GCE A LEVEL MARKING SCHEME

SUMMER 2024

A LEVEL
GEOGRAPHY - UNIT 4
1110U40-1

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About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

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WJEC GCE A LEVEL GEOGRAPHY

UNIT 4: CONTEMPORARY THEMES IN GEOGRAPHY

SUMMER 2024 MARK SCHEME

Guidance for Examiners

Positive marking

Learners are writing under examination conditions and credit should be given for what the learner writes, as opposed to adopting an approach of penalising him / her for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Marks should not be deducted for a less than perfect answer if it satisfies the criteria of the mark scheme.

The mark scheme for this component uses banded mark schemes.

Banded mark schemes

The mark scheme is in two parts to reflect the sections (A and B in the examination paper). Section A is 20 marks and Section B is 22 marks.

The first part of the mark scheme in each section is an assessment grid advising on bands and the associated marks that should be given in responses that demonstrate the qualities needed in the three AOs; AO1, AO2 and AO3 relevant to this component. The targeted AO(s) are also indicated, for example AO2.1c.

The second part of the mark scheme is advice on the indicative content that suggests the range of likely themes and specialised concepts, processes, scales and environments that may be included in the learner's answers.

Banded mark schemes are divided so that each band has a relevant descriptor. The descriptor for the band provides a description of the performance level for that band. Each band contains marks. Examiners should first read and annotate a learner's answer to pick out the evidence that is being assessed in that question. Once the annotation is complete, the mark scheme can be applied. This is a two stage process.

Banded mark schemes Stage 1 – Deciding on the band

Beginning at the lowest band, examiners should look at the learner's answer and check whether it matches the descriptor for that band. Examiners should look at the descriptor for that band and see if it matches the qualities shown in the learner's answer. If the descriptor at the lowest band is satisfied, examiners should move up to the next band and repeat this process for each band until the descriptor matches the answer.

If an answer covers different aspects of different bands within the mark scheme, a 'best fit' approach should be adopted to decide on the band and then the learner's response should be used to decide on the mark within the band. For instance, if a response is mainly in band 2 but with a limited amount of band 3 content, the answer would be placed in band 2, but the mark awarded would be close to the top of band 2 as a result of the band 3 content.

Examiners should not seek to mark candidates down as a result of small omissions in minor areas of an answer.

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Banded mark schemes Stage 2 – Deciding on the mark

Once the band has been decided, examiners can then assign a mark. During standardising (marking conference), detailed advice from the Principal Examiner on the qualities of each mark band will be given. Examiners will then receive examples of answers in each mark band that have been awarded a mark by the Principal Examiner. Examiners should mark the examples and compare their marks with those of the Principal Examiner.

When marking, examiners can use these examples to decide whether a learner's response is of a superior, inferior or comparable standard to the example. Examiners are reminded of the need to revisit the answer as they apply the mark scheme in order to confirm that the band and the mark allocated is appropriate to the response provided.

Indicative content is not exhaustive, and any other valid points must be credited. In order to reach the highest bands of the mark scheme a learner need not cover all of the points mentioned in the indicative content but must meet the requirements of the highest mark band. Where a response is not creditworthy, that is contains nothing of any significance to the mark scheme, or where no response has been provided, no marks should be awarded.

Where the specialised concepts are integral to knowledge and understanding, they are underlined in the indicative content.

The mark scheme reflects the layout of the examination paper. Mark the chosen question in Section A and the two chosen questions from Section B. If the candidate has responded to both questions in Section A or more than two in Section B mark all the answers. Award the higher marks attained for the correct number of required questions; further, possible rubric infringement will be discussed at the marking conference.

Be prepared to reward answers that give **valid and creditworthy** responses, especially if these do not fully reflect the 'indicative content' of the mark scheme.

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Section A: Tectonic Hazards: Generic Mark Bands [20 marks]

	AO1 [6 marks]	AO2 [13 marks]	AO3 [1 mark]
Band	*Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change at a variety of scales.*	*Apply knowledge and understanding in different contexts either to analyse or interpret or evaluate geographical issues and information.*	*Use a variety of relevant 'geographical skills' to construct arguments and draw conclusions.*
3	**5-6 marks** Secure factual knowledge and confident understanding of relevant concepts and principles. Developed exemplification used with supporting geographical terminology. Well-directed and well-annotated sketch maps / diagrams. Spelling, punctuation and grammar used with a high degree of accuracy.	**9-13 marks** Accurate application either to interpret or analyse or evaluate. Synthesis of the connections between different elements of the response to the question. Relevant application of the specialised concepts.	**1 mark** The response is appropriately structured.
2	**3-4 marks** Straightforward knowledge with some inaccuracies; some understanding of relevant concepts and principles. Appropriate exemplification and geographical terminology is partially evident. Annotated sketch maps / diagrams contain inaccuracies. Spelling, punctuation and grammar used with a reasonable degree of accuracy.	**5-8 marks** Some application either to interpret or analyse or evaluate with limited range, depth and development. Incomplete synthesis between different elements of the response to the question.	
1	**1-2 marks** Limited knowledge with errors and minimal understanding. Limited use of examples and terminology; no supporting sketch maps / diagrams. Spelling, punctuation and grammar used with limited accuracy.	**1-4 marks** Application either to interpret or analyse or evaluate is poor; occasional relevant points are made.	
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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Section A: Tectonic Hazards

1. Evaluate the impacts of earthquake activity on people and their environment.

AO1 [6] AO2 [13] AO3 [1] **[20 marks]**

Focus: 4.1.3

Indicative content
The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content. Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- Earthquake processes and the production of associated hazards including ground shaking, liquefaction, landslides and tsunami (place / risk / scale).
- Primary and secondary effects of earthquake activity (place / risk / scale / time).
- Environmental impacts of earthquake activity on people and their environment, e.g. landslides and tsunamis (place / risk / scale).
- Demographic impacts of earthquake activity on people, e.g. deaths and migration (inequality / place / risk / scale).
- Economic impacts of earthquake activity on people and their environment, e.g. losses incurred and disruption to production (inequality / place / risk / scale).
- Social impacts of earthquake activity on people, e.g. homelessness, injury and bereavement (inequality / place / risk / scale).
- Local, regional and global impacts on people and their environment (place / risk / scale).

AO2
Application of knowledge and understanding is deployed to evaluate the impacts of earthquake activity on people and their environment. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- An evaluation of the impacts of earthquake activity on people and their environment (place / risk / scale).
- Comparing and contrasting the impacts of earthquake activity on people and their environment (place / risk / scale).
- Examination of the severity of demographic, social, economic and environmental impacts of earthquake activity on people and their environment (place / risk / scale).
- An examination of the local, regional and global scale impacts of earthquake activity on people and their environment (place / scale).
- An examination of the temporal impacts of earthquake activity on people and their environment (place / temporal scale).
- Candidates may highlight the fact that there are positive and negative outcomes of earthquake activity on people and the environment, e.g. increase in tourism, improvements to early warning systems and building design etc. (mitigation / adaptation / resilience / sustainability).

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AO3

- The skill of presenting well-constructed, coherent and logical arguments which evaluate the impacts of earthquake activity on people and their environment.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions which evaluate the impacts of earthquake activity on people and their environment.

Credit other valid approaches.

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2. 'Quality of governance is the most important factor influencing vulnerability to volcanic activity.' Discuss.

AO1 [6] AO2 [13] AO3 [1] [20 marks]

Focus: 4.1.4

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- Volcanic processes and the production of associated hazards (causality / risk).
- Primary and secondary hazards associated with volcanic activity (causality / risk / place).
- Environmental impacts (e.g. damage to the built environment, landslides) (place / risk / scale).
- Demographic impacts (e.g. deaths, migration) (place / risk / scale).
- Economic impacts (e.g. disruption to production) (place / risk / scale).
- Social impacts (e.g. homelessness, injury, bereavement) (place / risk / scale)
- Local, regional and global impacts (place / risk / scale).
- Political factors affecting spatial variations in vulnerability (e.g. preparation of emergency services / evacuation policies etc.) (place / risk).
- Economic factors affecting spatial variations in vulnerability (place / risk / resilience).
- Level of development and level of technology (resilience / mitigation / adaption).
- Social factors affecting spatial variations in vulnerability in terms of the population profile (e.g. age, level of education) (place / risk).
- Geographical factors affecting spatial variations in vulnerability (e.g. rural / urban location / degree of isolation) (inequalities / place).
- The characteristics of the earthquake activity that influence its impact: Magnitude, predictability, frequency, duration, speed of onset, timing and areal extent (risk).

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AO2

Application of knowledge and understanding is deployed to discuss whether quality of governance is the most important factor influencing vulnerability to volcanic activity. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- A discussion of the importance of the magnitude of the event. (scale)
- An examination of the importance of political factors in managing the impact of volcanic activity e.g. stability of government / procedures and policies in place. (place / mitigation / resilience / interdependence).
- An examination of the importance of the level of economic development e.g. availability of technology to monitor and predict tectonic activity (place/ mitigation / resilience / interdependence).
- An examination of the role of geographical location e.g. the influence of densely / sparsely populated environments and rural / urban environments (inequalities / place / risk / interdependence).
- An examination of the role of social factors e.g. influence of literacy rates / population profile (inequalities / place / risk / interdependence).
- An examination of the role of the level of preparedness e.g. early warning systems / evacuation policies. (place / mitigation / resilience).
- Examining the relative importance of the factors highlighted above. (inequalities / place / risk / scale / temporal scale / vulnerability).

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments which discuss whether the quality of governance is the most important factor influencing vulnerability to volcanic activity.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions which discuss whether the quality of governance is the most important factor influencing vulnerability to volcanic activity.

Credit other valid approaches.

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Section B: Contemporary Themes in Geography: Generic Mark Bands [22 marks]

	AO1 [9 marks]	AO2 [11 marks]	AO3 [2 marks]
Band	*Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change at a variety of scales.*	*Apply knowledge and understanding in different contexts either to analyse or interpret or evaluate geographical issues and information.*	*Use a variety of relevant 'geographical skills'* to construct arguments and communicate findings.*
3	**7-9 marks** Wide-ranging and thorough knowledge and confident understanding of relevant concepts and principles. Developed exemplification used with supporting geographical terminology. Well-directed and well-annotated sketch maps / diagrams. Spelling, punctuation and grammar used with a high degree of accuracy.	**8-11 marks** Accurate application either to interpret or analyse or evaluate. Synthesis of the connections between different elements of the response to the question. Relevant application of the specialised concepts.	**2 marks** A well-constructed, coherent and logical response.
2	**4-6 marks** Secure, straightforward knowledge and reasonable understanding of relevant concepts and principles. Appropriate exemplification and geographical terminology is partially evident. Appropriate, basically accurate annotated sketch maps / diagrams are included. Spelling, punctuation and grammar used with a reasonable degree of accuracy.	**5-7 marks** Some application either to interpret or analyse or evaluate with limited range, depth and development Incomplete synthesis between different elements of the response to the question.	**1 mark** The communication in the response is limited or incomplete.
1	**1-3 marks** Limited knowledge with errors and minimal understanding. Limited use of examples and terminology; no supporting sketch maps / diagrams. Spelling, punctuation and grammar used with limited accuracy.	**1-4 marks** Application either to analyse or interpret or evaluate is poor; occasional relevant points are made.	
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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Section B: Contemporary Themes in Geography

3. "The greatest threats to biodiversity are seen in tropical rainforests." To what extent do you agree?

AO1 [9] AO2 [11] AO3 [2] [22 marks]

Focus: 4.2.3

Indicative content
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- Threats to biodiversity from direct action and indirect action (place / causality / risk / sustainability).
- Tropical rainforests such as the Amazon rainforest face a multitude of threats. (place / causality / risk sustainability).
- Threats linked to agriculture: E.g. Cattle ranching is the largest driver of deforestation in every Amazon country, accounting for 80% of current deforestation rates. In addition, Soy cultivation is becoming a major pressure too. Today Brazil has 24-25 million hectares devoted to the growth of this crop and is currently the second largest producer of soybeans in the world. (place / scale / risk).
- Threats linked to pressure from development / infrastructure: E.g. In the Amazon basin, roads and other forms of infrastructure development have played a massive role in logging, deforestation, and agricultural expansion. About 95% of all deforestation occurs within 50km of highways or roads in the Brazilian Amazon. (place / scale / risk).
- Coral reefs e.g. the Great Barrier Reef's biodiversity is also under threat due to climate change and coral bleaching. This may profoundly impact the beauty, inspiration and recreation opportunities contributing to our spiritual welfare e.g. The World Meteorological Organisation says that coral reefs yield more than $30 billion annually in goods and services (place / risk / scale / sustainability).
- Wetlands like the East Anglian Fens biodiversity are also threatened by industry, pollution and tourism e.g. pollution in wetlands is a growing concern, affecting drinking water sources and biological diversity. Drainage and run-off from crops also introduce high concentrations of nitrogen and phosphorous nutrients to water bodies. Pesticides applied to cotton crops alone account for 25 per cent of the global insecticide market, but the area of cotton grown is just 2.4 per cent of the world's arable land. (place / risk / scale / sustainability).

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AO2

Application of knowledge and understanding is deployed to examine whether the greatest threats to biodiversity are seen in tropical rainforests. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Tropical rainforests tend to be more fragile because of the importance of biomass as a nutrient store and because of high levels of biodiversity. Many ecological niches are highly specialised and losing them can have dramatically effect the food chain (place / causality / risk).
- Threats may be examined at a variety of scales: local, regional, national and global (place / scale).
- Impacts on biodiversity at a range of scales - local, regional, national and global (scale).
- Assessment of the severity of the threats in different contexts: Environmental, economic, social and political (place / scale / time scale / sustainability).
- An examination of the relative importance of threats (place / risk / scale).
- Freshwater ecosystems in rivers, lakes and wetlands occupy less than 1% of the Earth's surface but have a disproportionately large amount of biodiversity and provide important goods and services (inequality / place / risk / scale).
- Unlike the change in rainforests, the loss of coral reefs is difficult to assess from satellites (place / scale / temporal scale).
- The nature and severity of threats may change over time (place / risk / scale / temporal scale).

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments which examine whether the greatest threats to biodiversity are seen in tropical rainforests.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions which examine whether the greatest threats to biodiversity are seen in tropical rainforests.

Credit other valid approaches.

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4. Evaluate the impacts of climate change on the Arctic tundra biome.

AO1 [9] AO2 [11] AO3 [2] [22 marks]

Focus: 4.2.6

Indicative content
The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content. Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- Students should be familiar with the characteristics of the climate, plants, animals and soils of the Arctic tundra biome (place).
- They should also be aware of the interdependence between the climate, plants, animals and soils of the Arctic tundra biome and the impact a changing climate has on the interrelationships between these characteristics (place / interdependence / risk).
- The demographic, social, economic and environmental impacts of climate change in the Arctic tundra biome (place / risk / scale).
- Historically the short summers and cold winters meant that the tundra regions were too cold for trees to grow tall, leaving a landscape dominated by grasses, flowering plants and low shrubs. But recent warming has led to the shrubs getting taller, and denser in some parts. Taller shrubs mean the snow does not lay in a smooth blanket, losing the insulating effect in winter and reducing the amount of sunlight reflected out to space (place / risk / scale).
- More than 180 native communities in Alaska (86% of the total) are flooding and losing land because of the ice melt that is part of the changing global climate. The state's northern parts have seen an average temperature rise of three degrees Celsius in recent decades (inequality / place / risk / scale / time).
- Alaska has warmed twice as fast as the rest of the country over the past 60 years and settlements are at risk. The village of Newtok (a Yukip Eskimo community) is one such example. It lies 480 miles west of Anchorage and is home to 350 people, who inhabit 63 houses in the village. Now the permafrost is melting. Land has been acquired for a new townsite called Mertarvik, which is around 9 miles away. The cost of relocating Newtok's residents has been estimated at $130 million (inequality / place / risk / scale / time).
- Other impacts of climate change could be the increase of tundra fires due to the drying of the vegetation and the increased frequency of thunderstorms (place / risk / scale / sustainability / time).
  There is also a risk of invasive species, as typically southern species would find new habitats in the warming Arctic. These species would likely push native tundra species farther and farther north through displacement, resource competition and the spread of disease. This would greatly reduce levels of native biodiversity (place / risk / scale / sustainability / time).
- Policies have been implemented, such as the Paris Agreement, which have sought to protect extreme environments from the impacts of climate change. (mitigation / resilience / sustainability).
- The Arctic Environmental Protection Strategy (AEPS) is a multilateral, non-binding agreement among Arctic states on environmental protection in the Arctic. Discussions started in 1989, and the AEPS was formally adopted in June 1991 by Canada, Denmark, Finland, Iceland, Norway, Sweden, the Soviet Union, and the United States.

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AO2
Application of knowledge and understanding is deployed to evaluate the impacts of climate change on the Arctic tundra biome. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- An evaluation of the impacts of climate change in the Arctic tundra biome (place / risk / scale)
- Comparing and contrasting the impacts of climate change in the Arctic tundra biome (place / risk / scale).
- An examination of the severity of demographic, social, economic and environmental impacts of climate change in the Arctic tundra biome (place / risk / scale).
- An examination of the local, regional and global scale impacts of climate change in the Arctic tundra biome (place / scale / sustainability).
- Examining the temporal impacts of climate change in the Arctic tundra biome (place / scale / sustainability / time).
- Candidates may highlight the positive and negative outcomes of climate change in the Arctic tundra biome e.g. strategies introduced to protect fragile environments (mitigation / adaptation / resilience / sustainability).

AO3
Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments which evaluate the impacts of climate change on the Arctic tundra biome.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions which evaluate the impacts of climate change on the Arctic tundra biome.

Credit other valid approaches.

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5. "Cultural factors are the main influence on the demographic characteristics of India." Discuss.

AO1 [9] AO2 [11] AO3 [2] [22 marks]

Focus: 4.3.2

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- India's population size, distribution, growth and structure (place).
- Cultural factors influencing population growth and structure including the caste system (causality / place / scale / inequality).
- Physical factors influencing population distribution (causality / place / scale / inequality).
- Economic factors influencing population distribution, growth and structure (globalisation / inequality).
- Social factors influencing population growth and structure including education (causality / place / scale / inequality).
- Political factors influencing population distribution, growth and structure (causality / place / scale / inequality).
- Religious factors influencing demographic characteristics, especially gender balance (causality / place / scale / inequality).
- The contrasts between rural and urban communities in terms of tradition (causality / place / scale / inequality / temporal scale).
- The role of processes such as globalisation, modernisation, westernisation and rural to urban migration as drivers of demographic change (causality / place / scale / inequality / temporal scale).

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AO2

Application of knowledge and understanding is deployed to discuss whether cultural factors are the main influence on the demographic characteristics of India. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- The interdependence of cultural, economic, physical, political and social factors (interdependence)
- Changes in the importance of factors over time influencing population distribution. India's urban communities have grown significantly associated with the unprecedented rate of urbanisation since the economic reforms of 1991 (place / globalisation / time)
- Variation over space as there are differences between states, e.g. Political factors have been important influences in Kerala, which has a very progressive population management programme involving the education and empowerment of women and the lowest rate of population growth. Delhi's population growth can be related to rural-urban migration fuelled by economic development and employment opportunities. The highest growth rates, in Nagaland, can be linked to the political factor of the influx of refugees from Burma (globalisation / inequality / place).

AO3

- The skill of presenting well-constructed, coherent and logical arguments about whether cultural factors are the main influence on the demographic characteristics of India.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions about whether cultural factors are the main influence on the demographic characteristics of India.

Credit other valid approaches.

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6. Evaluate the success of strategies used to improve the sustainability of either water <u>or</u> food <u>or</u> energy supplies in India.

AO1 [9] AO2 [11] AO3 [2] [22 marks]

Focus: 4.3.7

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- Large parts of India have already become water-stressed. Rapid growth in demand for water due to population growth, urbanisation and changing lifestyles poses serious challenges to water security. (inequality / place / risk / scale / sustainability / vulnerability).
- There is wide variation in the availability of water, which may increase substantially due to climate change (inequality / place / risk / scale / sustainability / vulnerability)
- Access to safe drinking water continues to be a problem in some areas. Skewed availability of water between different regions and different people in the same regions has the potential to cause social unrest (inequality / place / risk / scale / sustainability / vulnerability).
- Groundwater, a community resource, is still perceived as an individual property and is exploited inequitably and without any consideration to its sustainability leading to its over-exploitation in several areas (inequality / place / risk / scale / sustainability / vulnerability).
- Growing pollution of water sources is influencing the availability of safe drinking water (inequality / place / risk / scale / sustainability / vulnerability).
- Coca-Cola's impact on water resources in India has been well documented, e.g. Mehdiganj plant in northern India at centre of protests accused of extracting too much groundwater and releasing pollutants above limits (inequality / place / risk / scale / sustainability / vulnerability).
- Impact of air pollution on crop yields. Researchers have concluded that significant decreases in yield could be attributed to two air pollutants, black carbon and ground-level ozone. The finding has implications for global food security as India is a major rice exporter (inequality / place / risk / scale / sustainability / temporal scale / vulnerability).
- Environmental pressures in Bangalore (inequality / place / risk / scale / sustainability / temporal scale / vulnerability).
- Strategies to improve the security of ***<u>either water or food or energy</u>*** Strategies can be local or regional and could be from the state or NGOs. Biogas production in rural Maharashtra provides a good example of a sustainable solution to improved energy security (adaptation / mitigation / place / resilience / scale / sustainability / time).
- Rainwater harvesting projects to manage water shortages in Gujarat or Rajasthan (adaptation / mitigation / place / resilience / sustainability / time).
- Banning auto-rickshaws in Delhi to combat vehicle pollution (mitigation / place / resilience / sustainability / time).
- The federal and state structure inhibits country-wide implementation of some strategies and political will/governance is a significant constraint (causality / inequality / place /scale).

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AO2

Application of knowledge and understanding is deployed to evaluate the success of strategies used to improve the sustainability of either water or food or energy supplies in India. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Comparing and contrasting the strategies presented (place / resilience / scale / sustainability).
- An evaluation of the relative success of the strategies presented (place / resilience / scale / sustainability / time).
- The scale of the strategies (place / scale / sustainability).
- Comparison of improvements in levels of sustainability of similar strategies employed in different environments (place).
- Improvements in the success of strategies over time (temporal scale).

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments which evaluate the success of strategies used to improve the sustainability of either water or food or energy supplies in India.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions which evaluate the success of strategies used to improve the sustainability of either water or food or energy supplies in India.

Credit other valid approaches.

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7. "Cultural factors are the main influence on the demographic characteristics of China." Discuss.

AO1 [9] AO2 [11] AO3 [2] [22 marks]

Focus: 4.3.2

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- China's population size (1.4 billion), distribution (concentrated to south and east and in cities), growth (transition to Stage 5 of DTM and negative demographic dividend) and structure (an ageing population with a gender imbalance).
- Cultural factors influencing population growth and structure including the prejudice against girls and Confucianism (causality / place / scale / inequality).
- Physical factors influencing population distribution (water supplies, accessibility, upland interior and water shortages) (causality / place / risk. scale / inequality / vulnerability).
- Economic factors influencing population distribution, growth and structure (causality / globalisation / place).
- Social factors influencing population growth and structure including education.
- Political factors influencing population distribution, growth and structure including the hukou system, population policies, family planning and women's reproductive health (causality / place / scale / inequality).
- The end of the One Child Policy in 2015 and its subsequent influence (causality / place / temporal scale).
- The contrasts between rural and urban communities in terms of tradition (causality / place / scale / inequality / temporal scale).
- The role of processes such as globalisation, modernisation, westernisation and rural to urban migration as drivers of demographic change (causality / place / scale / inequality / temporal scale).

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AO2

Application of knowledge and understanding is deployed to examine whether cultural factors are the main influence on the demographic characteristics of China. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- The interdependence of physical, economic, political, social and cultural factors (interdependence).
- Changes over time (temporal scale). China's urban communities have grown significantly associated with the unprecedented rate of urbanisation since the economic reforms of Deng Xiao Ping's 'Open Door Policy' (globalisation).
- Variation over space (place). The highest population growth rates occur in ethnic minority areas such as the autonomous regions of Ningxia and Xinjiang where China's One Child Policy has been less strictly applied. Rural-urban migration to the core regions along the coast and increasingly along the Yangtze corridor is a response to economic forces and employment opportunities in urban areas and SEZs (causality / inequality / place / scale / temporal scale).
- The economic factors, such as the 'Open Door Policy' are driven by the Communist party and therefore it is difficult to disaggregate economic and political influences (causality / interdependence).
- The dominance of political factors as China is a Communist state with power coming from the top down (although there are some freedoms for minority groups) (causality / scale / temporal scale).

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about whether cultural factors are the main influence on the demographic characteristics of China.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions about whether cultural factors are the main influence on the demographic characteristics of China.

Credit other valid approaches.

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8. Evaluate the success of strategies used to improve the sustainability of either water <u>or</u> food <u>or</u> energy supplies in China.

AO1 [9] AO2 [11] AO3 [2] [22 marks]

Focus: 4.3.7

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- The risks facing the environment due to the recent rapid economic growth. The use of fossil fuels directly impacts air quality in China and contributes to the process of climate change (place / risk / scale / sustainability / time).
- The rapid growth of industry has negatively impacted differing parts of the environment. Many waterways are polluted, and industrial waste has led to an increased incidence of cancer in some areas - dubbed 'Cancer Villages' (inequality / place / risk / sustainability).
- Air quality issues are particularly apparent in urban areas, the cities in China's industrial north regularly making international headlines (inequality / place / risk / sustainability).
- The intensification of farming practices has led to soil degradation which has impacted the lives of people in some of the poorest parts of China (inequality / place / risk / sustainability).
- Deforestation has led to desertification in the north and west of China and soil erosion in parts of the country, particularly on the Loess Plateau (place / risk / scale / sustainability).
- Water supply and sanitation in China is undergoing a massive transition while facing numerous challenges such as rapid urbanisation, increasing economic inequality, and water supply to rural areas. Water scarcity and pollution also impact access to water (inequality / place / scale / sustainability / vulnerability).
- Strategies to improve the security of ***<u>either water or food or energy</u>*** (adaptation / mitigation / place / resilience / scale / sustainability / time).
- China's huge expenditure on renewable energy is also part of the drive towards a more sustainable way of living and can be viewed within the context of helping to create sustainable urban areas (mitigation / place / resilience / sustainability).
- Strategies implemented at an international level such as the UN-HABITAT/UNEP Sustainable Cities Programme promote environmental, social and economic sustainability of cities through an Environmental Planning and Management (EPM) approach which a broad-based, participatory decision-making process facility characterises. Between 2008-13 6 projects were implemented in China, 3 of which are ongoing (mitigation / place / resilience / sustainability).
- Strategies implemented at a national level such as the construction of eco-cities e.g. Tianjin. Cities are units of central government (mitigation / place / resilience / sustainability).
- Progress has been made in the past decades, with increased access to services, increased municipal wastewater treatment, the creation of water and wastewater utilities that are legally and financially separated from local governments, and increasing cost recovery as part of the transformation of the Chinese economy to a more market-oriented system. The government quadrupled investments in the

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sector during the Eleventh Five-Year Plan (mitigation / resilience / sustainability / temporal scale).

- In 2014 Premier Li Keqiang set aside US $330 billion to tackle water pollution, aiming to reduce water pollution by 30-50%. Three “red lines” were declared, with targets set for 2015, 2020, and 2030 that covered maximum total water use, efficiency of water use and pollution control n(mitigation / resilience / scale / sustainability / temporal scale).
- The Three Gorges Dam - Since it was built, it has provided water during the dry season and kept the river more uniformly level downstream for shipping. The electricity fuels Chongqing's heavy industry providing some of the biggest steel, aluminium, and car companies in China with cheaper power (place / risk / scale / sustainability / temporal scale / vulnerability).
- The South-North water transfer, which diverts water from the Yangtze to the arid Yellow River basin in arid northern China (place / risk / scale / sustainability / temporal scale / vulnerability).
- Diversion schemes – China has been diverting the headwaters of the Mekong and Brahmaputra rivers (interdependence / place / risk / scale / sustainability / vulnerability).

AO2

Application of knowledge and understanding is deployed to evaluate the success of strategies used to improve the sustainability of either water or food or energy supplies in China.

Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Comparing and contrasting the strategies presented (place / resilience / scale / sustainability).
- An evaluation of the relative success of the strategies presented (place / resilience / scale / sustainability / time).
- The scale of the strategies (place / scale / sustainability).
- Comparison of improvements in levels of sustainability of similar strategies employed in different environments (place).
- Improvements in the success of strategies over time (time).

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments which evaluate the success of strategies used to improve the sustainability of either water or food or energy supplies in China.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions which evaluate the success of strategies used to improve the sustainability of either water or food or energy supplies in China.

Credit other valid approaches.

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9. Discuss the role of conflict minerals in the development of selected Sub-Saharan African countries.

AO1 [9] AO2 [11] AO3 [2] [22 marks]

Focus: 4.3.10

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- Influence of conflict minerals such as coltan, diamonds, gold, tin and tantalum in countries such as DRC, Mozambique, South Africa etc. (causality / inequality / place / risk / scale).
- Influence of political factors including governance, colonialism and neo-colonialism, global organisations and corruption (interdependence / globalisation).
- Influence of social factors including education, health and welfare, social and cultural constraints including the role of women and ethnic divisions (sustainability / interdependence / causality).
- Influence of free trade and trade blocs in promoting and hindering development including subsidies and tariffs, quotas and protectionism (interdependence / causality).
- Influence of MNCs, including foreign direct investment, outsourcing and offshoring (interdependence).
- Influence of tourism and fair trade (globalisation / sustainability).
- The influence of soils, relief, climate and water availability on development (place).
- The constraining effects of climate variability, droughts and / or floods on development (risk).
- The availability of cultivable agricultural land (place).
- Recurrent natural hazards, particularly drought, constrain development (risk).
- The impact of natural hazards and climate change on water availability and soil erosion operate to constrain development (risk).
- The influence of locational factors, e.g. access to ports or a landlocked location (place).

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AO2

Application of knowledge and understanding is deployed to discuss the role of conflict minerals in the development of selected Sub-Saharan African countries. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- The interdependence of physical, economic, political, social and cultural factors (interdependence).
- The relative importance of factors varies spatially and may vary according to the countries selected for examination. Physical factors may be more important for landlocked countries experiencing extreme climatic variability (causality / place).
- The relative importance of factors varies temporally. Political instability may disrupt economic growth, as with the recent political instability in The Gambia (causality / place).
- The relative importance of factors may vary according to scale. Economic factors may be more important at the national scale, but cultural at the regional scale because of ethnic divisions, as in northern Nigeria (scale).

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the role of conflict minerals in the development of selected Sub-Saharan African countries.
- The skill of constructing relevant diagrams, which are annotated to meet the requirements of the question.
- The skill of reaching conclusions about the role of conflict minerals in the development of selected Sub-Saharan African countries.

Credit other valid approaches.

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10. Evaluate the consequences of desertification in selected Sub-Saharan African countries.

AO1 [9] AO2 [11] AO3 [2] **[22 marks]**

Focus: 4.3.13

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- Causes of desertification: Natural processes, e.g. Drought, high rates of evapotranspiration and infrequent/intense precipitation (causality / place / risk / scale / temporal scale).
- Causes of desertification: Socio-economic processes, e.g. Overgrazing, over-cultivation, deforestation and poor irrigation techniques (causality / place / risk / scale).
- Physical consequences of desertification, e.g. lowering of the water table, rivers and wells dry up, land degradation and vegetation loss (place / risk / scale / sustainability / temporal scale)
- Human consequences of desertification, e.g. migration, food supply problems, conflict, famine, social stress malnutrition, associated health issues and death (place / risk / scale / sustainability / temporal scale).
- There are a wide range of strategies that attempt to address the causes and consequences of desertification at the individual, national and international level (place / adaptation / mitigation / resilience / scale / temporal scale).

AO2
Application of knowledge and understanding is deployed to evaluate the consequences of desertification in selected Sub-Saharan African countries. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- An evaluation of the consequences of desertification in selected Sub-Saharan African countries (place / risk / scale).
- Comparing and contrasting the consequences of desertification in selected Sub-Saharan African countries (place / risk / scale).
- An examination of the severity of demographic, social, economic and environmental consequences of desertification in selected Sub-Saharan African countries (place / risk / scale).
- An examination of the local and regional consequences of desertification in selected Sub-Saharan African countries (place / scale).
- An examination of the temporal consequences of desertification in selected Sub-Saharan African countries (place / scale / temporal scale).
- Candidates may highlight the fact that there are positive as well as negative consequences of desertification in selected Sub-Saharan African countries, e.g. strategies to reduce the consequences of desertification such as education schemes and tree planting programmes (adaptation / mitigation / place / scale / sustainability / resilience).

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- An examination of strategies employed to combat the consequences of desertification in selected Sub-Saharan African countries (adaptation / mitigation / place / scale / sustainability / resilience).

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments which evaluate the consequences of desertification in selected Sub-Saharan African countries.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions which evaluate the consequences of desertification in selected Sub-Saharan African countries.

Credit other valid approaches.

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11. 'Climate is the most important physical factor determining the supply of energy.' To what extent do you agree?

AO1 [9] AO2 [11] AO3 [2] **[22 marks]**

Focus: 4.4.2

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- Climatic factors constrain certain forms of renewable energy. Solar power requires high insolation rates; wind power relies on high, constant wind speeds characteristic of areas affected by westerly wind belts, and hydropower is usually linked to areas of high precipitation (causality / inequality / place).
- Wood is a significant source of energy for communities in the developing world and climate change is having a significant impact on wood supplies (inequality / place / risk / sustainability / vulnerability).
- Certain locations provide favourable conditions for sustainable energy generation from waves, tides and biofuels (causality / place / scale / temporal scale).
- Relief factors include the influence of relief on creating suitable locations for dam construction. The deep, narrow valleys of the west slopes of the Sierra Nevada in California provide sites for dams and reservoirs such as at Shasta in the Upper Sacramento River Basin and Oroville on the Feather River. Relief is also important for providing a 'head' of water which is stored and then released to drive turbines and generate hydropower (causality / place).
- Geological factors influence oil and gas traps and the formation of deltaic swamps in which coal formed. Direct access to fossil fuel reserves coincidences with geological history and international boundaries. For example, Saudi Arabia has large oil reserves, and Russia has large oil and gas reserves. Geological factors also influence the location of active areas for geothermal energy such as Iceland (causality / inequality / interdependence / place / scale / vulnerability).

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AO2

Application of knowledge and understanding is deployed to examine whether climate is the most important physical factor determining the supply of energy. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- The main physical factor determining the supply of energy varies by location (place). Regarding geological factors, the USA has the largest reserves of coal, followed by Russia, China, Australia, India and Ukraine. Russia is one of the world's major producers of oil and natural gas. The USA has large reserves of unconventional (shale) gas, with hotspots in Australia, China, South Africa and Europe. Geology is the most important factor in determining the location of active areas for geothermal energy; Iceland provides 87% of its demand for hot water and heat with geothermal energy (causality).
- The main physical factor influencing the supply of energy varies over time (timescales). Fossil fuels are finite, and there is a general consensus between industry leaders and analysts that world oil production will peak between 2010 and 2030 (sustainability). Substantial changes in the volume of glacier ice associated with climate change will lead to large changes in the hydrology of glacial rivers in countries such as Iceland, with important implications for the hydropower industry. Glacier mass balance changes due to changes in climate and feedback effects caused by glacier dynamics may lead to migration of ice divides and subglacial watersheds and change in subglacial water courses. This can, in some cases, cause very large relative changes locally in the discharge of rivers generating hydropower (systems / feedback / equilibrium).
- The main cause may vary according to the scale of analysis. At the regional scale, geological factors may be the most important, but at the local level it may be climate and relief generating large amounts of hydropower or estuaries generating tidal power (scale).
- Geological factors may be an important indirect factor as large nuclear power stations are best located on geologically and seismically stable foundations. This illustrates the interdependence of factors, making it difficult to isolate one main factor (interdependence / place / risk).

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about whether climate is the most important physical factor determining the supply of energy.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions about whether climate is the most important physical factor determining the supply of energy.

Credit other valid approaches.

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12. 'Demographic and social factors are the main influence on the changing demand for energy.' Discuss.

AO1 [9] AO2 [11] AO3 [2] [22 marks]

Focus: 4.4.3

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- The growing demand for energy, which during the 20th century increased tenfold, with consumption expected to double to around 900 exajoules by 2050 (risk / sustainability / thresholds).
- The number of people has a direct impact on energy demand, as people need energy for their basic day to day activities: to stay warm, to do washing etc., mostly in their homes (although e.g. travel is not based at home). A greater number of people means more or bigger households, both of which will drive up energy demand, although not necessarily by the same amount. Population growth is a major issue in the developing world and these demographic pressures cannot be ignored (causality / place / sustainability / interdependence).
- In social terms, leisure and social activities very often require energy: underlying all these are needs for transport, cooking, heating, air conditioning and lighting. In emerging economies, car ownership becomes an aspiration and is rising rapidly in countries such as China, as people want to commute in comfort, travel to see friends and relatives and enjoy hobbies and holidays (causality / place / globalisation).
- Rising demand is linked to economic growth. This is particularly the case for the NICs and BRICS, where energy for manufacturing is an important driver of growth and this exponential growth requires huge quantities of energy (causality / place / globalisation).
- Socially, countries that experience a low level of development need to grow so that large proportions of their populations can rise out of poverty. As people acquire wealth, more energy is used for appliances and gadgets for cooking, heating, air conditioning and lighting. In an increasingly globalised world, with growing international trade and tourism, the transport of people and goods by air, sea and land has increased the demand for energy enormously (causality / place / globalisation).
- Technology has produced equipment that requires energy. Car ownership grows continuously. Growing international trade has transported goods by air, sea and land. Around the home, washing machines, vacuum cleaners, TVs, computers, games consoles, sound systems and mobile phones have developed. Electronic gadgets are found in almost all activities. The number of appliances and gadgets owned in the world increases daily, all needing energy (causality / place /globalisation).
- Political factors, including government policies have a significant influence on the changing demand for energy at a national and global level (causality / place / scale).

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AO2

Application of knowledge and understanding is deployed to discuss whether demographic and social factors are the main influence on the changing demand for energy. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- Current and likely future demands for energy will be discussed for a range of levels and stages of development. (scale / place / timescales).
- The relative importance of factors may vary according to scale. Factors driving energy demand at the global scale may differ from those driving energy demand at the local scale (place / scale / causality).
- Other demands identified (causality / interdependence / place / scale).
- The interdependence of economic, demographic, social and technological factors (place / interdependence / scale).
- Examination of the importance of demographic and social factors in relation to other factors (place / causality / interdependence).
- The extent to which demographic and social factors can influence the demand for energy (place / scale / interdependence).
- Whether or not demographic and social factors are critical in the demand for energy. For example, economic growth may play a more influential role - the recent rise in demand for energy in NICs and BRICs is mostly associated with economic factors (causality / place / scale / interdependence).
- The relative importance of factors varies spatially. In countries at a very low level of economic development, demographic factors may be more important (causality / place).
- Demographic factors are associated with an increase in the demand for energy whereas technological (greater efficiency) and economic (cost) factors may be associated with a reduction in demand (causality / mitigation).
- Evaluation of the relative importance of demographic and social factors on the demand for energy over time (time scale / place / interdependence / globalisation).

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about whether demographic and social factors are the main influence on the changing demand for energy.
- The skill of constructing relevant diagrams, which are annotated to meet the requirements of the question.
- The skill of reaching conclusions about whether to discuss whether demographic and social factors are the main influence on the changing demand for energy.

Credit other valid approaches.

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13. Evaluate the impacts of hazards associated with low-pressure systems.

AO1 [9] AO2 [11] AO3 [2] [22 marks]

Focus: 4.5.5

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- In tropical regions low-pressure systems (hurricanes and cyclones) are associated with torrential rain and high winds triggering secondary hazards of flooding, tidal waves and sea incursions, landslides, mudflows and wind-borne debris (place / risk / scale).
- In temperate regions low-pressure systems are associated with storms, heavy rainfall/snowfalls and gale force winds triggering secondary hazards of flooding, sea insurgences (especially where the deep depression coincides with a time of very high tides), landslides and wind-borne debris (place / risk / scale).
- The irregularity and unpredictability of hazards from temperate low-pressure systems is a problem, as we don't mitigate them effectively. As a result, the impacts are potentially more severe (risk / temporal scale / vulnerability).
- There may be reference to demographic effects at both time scales such as deaths and long-term migration (inequality / place / risk / scale / time / vulnerability).
- Economic effects may analyse losses in the short term such as cessation of production and costs of damage in the long-term, such as the effects on economic activity and infrastructure (place / risk / scale / time).
- Social effects may include observations on health, homelessness and bereavement (place / risk / scale).
- There may also be consideration of the effects on the environment such as landslides and deforestation (place / risk / scale / time).

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AO2
Application of knowledge and understanding is deployed to evaluate the impacts of hazards associated with low-pressure systems. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- An evaluation of the impacts of hazards associated with low-pressure systems (place / risk / scale).
- Comparing and contrasting the impacts of hazards associated with low-pressure systems (place / risk / scale).
- Examination of the severity of demographic, social, economic and environmental impacts of hazards associated with low-pressure systems. (place / risk / scale)
- An examination of the scale of impacts of associated with low-pressure systems (place / scale).
- An examination of the temporal impacts of hazards associated with low-pressure systems (place / time).
- Candidates may highlight the fact that there are positive as well as negative outcomes of hazards associated with low-pressure systems, e.g. increase in tourism, improvements to evacuation procedures, early warning systems and building design etc. (mitigation / adaptation / resilience / sustainability).

AO3
Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments which evaluate the impacts of hazards associated with low-pressure systems.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions which evaluate the impacts of hazards associated with low-pressure systems.

Credit other valid approaches.

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14. Discuss the impacts of human activities on the atmosphere at local and regional scales.

AO [9] AO [11] AO3 [2] [22 marks]

Focus: 4.5.6

Indicative content
The indicative content is not prescriptive, and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.
Likely themes and specialised concepts include:

AO1
Knowledge and understanding could include:

- The main impact of human activity on the atmosphere at both the local and regional scale is the formation of urban microclimates (place / scale).
- The main impact of human activities in urban areas is to destroy the existing microclimate and create a new one (place / risk / scale).
- Urban areas affect all microclimate variables. Temperatures increase, particularly during anticyclonic conditions, at night and in winter (place / scale / time).
- Wind characteristics are altered, including wind speed (reduced through friction or increased through channelling between tall buildings) wind direction and turbulence (place / scale).
- Precipitation levels are higher with thunderstorms and hail more likely. There are also changes to the hydrology of urban areas in terms of lower humidity levels and higher evapotranspiration rates (place / scale / time).
- The increase in particulate matter results in a higher frequency, duration and intensity of fog, a higher incidence of cloud, and therefore lower amounts of sunshine (place / scale / time).
- Human activity also induces changes in atmospheric composition, higher concentrations of gases such as carbon dioxide and sulphur dioxide and particulates leading to particulate pollution, photochemical smog and acid rain (place / risk / scale).
- Human activity can also impact the atmosphere at regional (national) scales via increasing concentrations of greenhouse gases. Credit knowledge of increasing concentrations of greenhouse gases and how the scale of contributions vary e.g. some regions/countries contribute more to the changing composition of the atmosphere. This may be linked to increased frequency of extreme weather patterns (must focus on atmospheric changes).
- Strategies implemented to deal with the above, may also be advanced (adaptation / mitigation / place / sustainability).

Do not credit drift into impacts on humans – this is not answering the question.

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AO2

Application of knowledge and understanding is deployed to discuss the impacts of human activities on the atmosphere at local and regional scales.
Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- A discussion of the impacts of human activities on the atmosphere at local and regional scales (place / risk / scale).
- Comparing and contrasting the impacts of human activities on the atmosphere at local and regional scales (place / risk / scale).
- An examination of the scale of impacts (place / scale).
- Examining the temporal impacts associated with human activities on the atmosphere at local and regional scales (place / time).
- Candidates may highlight the fact that there are positive as well as the negative outcomes of human activities on the atmosphere at local and regional scales, e.g. policies to improve environmental quality / education schemes etc. (adaptation / mitigation / resilience / sustainability).

AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments which discuss the impacts of human activities on the atmosphere at local and regional scales.
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question.
- The skill of reaching conclusions which discuss the impacts of human activities on the atmosphere at local and regional scales.

Credit other valid approaches.

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