EUNOIA JUNIOR COLLEGE
JC2 Preliminary Examination 2018
General Certificate of Education Advanced Level
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, 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.

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

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 80m^2 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]

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INSERT

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

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

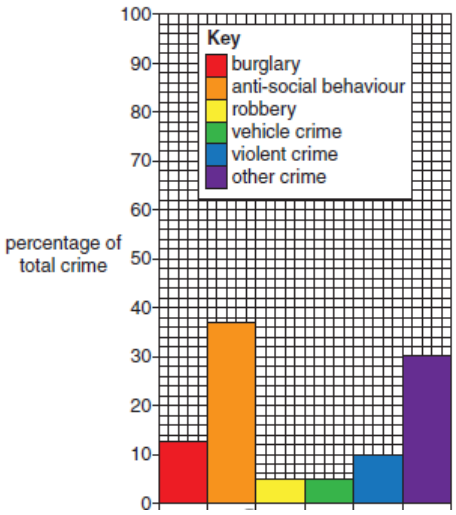
Resource 1 for Question 1

Average earnings of employed residents and average monthly rent of a 80m^2 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

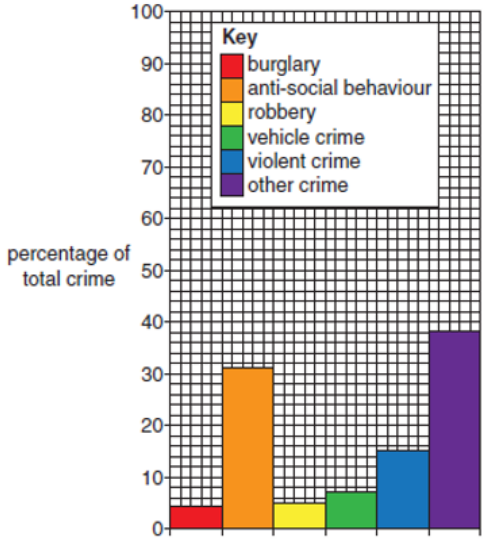
Resource 2A for Question 1

Relative incidence of crime in Birmingham



Resource 2B for Question 1

Relative incidence of crime in Solihull



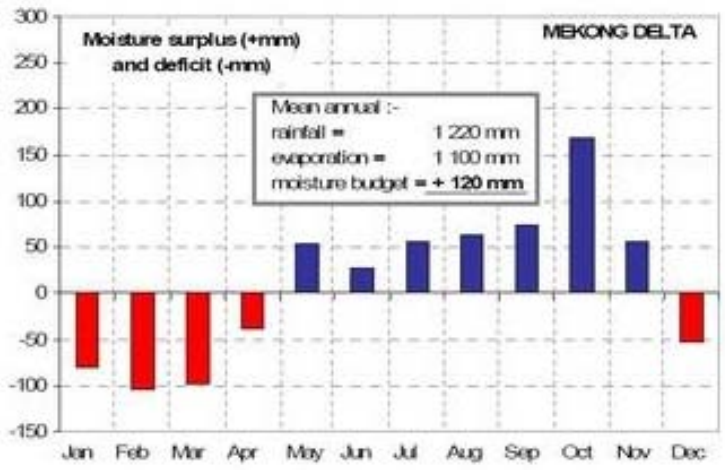
Resource 3 for Question 1

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

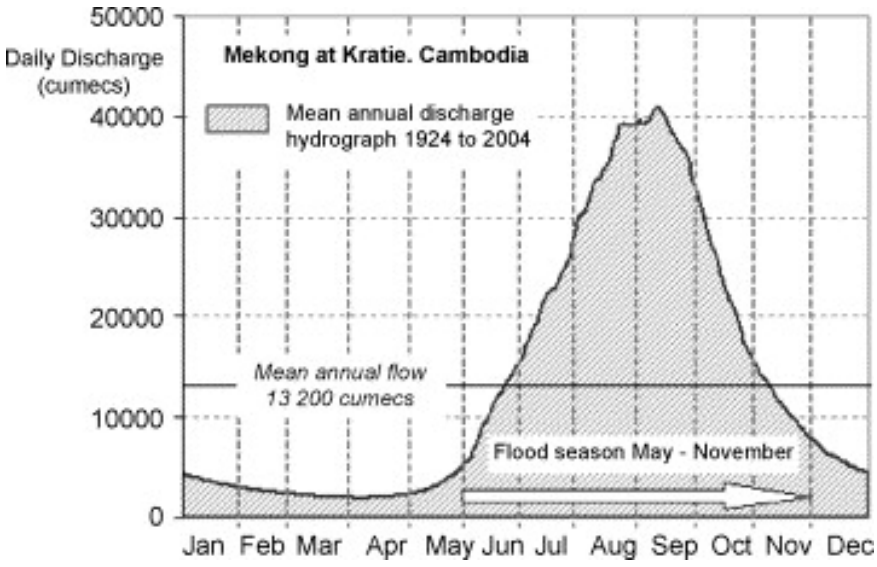
Resource 4 for Question 2

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 80m^2 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 Soilhull 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*	*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.*

2	*4-6*	*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.*
1	*1-3*	*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.*

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 Tibetian 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]

- *Forcasted 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***	*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.*
1	***1-2***	*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*
0	***0***	*No creditworthy response*

(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***	*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.*
2	***3-4***	*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.*
1	***1-2***	*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*
0	***0***	*No creditworthy response*

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.