Section A – Tropical Environments

Answer **one** question from this section

1 (a) Explain the variations in rainfall patterns within the tropics. [12]

Better responses will be able to integrate the use of variations in annual total rainfall, seasonality in rainfall patterns, sketches of climograph or the use of world map may also be used to support and illustrate the variations in rainfall patterns in the tropics. The predominant mechanism influencing rainfall—seasonal migration of the ITCZ and the resulting movement of the Hadley cell must be explained in detail. The effect of latitude on uneven heating can also be used to explain the presence of convectional rainfall. Other more localised factors like topographical barriers, continentality, ocean currents can also be used to explain variations.

Indicative content:

(i) Migration of the Hadley Cell
   a. Influence of the Inter tropical convergence zone
   b. Influence of Subtropical High

(ii) Topographical Barriers

(iii) Effect of Continentality

(b) Evaluate the extent to which erosion by water is responsible for the formation of landscapes in the arid tropics. [20]

Fluvial erosion is not entirely responsible for the formation of arid landscapes, instead the role of Aeolian processes, and specifically erosion and deposition are not to be neglected. The two mechanism tend to work symbiotically, although most landforms are indeed dominantly a result of either fluvial or Aeolian processes.

Rills, Gullies & wadis are dominantly the result of fluvial erosion (rill and gully erosion), while yardangs, dunes and deflation hollows are the dominantly the result of Aeolian processes. Better responses will be able to identify how both sets of processes are interlinked in which, one might aid the other e.g. How gully erosion accelerates the initial stages of corridor formation in yardangs. Weakest response would go with simplistic and unbalanced argument on the importance of either water or wind.

2 (a) Using one or more diagrams, explain the relationship between velocity, sediment size and fluvial processes. [12]

The Hjulstrom curve ought to be used to illustrate the relationship between velocity, sediment size and fluvial processes. Answers could be organised according to sediment size or fluvial processes. Better responses will also be able to draw upon specific fluvial erosion, transportation and depositional process to support responses.

(b) To what extent is climate the most important factor in the formation of different channel patterns in the humid tropics? [20]

Responses ought to recognise that beyond the influence of climate, there are also contributing factors leading to the formation of different channel patterns, specifically sediment load and velocity that can cause the river to be in disequilibrium, make alterations to the channel morphology via different channel processes. A comparison between the total annual rainfall across different climatic types should also be brought in to support explanations. Arguments could be made recognising that given climate affects discharge and hence, the capacity and competence of the channel, it is indeed comparatively important.

Indicative content:

Argument 1: Given that climate determines discharge, the river therefore responds according to the changes in the discharge, which favours the development of different channel patterns.

Argument 2: Other factors like the sediment load is also important in the formation of the different climatic types.

- Favouring meandering channels – Mixed loads comprising mainly clays, silt (due to persistent flooding) and some gravels will allow for the shape of the meanders to be maintained given that banks are more cohesive.
- Favouring braided channels – Large bed loads and channels with banks composed of incoherent sands and gravels. These materials are easily eroded during periods of high discharge, further adding to the sediment load, which may have been contributed by weathering and/or mass movement on the slopes flanking the channels.

Section B – Development, Economy and Environment

Answer **one** question from this section

3 (a) Explain the uneven levels of development in **one** region you have studied. [12]

Remarks

- It is important to consider the scalar dimension in this question, i.e. region.
  - However, the interpretation of 'region' can be broad. It can be strictly geographical, such as Asia, or SE Asia, or Europe, or Africa. Or it can be more conceptual, such as within the South in the N-S divide (so, LDCs vs NIEs), or within a trade bloc (such as AFTA).
  - What not to do: Treat the world as one big region, or look at only one country.
- The emphasis is unevenness of development, not merely low levels of development. Strong responses would explain why some countries are poorer or richer than others.
- Reference to measurements of development such as HDI, MPI, GDP, GINI, etc will help illustrate the unevenness of development in the chosen region, providing the context for the explanation.

Indicative content

- An opportunity to consider factors in an interactive manner in several dimensions. For example, when explaining low levels of development:
  - physical e.g. extreme environments, remoteness, water issues, land degradation, hazards such as droughts and floods
  - social e.g. tribalism, elites, population pressure, AIDS
  - economic e.g. extreme poverty, indebtedness, lack of funds, diversion of funds towards other priorities, inflation, landlessness
  - political e.g. instability, breakdown in governmental structures, corruption, inability to cope.
- Concepts to explain development levels may also be used effectively here. These include core-periphery, dependency theory, and resource-curse thesis.

(b) The Millennium Development Goals (MDGs) have at times been described by their critics as "worthless".

How far do you agree with such a criticism? [20]

Indicative content

- The MDGs that ran its course from 2000 to 2015 helped to raise development in several areas and in different regions to some extent.
- Overall, it would be overly harsh to describe this project as "worthless" as the MDGs registered some success. The MDGs had been a guiding force in helping to raise development globally. Without these goals, there might be less concerted effort in ensuring development reaches the countries at low levels of development, and no motivation or aid given to governments of these countries. Its mixed success has also set the foundation on which SDGs are built.
- Thus, the "worth" of MDGs should be more fairly acknowledged and criticisms taken constructively as reminders on how improvements can be made. Labelling these as "worthless" is unfair and extreme, sweeping aside years of hard work by various organisations and respective governments who have played their part to raise development in areas that need this most.

4 (a) Explain the ways extractive industries are different from other industries. [12]

Remarks and indicative content

- This question is about characteristics of extractive industries, but not an invitation to simply describe or list them. These would include (i) locational specific (ii) capital and technology intensive (iii) a mixture of large private and state-owned firms, although the dominance of each may differ between sectors
- There is a need to explain these characteristics vis-à-vis other industries, such as service and manufacturing.

(b) To what extent are the impacts of extractive industries only environmental? Support your answer with reference to low income countries. [20]

Indicative content

- There can be no doubting that extractive industries involve a range of environmental impacts Many examples suggest that the environmental impact may be so severe that the **regenerative capacity of nature is compromised, especially in environmentally sensitive areas**.
- However, when considering the study of extractive industries across the syllabus, including and beyond Topic 2.2, the impacts of extractive industries cannot only be environmental, but social and economic as well.

Section C – Sustainable Development

Answer **one** question from this section

5 (a) Explain what is meant by *greenhouse effect* and how human activities may affect its operation. [12]

Indicative content

- Explain, using diagrams, how greenhouse gases trap long wave radiation emitted from ground surfaces.
  - The main greenhouse gases are water vapour, carbon dioxide, methane, nitrous oxide.
  - They are particularly effective in absorbing outgoing (terrestrial) long wave radiation (LWR). Whilst most occur naturally, there have been significant increases in the past century or so in gases such as CO_2 and N_2O due to industrialisation.
- Human activities affect this effect by increasing the greenhouse gases in the atmosphere, and reduction of carbon sinks, hence **enhancing** the greenhouse effect, whereby SWR relatively easily passes through the atmosphere whilst outgoing LWR is effectively trapped within the atmosphere leading to global warming. Global warming refers to the increase in the average temperature of the Earth's atmosphere and oceans.
- Causes of increased greenhouse gases (not merely CO_2) include:
  - landuse changes (e.g. agriculture, deforestation and industrialisation),
  - fossil fuel burning,
  - reduction in carbon sink, etc

(b) 'Adapting to the effects of climate change is more useful than mitigating them.'

Discuss the validity of this view with countries at low levels of development. [20]

Remarks and indicative content

- Responses to the impacts and risks of 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". Hence, these aim to reduce the severity of the impacts brought about by climate change. If we accept the scientific consensus that global warming is due mainly to an increased concentration of greenhouse gases, then the reduction of these gases in the atmosphere must be a primary management strategy.
- 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.
- Both mitigation and adaptation are complementary, so they are often, and should be, adopted together. They represent a two-pronged approach to the challenge of climate change.

Indicative content

- Argument 1: Mitigation is more useful than adaptation if we take a long-term view on managing climate change.
- Argument 2: Mitigation measures have seen varied levels of success, however. Even when mitigation measures work well, their effectiveness will only be observed later. Countries today, especially low income ones, experiencing the effects of climate change must take action now to deal with them. Hence, adaptation measures are important, because these are about the 'here and now'.

6 (a) Explain why traffic congestion in rapidly growing urban areas needs to be eased. [12]

Remarks

- This is a question on negative impacts of traffic congestion, in the context of 'rapidly growing urban areas', which will be best exemplified by urban areas in **less developed countries**.
- The best answers will classify them into types and will use examples to illustrate. Good marks will be awarded to those who see the range of problems and can exemplify in some cases, paying attention to the severity and scale of the problems (and therefore needs easing)

Indicative content

- Environmental: noise and air pollution
- Economic: loss in productivity, cost of road maintenance
- Social: time loss with loved ones and with oneself, health effects, stress, etc

(b) Assess the extent to which strategies to help improve urban liveability for the elderly can be considered effective. [20]

Indicative content

- The response ought to establish a good understanding of urban liveability, which is defined as a relative term whose precise meaning depends on the place, time and purpose of the assessment and on the value system of the individual assessor. As such, for the elderly, urban liveability would differ from that of other urban dwellers (differential liveability).
- The strategies to improve liveability can be assessed for effectiveness can be based on the intent on which these were designed, and/or also on whether they have indeed served their purpose upon implementation. Response ought to be balanced and consider how some needs/demands are relatively easier to address than the others, before coming to a weighed assessment on the relatively effectiveness thus far. Evaluation on how the place, and socio-economic differences influencing the extent of success/effectiveness may also be examined. Reference to examples in UK, Singapore, Japan, etc will be essential.