Section A

Answer the question.

Cluster 1: Sustainable Futures and Climate Change

1 Resource 1 shows the changes in percentage of people living in urban areas in 1950, 2007 and 2030 (estimated). Resource 2 shows part of an urban slum in Nairobi, Kenya.

(a) Using Resource 1, describe the **changes** in percentage of people living in urban areas from 1950 to 2007. [4] AO2

Award 1 mark for each change described. Award 1 additional mark for supporting detail.

- Generally all increasing from 1950-2007
- But great variations in changes, with South America and North America registering differences
- Africa and Europe have almost comparable increases

(b) Suggest reasons for the projected changes in percentage of population in urban areas in Europe from 2007 to 2030 as shown in Resource 1. [5] AO2

Award 1 mark for each explained reason. Award 1 additional mark for supporting detail.

- Counterurbanisation
- Reurbanisation
- Global migration to global cities
- Slow natural increase

(c) Using Resource 2, describe the characteristics of urban slums. [4] AO2

Award 1 mark for each identified characteristic with cited evidence from the resource

The urban slums are *lacking* in the following aspects:

1. Durable housing
2. Sufficient living area
3. Access to improved water
4. Access to improved sanitation facilities
5. Secure tenure

(d) Explain how the concept of ecological footprint can help to measure sustainability. [4] AO1

Award 1 mark for each explanation of the demand and supply side of measurement. Award a maximum of 1 additional mark for further development of each explanation, where applicable.

Indicative content

- Ecological Footprint accounting measures the demand on and supply of nature.
- Tracks the use of six categories of productive surface areas: cropland, grazing land, fishing grounds, built-up land, forest area, and carbon demand on land.
- On the demand side, the Ecological Footprint measures the ecological assets that a given population requires to produce the natural resources, and to absorb its waste, especially carbon emissions.
- On the supply side, a city, state or nation's biocapacity represents the productivity of its ecological assets. These areas can also absorb much of the waste we generate.
- If a population's Ecological Footprint exceeds the region's biocapacity, that region runs an ecological deficit.

(e) Using examples, explain two problems associated with non-hazardous solid waste in urban areas of countries at low levels of development. [5] AO1

Award 1 mark for each explanation. Award a maximum of 2 additional marks for further development of each explanation, where applicable.

- Environmental problem including air and land pollusion
- Economic cost of managing the waste generated
- Social health effects, including respiratory diseases and cancer from prolonged exposure

Cluster 1: Sustainable Futures and Climate Change

2 Resource 3 shows the trend in global temperature change and the trend in carbon dioxide concentration since 1850. Resource 4 shows the world's top 10 emitters of carbon dioxide by country in 2018. Resource 5 shows the emissions sources for methane and nitrous oxide in the USA.

(a) Using Resource 3, compare the trends in global temperature change and carbon dioxide concentration. [4]
AO2

Award 1 mark for each comparison. Award 1 mark for additional supporting detail.

Similarity:
- Both global temperature change and carbon dioxide concentration saw an overall increase of 0.68°C above the mean and 95ppm respectively.

Differences:
- Overall pattern: Carbon dioxide concentration increased throughout the entire period 1850 to 2000 while global temperature change fluctuates.
- Rate of change: For carbon dioxide: gentle increase 1850–1950, followed by a rapid rise to 2000. For global temperature: marked fluctuations 1850–1910, rapid rise 1910– 1940, followed by a drop then rapid fluctuating rise to 2000.

(b) Using Resource 4, describe the regional variations of carbon dioxide emitters. [4]
AO2

Award 1 mark for each description. Award 1 mark for additional supporting detail.

Indicative content
• Asia has the most at 4/5 (including Russia) of the top 10 countries
• other regions have two each, i.e. Europe (including Russia), Middle East, N. America
• comment on the variations in the total amount for regions, e.g. Asia is highest region with 15 772 Mt (or 17 520 Mt with Russia) and USA and Canada in North America (5869 Mt) are the second highest region, e.g. in the Middle East, Iran and Saudi Arabia are included (1353 Mt) as third highest region are generally lower than other regions and European region has one country, Germany, and is the lowest region in the top 10
• comment on difference in the range between regions, e.g. greatest range is within Asia, China is largest, South is Korea smallest and Middle East has smallest range

(c) Suggest reasons why there are variation in the level of carbon dioxide emissions shown in Resource 4. [5]
AO2

Award 1 mark for each explanation. Award 1 mark for additional supporting detail.

Indicative content
• total population
• amount of secondary industry
• level of demand/development
• resource endowment
• level of investment in alternative energy sources to fossil fuels
• other valid explanation

(d) Compare the emissions sources for methane and nitrous oxide in the USA shown in Resource 5. [4]
AO2

Award 1 mark for each comparison. Award 1 mark for additional supporting detail.

Similarities
- Both are primarily emitted from agricultural activities.
- The top 2 ranked sectors by emissions are agricultural and energy generation activities.

Differences
- Nitrous oxide is emitted through industrial activities and none via industrial activities for methane
- Waste emits proportionally more methane than nitrous oxide

(e) Explain **two** natural causes of climate variability in the Quaternary. [5]
AO1

Award 1 mark for each explanation. Award 1 mark for additional supporting detail up to a maximum of 2 marks.

The natural causes of climate variability include Milankovitch cycles and orbital forcing, changes in thermohaline circulation, volcanic eruptions, as well as earth's atmospheric composition and its positive feedback mechanism.

Section B

Answer **either** question 3 **or** question 4.

Cluster 1 Development, Economy and Environment

3 Evaluate the success of strategies to manage non-hazardous solid waste across places. [13] AO3

Higher level responses from candidates will make case of the **waste management hierarchy** to evaluate the preferred strategies, the prevalent strategies and potential for success or improvement in different city contexts. Both the informal and formal waste management strategies will be explained and evaluated.

Marked using H1 Level descriptors.

4 Evaluate the success of the strategies used to address the issues faced by women living in cities. [13] AO3

Possible Approaches:
Candidates could approach the question by making a judgement on whether some strategies are more effective than others through a consideration of the relative strengths and limitations of the strategies. These strategies could be aimed at addressing different issues related to women such as those related to economic well-being, social well-being and psychological well-being. They could also include those implemented at different scales or by different stakeholders.

Marked using H1 Level descriptors.

Levels	Marks	Generic Level Descriptors for H1 Essays
4	11–13	Evaluation is analytical and coherent. Response is mostly well-supported by relevant material, including the appropriate use of examples. Response features accurate geographical knowledge and reflects adequate understanding of the subject content relevant to the question.
3	8–10	Evaluation is broadly analytical and generally coherent. Response is moderately well-supported by relevant material, including some appropriate use of examples. Response features accurate geographical knowledge and reflects adequate understanding of the subject content relevant to the question.
2	5–7	Response is largely descriptive with limited analysis and evaluation. Response is partly coherent and may lack clarity in parts. Response is poorly supported by relevant materials, including the limited use of examples. Response features inaccurate geographical knowledge and poor understanding of the subject content relevant to the question.
1	1–4	Response is descriptive with no analysis or evaluation. Response is fragmented and lacks clarity. Response consists of unsupported assertions. Response features largely inaccurate geographical knowledge and a lack of understanding of the subject content relevant to the question.
0	0	No creditworthy response