Percentage with limited English proficiency	Percentage with at least a university degree	Poverty rate (%)	Percentage who owns their homes
• Born in USA	28	5.6	44.2	19.8	32.1
• Foreign-born	46	48.8	28.7	18.7	31.2
↳ Dominican Republic	46	70.5	12.2	31.8	9.2
↳ China	48	76.6	27.2	22.3	45.2
↳ Guyana	50	2.1	17.3	10.3	51.8

Section A

Theme 3: Geographical Investigation

- 1 A group of 6 student researchers from the Research Institute of Hyderabad conducted a study in the vicinity of Wailepalle Village in Andhra Pradesh, India to assess the variables affecting infiltration in the area of study.

The researchers carried out infiltration measurements at 6 study sites. Study Sites A-E were randomly selected and were located close together. Study Site F was selected to compare with findings from Site A – E. Study Site F was located in Wailepalle Village and downslope of Study Sites A – E.

Infiltration measurements were taken over a period of 4 days at Study Sites A – E and 2 months later at Study Site F. At each study site, measurements were taken over 3 hours using the same double ring infiltrometer.

Resource 1 shows a map of the study area. Resource 2 shows a table of the infiltration rate measurements (mm/h) for Study Sites A – E. Resource 3 shows a photograph of the equipment setup for the infiltration measurements used at all study sites.

- (a) With reference to Resource 1, explain why it is appropriate to select Site F for comparison with Sites A – E.

[5]

Indicative content:

Due to following conditions at F:

Similar to Sites A-E:

- Within close proximity (distance evidence) of Sites A-E, thus experiences similar precipitation conditions.

Difference to Sites A-E:

- Further downstream (distance evidence) therefore surface run-off less affected by dam
- Location at base of slope allows more infiltration
- Thick soil allows more infiltration
- More fractured granite allows more infiltration
- Base of slope and thick soil leads to higher antecedent moisture which allows less infiltration

Levels-marked

- (b) With reference to Resources 2 and 3, explain the possible measures taken by the group of researchers to improve the reliability of their data.

[4]

Indicative content

Measures taken:

- Same equipment setup for all days
- Stopwatch and wrist watch was recalibrated before the start of measurements for the day.
- Same time intervals.
- Ruler was cleaned before each set of measurements.

Point-marked

- (c) Suggest additional measures the researchers can take to improve the reliability of their data.

[3]

Indicative content

Measures they could have taken

- Used either wrist watch or stop watch for all measurements
- Continued with 1 day 1 site intervals - 17 May had 2 measurements
- Continued measuring at Site C and E at the 180min mark - No measurements for Site C-E at 180 mins.

Point-marked

- (d) With reference to Resource 2, explain the strengths and limitations of the data presentation technique shown.

[5]

Indicative content

Table:

- Columns (days) and rows (time intervals) allow better organisation (+ve)
- Easy to compare across different study sites (+ve)
- Difficult to see trends and patterns for each study site and across study sites (–ve)

Levels-marked

- (e) With reference to Resources 1, 2 and 3, evaluate the accuracy of the data collected.

[8]

Indicative content

- Appropriate equipment - Double ring infiltrometer outer ring ensures not lateral seepage, wrist watch & stopwatch for time intervals
- Ruler measurements taken at eye level to avoid error, dirty or scratched ruler surface (reduced accuracy)
- Different days to ensure study sites are not affected by previous site measurements
- Random sampling of 5 sites – no bias BUT may not be representative of the whole study area (reduced accuracy)

- Study Site F chosen (stratified sampling) better accuracy in terms of representation

Levels-marked using the generic descriptors for H1 8m DRQ from Theme 3

Section B

Theme 2: Urban Change

Urban trends in USA

- 2 Resource 4 shows the changes in the percentage of the population living in urban and rural areas in the USA between 1900 and 2010. Resource 5 shows the 10 largest international migrant groups in New York City, USA in 2015. Resource 6 shows the elderly population (aged 65 and above) in New York City from 1990 to 2011. Resource 7 shows the socio-economic characteristics of selected groups in New York City in 2015.

- (a) With reference to Resource 4, describe the changes in the level of urbanisation in the USA between 1900 and 2010.

[3]

Indicative content

- Overall, there is an increase in the level of urbanisation from 1900 to 2010.
- The increase in the level of urbanisation started to slow down after 1950.
- Generally, level of urbanisation experienced an upward trend except for between 1930 and 1940.

Point-marked

- (b) With reference to Resource 5, describe the trends in international migration to New York City.

[4]

Indicative content

- Dominican Republic is the largest group.
- Bangladesh is the smallest group out of the ten.
- Nevertheless, Bangladesh has experienced the largest percentage increase.
- Out of the ten largest groups, majority have experienced increase in numbers.
- Only three experienced a decrease.

Levels-marked

Level	Marks	Descriptor
2	3 – 4	Response highlights key patterns. Good and accurate use of the resource throughout by citing relevant figures from the resource. Response is consistently clear, detailed and focused on the question.
1	1 – 2	Response does not highlight any key pattern. Limited or no use of the resource. Response lacks clarity, detail and focus on the question.
0	0	No creditworthy response.

- © With reference to Resource 6, describe the changes in the elderly population (aged 65 and above) in New York City between 1990 and 2011.

[4]

Indicative content

- Total elderly population increased from 1990 to 2011.
- The number of elderly who are foreign-born increased.
- However, the number of elderly who are born in USA decreased.
- The proportion of elderly who are born in USA declined, while the proportion of elderly who are foreign-born increased.

Levels-marked

Level	Marks	Descriptor
2	3 – 4	Response highlights key patterns. Good and accurate use of the resource throughout by citing relevant figures from the resource. Response is consistently clear, detailed and focused on the question.
1	1 – 2	Response does not highlight any key pattern. Limited or no use of the resource. Response lacks clarity, detail and focus on the question.
0	0	No creditworthy response.

- (d) With reference to Resource 7, explain the possible issues that immigrants from the Dominican Republic might face in New York City.

[6]

Indicative content

- Difficulty in assimilating due to language barrier.
- Difficulty in getting jobs with good wages due to limited English proficiency and lack of educational qualifications.
- Because of their low income (indicated by the high poverty rate), they may face multiple deprivations (e.g. lack of access to adequate healthcare, lack of access to housing of reasonable quality, etc.)

Levels-marked

Level	Marks	Descriptor
3	5 – 6	Response covers at least two issues. The issues cited are linked to the socio-economic characteristics of migrants from the Dominican Republic shown in the resource, and are also specific to the issues faced by migrants. The issues are well-explained. Good and accurate use of the resource. Response is consistently clear, detailed and focused on the question.
2	3 – 4	Response covers at least two issues. The issues cited are largely linked to the socio-economic characteristics of migrants from the Dominican Republic shown in the resource, and are also largely specific to the issues faced by migrants. The issues are mostly accurate and well-explained, though there may be some gaps. Resource is used for some parts of the response. Response may lack clarity, detail and focus on the question at some parts.
1	1 – 2	Response covers only one issue. The issues cited have limited links to the socio-economic characteristics of

		migrants from the Dominican Republic shown in the resource, and are also not specific to the issues faced by migrants. The issues are not well-explained, with many gaps. Limited or no use of the resource. Response lacks clarity, detail and focus on the question.
0	0	No creditworthy response.

- (e) With reference to Resources 5, 6, 7 and your own knowledge, discuss the challenges that the New York City authority might face in catering to the needs of migrants in the city.

[8]

Indicative content

Possible challenges include:

- An increasing strain on the city authority's resources to provide for the migrants
 - The number of migrants have likely increased (Resource 5)
 - The migrants may be poor (Resource 5 and Resource 7)
- Difficult to meet all the needs of migrants since the issues they face may vary
 - The migrants are diverse in terms of their socio-economic profile (Resource 7)
- Furthermore, the fact that there is a growing proportion of elderly migrants (Resource 6) will make efforts to meet the needs of migrants more complex

Levels-marked using the generic descriptors for H1 8m DRQ from Themes 1 and 2

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 factors that contribute to storm runoff generation in the tropics. [9]

Indicative content

Responses could consider factors such as nature of precipitation, soil characteristics and human activities.

Higher level responses may show a strong awareness of how both human and natural factors can affect storm runoff generation. They may also demonstrate an awareness of how the factors may result in variations in storm runoff generation in the tropics (e.g. between humid and arid tropics or between different parts of the same drainage basin). There will be a good coverage of both infiltration excess and saturation overland flow in the higher level responses.

- (b) Discuss the factors that contribute to the development of tropical cyclones. [16]

Indicative content

Responses should evaluate the importance of different factors that result in the development of cyclones.

These include high amount of insolation, ocean surface temperatures greater than 26° - 27°C; weak vertical wind shear (minimal wind speed and direction changes with height); sufficiently strong Coriolis effect; and development of a strong upper air outflow of wind

Stronger responses will be able to weigh the importance of the different factors relative to specific aspects (criteria) of a cyclone's development e.g. structure, strength etc. or specific context e.g. during an El Nino event. The strongest responses will be well supported with relevant examples.

- 4 (a) Explain the fluvial processes in the tropics. [9]

Indicative content

Responses consider the various fluvial processes in the tropics (i.e. deposition, erosion and transportation).

Higher level responses will cover all three processes and will show a strong awareness of the variations in fluvial processes in the tropics (e.g. spatial variations or temporal variations).

- (b) To what extent is the El Nino Southern Oscillation an important factor influencing rainfall patterns in the tropics? [16]

Indicative Content

Responses should evaluate the importance of the ENSO in the formation of rain in the tropics (reversal of the Walker circulation, cyclones).

Stronger responses will be able to weigh the importance of the ENSO event relative to existing factors influencing rainfall in the tropics e.g ITCZ, monsoons in specific contexts (eastern vs western Pacific, areas affect by teleconnections). The strongest responses will be well supported with relevant examples.

Theme 2: Urban Change

- 5 (a) Explain the factors that affect urban liveability in cities in countries at high levels of development.

[9]

Indicative content

Responses could consider the political, socio-economic and environmental factors that affect urban liveability in countries at high levels of development.

Higher level responses will have a good coverage of factors (e.g. covering the different dimensions) and show a strong awareness of the factors that are relevant to countries at high levels of development.

- (b) To what extent can the same strategies be used to manage traffic congestion in cities in countries at different levels of development?

[16]

Indicative content

Responses consider the various strategies that can be used to manage traffic congestion (e.g. developing a good public transport system, restricting private vehicle ownership, restricting private vehicle usage, integrating land use planning with transport planning, increasing road capacity and network, etc.) It should be clear to candidates that the focus of the question is not about the effectiveness of strategies, but whether cities in countries at high and low levels of development can employ the same strategies.

Higher level responses would consider:

- Whether the same strategy can be used is dependent on whether the root cause of traffic congestion between cities at different levels of development is the same

AND / OR

- Context—even if the root cause is the same, due to the nature of the strategy (e.g. capital intensive), can it be implemented at a different level of development?

- E.g. Producing a mass rapid transit train system may not be used in countries at lower levels of development as it is capital intensive

- 6 (a) Explain the concepts of *needs* and *limitations* in sustainable development for urban areas in countries at low levels of development.

[9]

Indicative content

Responses should explain the essential needs of the world's poor and also the limitations imposed by the current level of technology and how society is organised on the environment's ability to meet present and future needs.

Higher level responses will show a strong awareness of how these concepts are central to the concept of sustainable urban development. There is also a strong awareness of how these concepts are applicable to urban areas in countries at low levels of development.

- (b) Discuss the issues that the elderly living in the city may face.

[16]

Indicative content

Responses can identify and explain which is the most / least important issue that the elderly living in cities may face.

Higher level response would consider variations. For example:

- Would the elderly living in cities in countries at different levels of development face the same issues? Or would the more pressing issues differ?
- At the same level of development, would elderly living in different cities (be it in the same country or different country) experience the same issues?
- Even within the same city, would the difference in socio-economic status amongst the elderly affect how certain issues would be more pressing than others?

YISHUN JUNIOR COLLEGE
JC 2 PRELIMINARY EXAMINATION 2018

H1 GEOGRAPHY

Paper 1

8813/01

20 August 2018

3 Hours

QUESTION PAPER

Additional materials: Answer Paper

1 Insert

World outline map



READ THESE INSTRUCTIONS FIRST

Start each question on a fresh piece of paper.

Write your name and CTG on all the work you hand in.

Write in dark blue or black pen on both sides of the paper.

You may use a pencil for any diagrams or graphs.

Do not use staples, paperclips, 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.

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

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

This question paper consists of **4** printed pages

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Section A

Theme 3: Geographical Investigation

- 1 Your class of 20 has been tasked to conduct a geography fieldwork exercise to investigate the impact of human activities on infiltration rates in the school.

Your group of four were assigned to collect infiltration data at two sites shown in Resource 1. Your group completed the fieldwork over 2 hours on a Wednesday afternoon as it started to rain like the previous 2 days.

Your group has been provided with the following equipment:

- 1 infiltration ring (improvised from a PVC pipe that is 30 cm high)
- 1 hammer
- 1 stop watch
- 1 1.5 litre bottles
- 1 30 cm ruler

Your group knocked the infiltration ring 5 cm into the ground. Water was then poured into the infiltration ring. Using the ruler and the stop watch, you measured the time taken for the water level to drop every 30 seconds and recorded the data in the recording sheet. Water is topped up in the infiltration ring after the reading is taken. This is repeated after each reading. Data was similarly collected at the second site.

Resource 1 are photographs of Sites 1 and 2. Resource 2 shows your recording sheet.

- (a) With reference to Resource 1, suggest a suitable hypothesis. [2]
- (b) Explain how your group would minimise the impact of your investigation at the 2 sites. [4]
- (c) Your group realized that the data collected may be inaccurate. Suggest the possible problems with the method of collecting data and how you could resolve them. [7]
- (d) With reference to Resource 2, explain how you would represent the data. [4]
- (e) Evaluate the usefulness of the data collected from your investigation to understanding infiltration and flood risk in school. [8]

Section B

Theme 2: Urban Change

- 2 Resource 3 shows a section of downtown Calgary and an inset map of East Village, a neighbourhood in downtown Calgary. Calgary is a city in Canada and its downtown area serves as a major employment centre.

Calgary has a high rate of workers who commute from the suburbs daily. The East Village is a neighbourhood characterised as an area with many derelict buildings, vacant plots of land and an active drug and prostitution culture on the streets.

Resource 4 tabulates the results of a survey conducted by the Calgary City Council asking citizens to prioritize the types of public amenities that would provide the most public benefit in East Village. Resource 5 shows a section of the East Village Area Development Plan focusing on the improvement of open space amenities. Resource 6 shows an artist's impression of Calgary's New Central Library which is expected to open in November 2018.

- (a) With reference to Resource 3, suggest reasons why the East Village neighbourhood has not been able to attract investment from property developers. [2]
- (b) With reference to Resource 3, explain why the Calgary City Council would be interested to redevelop the East Village. [4]
- (c) 'Based on the Economist Intelligence Unit's (EIU) Liveability Ranking in 2014, Calgary is ranked 5th. The EIU liveability index measures the dimensions of stability, healthcare, culture and the environment, infrastructure, and education.'

With the help of Resources 3 and 4, assess the usefulness of such indicators to measure urban liveability. [6]

- (d) Explain the strategy used to improve the image of the East Village neighbourhood as seen in Resource 5. [5]
- (e) With reference to Resources 5, 6 and your own knowledge, evaluate the effectiveness of urban reimagining on the residents of the East Village. [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 the weakening of the Walker Circulation impacts the Pacific. [9]
- (b) Assess the role of the Intertropical Convergence Zone (ITCZ) in influencing rainfall variation across the tropics. [16]
- 4 (a) Explain the characteristics of storm hydrographs in the tropics. [9]
- (b) “The occurrence of floods is mainly due to natural factors.” Discuss. [16]

Theme 2: Urban Change

- 5 (a) Explain the causes of urban traffic congestion in countries at high levels of development. [9]
- (b) ‘Strategies to ease traffic congestion in cities have had little success.’ To what extent do you agree with this statement? [16]
- 6 (a) Explain how urbanisation trends may vary across urban areas at different levels of development. [9]
- (b) To what extent have the strategies in managing non-hazardous solid waste in cities been effective? [16]

- END OF PAPER -

YISHUN JUNIOR COLLEGE
JC 2 PRELIMINARY EXAMINATION 2018

H1 GEOGRAPHY

Paper 1

INSERT

8813/01

20 August 2018

3 hours

READ THESE INSTRUCTIONS FIRST

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

This insert consists of 6 printed pages and 1 blank page.

BLANK

Resource 1 for Question 1

Site 1 Small field behind hall in Yishun Junior College



Site 2 Slope between lecture theatre and science laboratories



Resource 2 for Question 1

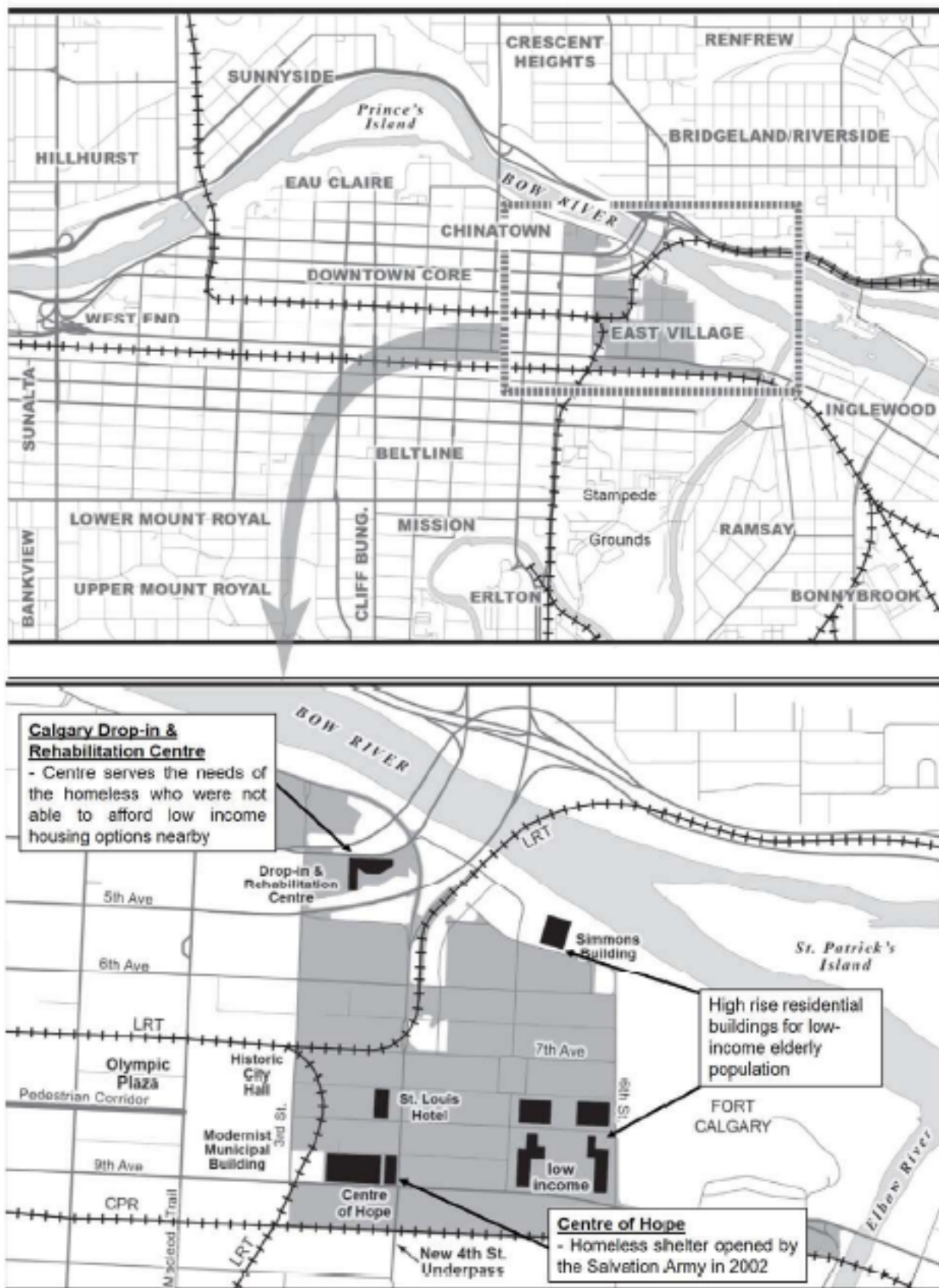
Recording sheet used in fieldwork exercise

Group:	1		
Collection Date:	25 July 2018		
Time:	3 – 5 pm		
Site Description:	Small field behind hall in Yishun Junior College		
Time (s)	Water level readings (mm)	Infiltration (mm)	Infiltration rate (mm/s)
0	30	0	0
30	17	13	0.43
60	18	12	0.40
90	19	11	0.36
120	20	10	0.33
150	21	9	0.30
180	21.4	8.6	0.29
210	22	8	0.26
240	27.4	7.6	0.25
270	23	7	0.23
300	23	7	0.23

Group:	1		
Collection Date:	25 July 2018		
Time:	3 – 5 pm		
Site Description:	Slope between lecture theatre and science laboratories		
Time (s)	Water level readings	Infiltration (mm)	Infiltration rate (mm/s)
0	30	0	0
30	20	10	0.33
60	21	9	0.30
90	22	8	0.26
120	23	7	0.23
150	23.5	6.5	0.22
180	23.9	6.1	0.20
210	24	6	0.20
240	25	5	0.16
270	26	4	0.13
300	26	4	0.13

Resource 3 for Question 2

East Village neighbourhood in the context of Downtown Calgary



Resource 4 for Question 2

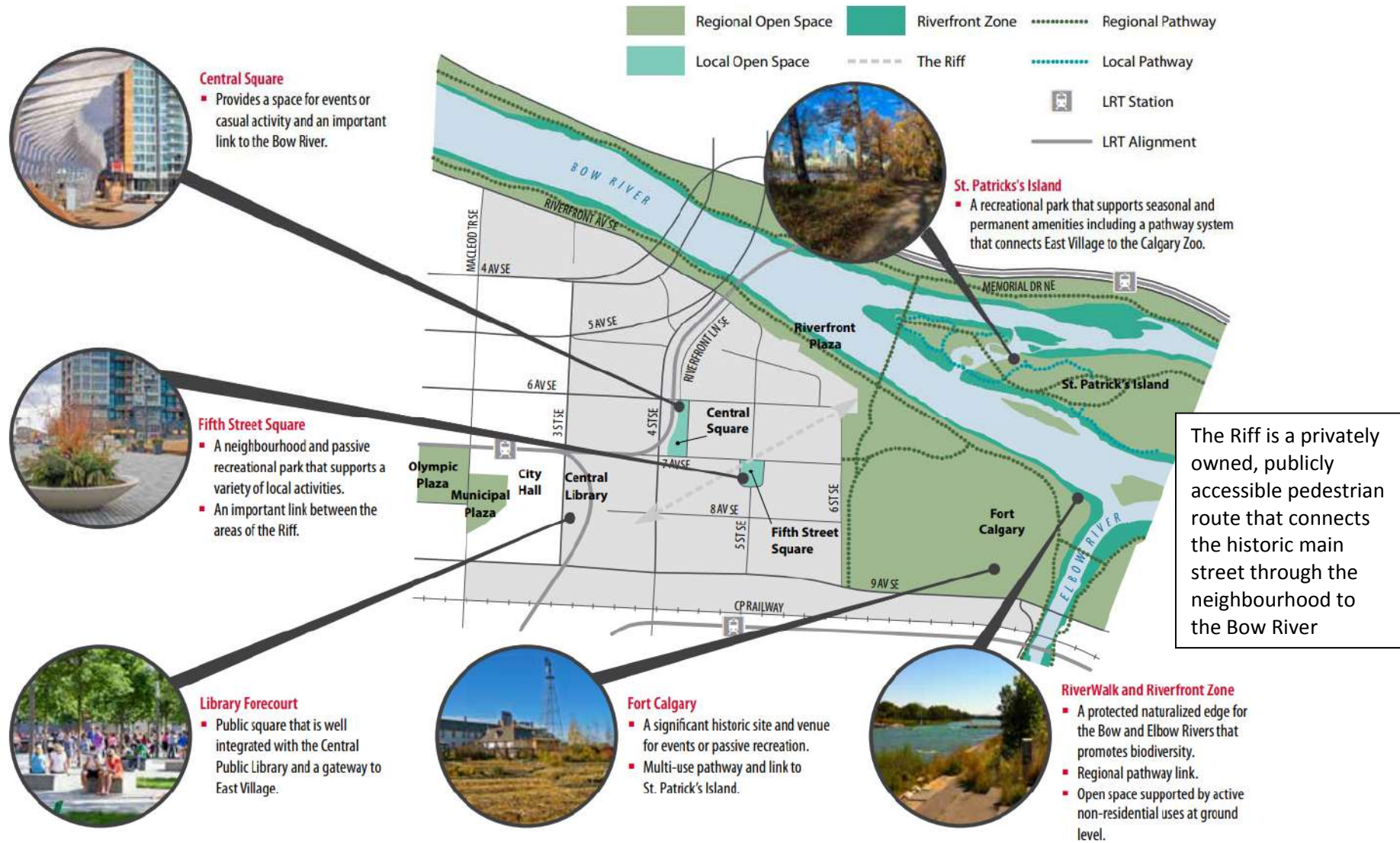
Public Amenity Ranking

1.	Neighbourhood	<ul style="list-style-type: none">• Facilities that support community activities (e.g. elderly care, child care, recreation, libraries, museums, etc.)• Residential units that meet enhanced accessibility standards• Dwelling units that contain 3 or more bedrooms
2.	Public Open Space	<ul style="list-style-type: none">• Public parks, courtyards and green spaces• Improvements to public parks, squares or sidewalks• Enhanced bus-stops• Larger sidewalks or pedestrian spaces
3.	Culture	<ul style="list-style-type: none">• Publicly accessible lobbies or indoor spaces for art exhibitions and creative activities• Facilities that support culture (administration, rehearsal, storage)• Publicly accessible art that is permanently installed/integrated into a development
4.	Mobility + Sustainable Development	<ul style="list-style-type: none">• Green building features (e.g. environmental roofs)• Connection to a district energy system, which reduces dependence on natural gas and other energy sources• Electric vehicle charging stalls• Bicycle facilities with secure parking, showers, toilets and change rooms
5.	Heritage	<ul style="list-style-type: none">• Incentives to developers to retain and preserve heritage buildings and/or heritage features• Reusing existing buildings

The table shows the five categories, in order of priority from survey results, with 1 (i.e. Neighbourhood amenities) being the type of public amenity valued **most** and 5 (i.e. Heritage amenities) being the **least** valued.

Resource 5 for Question 2

East Village Area Development Plan: Open Space Amenities



Resource 6 for Question 2

Artist's Impression of Calgary's New Central Library



"The façade utilizes a unique geometry and distribution of clear and fritted glass openings to control desired daylight levels for the interior spaces. Dramatic, highly transparent zones attract public interest to activities inside, while closed areas provide more focused study spaces. The encapsulation of the existing Light Rail Train is currently underway, and the new Calgary Public Library is expected to be completed in 2018."

- Description provided by Snøhetta, an international architecture firm based in Oslo, Norway