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# **GCE A LEVEL MARKING SCHEME**

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**SUMMER 2018**

**A LEVEL  
GEOGRAPHY - COMPONENT 3  
A110U30-1**

## **INTRODUCTION**

This marking scheme was used by WJEC for the 2018 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

## **Component 3: Contemporary Themes in Geography**

### **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 38 marks and Section B is 45 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.

## **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.

**Section A: Tectonic Hazards: Generic Mark Bands [38 marks]**

	<b>AO1 [14 marks]</b>	<b>AO2 [20 marks]</b>	<b>AO3 [4 marks]</b>
<b>Band</b>	<i>Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change at a variety of scales.</i>	<i>Apply knowledge and understanding in different contexts either to analyse or interpret or evaluate geographical issues and information.</i>	<i>Use a variety of relevant quantitative and qualitative skills to construct arguments and draw conclusions.</i>
<b>4</b>	<b>10-14 marks</b>  Demonstrates thorough and accurate knowledge; confident understanding of relevant concepts and principles throughout the response that is wholly relevant to the question.  Demonstrates knowledge and understanding through the use of appropriate, accurate and well-developed examples.  Wholly appropriate, accurate and relevant supporting geographical terminology is well used.  Well-directed and well-annotated sketch maps / diagrams are included and should be credited.	<b>16-20 marks</b>  Demonstrates sophisticated application of knowledge and understanding either to analyse or interpret or evaluate in order to produce a full and coherent response that is supported by wholly appropriate evidence.  Demonstrates application of knowledge and understanding through the synthesis of the connections between different elements of the question.  Demonstrates application of knowledge and understanding through the confident application of the specialised concepts throughout the response.	<b>4 marks</b>  The response uses wholly relevant qualitative skills to construct clear, coherent and appropriately structured arguments and conclusions.

<p><b>3</b></p>	<p style="text-align: center;"><b>7-9 marks</b></p> <p>Demonstrates secure factual knowledge and reasonable understanding of relevant concepts and principles for large portions of the response that is mostly relevant to the question.</p> <p>Demonstrates knowledge and understanding through the use of appropriate, generally accurate and developed examples.</p> <p>The use of appropriate and mostly relevant geographical terminology is evident.</p> <p>Appropriate, basically accurate annotated sketch maps / diagrams are included and should be credited.</p>	<p style="text-align: center;"><b>11-15 marks</b></p> <p>Demonstrates accurate application of knowledge and understanding either to interpret or analyse or evaluate in order to produce a partial but coherent response that is supported by mostly appropriate evidence.</p> <p>Demonstrates application of knowledge and understanding through the partial synthesis of the connections between different elements of the question.</p> <p>Demonstrates application of knowledge and understanding through the mostly relevant application of the specialised concepts.</p>	<p style="text-align: center;"><b>3 marks</b></p> <p>The response uses mostly relevant qualitative skills to construct structured arguments and conclusions where coherence is variable.</p>
<p><b>2</b></p>	<p style="text-align: center;"><b>4-6 marks</b></p> <p>Demonstrates straightforward knowledge with some inaccuracies; some understanding of relevant concepts and principles that is linked to the question.</p> <p>Demonstrates knowledge and understanding through the use of limited examples that may not always be appropriate or accurate.</p> <p>The use of geographical terminology is limited.</p> <p>Annotated sketch maps / diagrams are basic and should be credited.</p>	<p style="text-align: center;"><b>6-10 marks</b></p> <p>Demonstrates some application of knowledge and understanding either to interpret or analyse or evaluate in order to produce a response which is limited in coherence and is supported by limited appropriate evidence.</p> <p>Demonstrates application of knowledge and understanding through the limited synthesis of the connections between different elements of the question.</p> <p>Demonstrate application of knowledge and understanding through limited application of the specialised concepts.</p>	<p style="text-align: center;"><b>2 marks</b></p> <p>The response uses limited qualitative skills to construct argument(s) and conclusion(s) that are superficial in structure with minimal coherence.</p>

1	<p style="text-align: center;"><b>1-3 marks</b></p> <p>Demonstrates poor knowledge with errors and minimal understanding and linkage to the question.</p> <p>Basic use of examples or if evident, lack relevance to the question asked.</p> <p>Geographical terminology is rarely used within the response.</p>	<p style="text-align: center;"><b>1-5 marks</b></p> <p>Demonstrates application either to interpret or analyse or evaluate in order to produce a response which lacks coherence and is unsupported by appropriate evidence.</p> <p>Demonstrates application of knowledge and understanding through the superficial synthesis of the connections between different elements of the question.</p> <p>Demonstrate application of knowledge and understanding through superficial application of the specialised concepts.</p>	<p style="text-align: center;"><b>1 mark</b></p> <p>The response uses qualitative skills superficially to construct an argument / conclusion that is incomplete and lacks coherence.</p>
	<p style="text-align: center;"><b>0 marks</b></p> <p>Response not creditworthy or not attempted.</p>	<p style="text-align: center;"><b>0 marks</b></p> <p>Response not creditworthy or not attempted.</p>	<p style="text-align: center;"><b>0 marks</b></p> <p>Response not creditworthy or not attempted.</p>

## Section A: Tectonic Hazards

1. 'Earthquakes only generate hazards at the local scale'. Discuss. [38 marks]  
AO1 [14] AO2.1c [20] AO3.3 [4]

### Focus: 3.1.3

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

### 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.

### AO1

Knowledge and understanding of the hazards that result from earthquake activity could include:

- The connections between the processes operative at tectonic plate boundaries and causes of earthquake hazards (causality)
- Hazards generated by earthquakes include ground shaking, liquefaction, landslides and tsunami (risk) and include aftershocks
- The characteristics of earthquake activity: whether shallow or deep focus, its magnitude and geographical location (place)
- Credit impacts where linked to the physical hazard

### AO2

Application of knowledge and understanding is deployed to evaluate whether earthquake activity results in hazards only at the local scale. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- Some earthquake activity may result in hazards that are concentrated locally (scale), for example liquefaction in the Kobe earthquake (1995) was largely restricted to the reclaimed land of the port
- Some earthquake activity may result in hazards that are more important at a regional or global scale (scale), for example the Boxing Day earthquake (2004) and associated tsunami generated hazards which spread around the Indian Ocean
- Earthquake activity in areas of steep relief may result in landslide hazards as such areas are prone to mass movement (place)
- The scale of the hazard varies according to the nature of the hazard, liquefaction, ground shaking and landslides often have a greater impact at the local scale compared to tsunamis which can have an impact at a regional or global scale
- The magnitude of earthquake activity, with the assertion that the greater the magnitude the more widespread the hazards are likely to be
- Earthquake activity results in hazards operating over different time scales, initially earthquake activity can have local impacts, but over time these may spread more widely, for example the Boxing Day earthquake (2004) and associated tsunami generated hazards which spread around the Indian Ocean and beyond with northeast Australia experiencing the impact 24 hours after the tsunami was generated
- The globalisation of the world economy means that earthquake events are more likely to have widespread impacts than they did in the past (globalisation)

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the hazards that result from earthquake activity
- 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 earthquake activity results in hazards only at the local scale

Credit other valid approaches.

2. 'Short-term responses to the effects of tectonic hazards are more effective than long-term responses'. To what extent do you agree? [38 marks]  
AO1 [14] AO2.1c [20] AO3.3 [4]

**Focus: 3.1.5**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

**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.

**AO1**

Knowledge and understanding of short- and long-term responses to the effects of tectonic hazards (the hazard management cycle) could include:

- A description of strategies and how they manage hazards. The management may refer to how the strategy allows people to avoid the hazard, to absorb the impacts of the hazard or to alleviate the impacts of the hazard after it has occurred (place / mitigation / adaptation / resilience)
- Strategies that respond to the event can be divided into short and long-term responses (place / mitigation / adaptation / resilience)
- Strategies used to manage tectonic hazards can be divided into:
  - (a) Monitoring, predicting and warnings of tectonic hazards – e.g. hazard zone mapping / early warning systems / media broadcasts etc. (place / mitigation / risk / adaptation)
  - (b) Mitigating tectonic hazards and modifying the event, vulnerability and loss – e.g. evacuation procedures / rescue efforts / provision of aid (place / mitigation / risk / adaptation / resilience)
  - (c) those that respond to the event – e.g. reconstruction efforts / rehabilitation / building engineering (mitigation / adaptation / resilience)
- Credit knowledge and understanding of a conceptual framework e.g. hazard management cycle or Park's response curve or definitions of what constitutes a short and/or a long-term response

**AO2**

Application of knowledge and understanding is deployed to evaluate to what extent short-term responses to the effects of tectonic hazards are more effective than long-term responses. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Comparison of the effectiveness of different measures employed in different environments (place)
- The interdependence of strategies. Evacuation (short-term response) is a very effective method of management, but it depends on effective long-term monitoring and prediction (interdependence)
- Variation in the effectiveness of the strategies provided according to the nature of the primary and secondary hazards associated with tectonic activity (risk) for example the effectiveness of a strategy may vary according to whether the tectonic hazard is a lava flow or liquefaction
- The frequency of the tectonic hazard can determine whether short- or long-term responses are more effective. Mount Sakurajima in Japan erupts so frequently (548 eruptions in 2009) that long-term responses (hazard map with exclusion zones; annual evacuation drill is a 40-year tradition) are well-established

- The magnitude of the tectonic hazard can determine whether short- or long-term responses are more effective
- The areal extent of the tectonic hazard can determine whether short- or long-term responses are more effective (scale), for example the ash associated with the eruption of Eyjafjallajökull (2010) had profound impacts on aviation over European air space. Evacuation proved to be an effective strategy on a local scale, but hazard mapping was more appropriate for the aviation industry on a regional scale (scale)
- The level of economic development can determine which types of strategies local communities affected can afford and have a bearing on their effectiveness (resilience), for example expensive aseismic buildings in California and Japan do perform well even in high magnitude earthquakes

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the short-term and long-term responses to the effects of tectonic hazards
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about the effectiveness of short-term and long-term responses to the effects of tectonic hazards

Credit other valid approaches.

**Section B: Contemporary Themes in Geography: Generic Mark Bands [45 marks]**

	<b>AO1 [20 marks]</b>	<b>AO2 [20 marks]</b>	<b>AO3 [5 marks]</b>
<b>Band</b>	<i>Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change at a variety of scales.</i>	<i>Apply knowledge and understanding in different contexts either to analyse or interpret or evaluate geographical issues and information.</i>	<i>Use a variety of relevant 'geographical skills' to construct arguments and draw conclusions.</i>
<b>5</b>	<b>17-20 marks</b>  Demonstrates wide ranging, thorough and accurate knowledge with a high order of conceptual understanding throughout the response that is wholly relevant to the question.  Demonstrates knowledge and understanding through the use of wholly appropriate, accurate and well-developed examples.  Wholly appropriate, accurate and relevant supporting geographical terminology is well used.  Well-directed and well-annotated sketch maps / diagrams are integrated and should be credited.	<b>17-20 marks</b>  Demonstrates sophisticated application of knowledge and understanding either to analyse or interpret or evaluate in order to produce a full, comprehensive and coherent response that is supported by wholly appropriate, wide ranging and relevant evidence.  Demonstrates application of knowledge and understanding through the sophisticated synthesis of the connections between different elements of the question.  Demonstrates application of knowledge and understanding through the confident application of the specialised concepts throughout the response.	<b>5 marks</b>  The response uses wholly relevant qualitative skills to produce well-constructed, coherent, sophisticated and logical arguments and conclusions.

<p><b>4</b></p>	<p><b>13-16 marks</b></p> <p>Demonstrates accurate factual knowledge and confident understanding of relevant concepts and principles throughout the response that is relevant to the question.</p> <p>Demonstrates knowledge and understanding through the use of appropriate, accurate and developed examples.</p> <p>Appropriate, accurate and relevant geographical terminology is evident.</p> <p>Appropriate, mostly accurate and relevant annotated sketch maps / diagrams are included and should be credited.</p>	<p><b>13-16 marks</b></p> <p>Demonstrates accurate application of knowledge and understanding either to interpret or analyse or evaluate in order to produce a coherent response that is supported by appropriate evidence.</p> <p>Demonstrates application of knowledge and understanding through the synthesis of the connections between different elements of the question.</p> <p>Demonstrates application of knowledge and understanding through the relevant application of the specialised concepts.</p>	<p><b>4 marks</b></p> <p>The response uses relevant qualitative skills to produce clear, coherent and appropriately structured arguments and conclusions.</p>
<p><b>3</b></p>	<p><b>9-12 marks</b></p> <p>Demonstrates secure, straightforward knowledge and reasonable understanding of relevant concepts and principles throughout most of the response that is mostly relevant to the question.</p> <p>Demonstrates knowledge and understanding through the use of mostly appropriate, mostly accurate and developed examples.</p> <p>Mostly appropriate, accurate and mostly relevant geographical terminology is evident but is variable in its use.</p> <p>Appropriate, basically accurate annotated sketch maps / diagrams are included and should be credited.</p>	<p><b>9-12 marks</b></p> <p>Demonstrates partial application either to analyse or interpret or evaluate in order to produce a partial but coherent response that is supported by mostly appropriate evidence.</p> <p>Demonstrates application of knowledge through the partial synthesis between different elements of the question.</p> <p>Demonstrates application of knowledge and understanding through the partial application of some specialised concepts.</p>	<p><b>3 marks</b></p> <p>The response uses mostly relevant qualitative skills to produce a structured response but where coherence is variable.</p>

<p><b>2</b></p>	<p style="text-align: center;"><b>5-8 marks</b></p> <p>Demonstrates some knowledge, but limited in scope with some inaccuracies; some understanding of relevant concepts and principles.</p> <p>Demonstrates knowledge and understanding through the use of limited examples, which are mostly accurate but un-developed.</p> <p>Limited geographical terminology is evident, not all of which is appropriate or accurate.</p> <p>Basic sketch maps / diagrams are used but contain inaccuracies. Credit should be given when used appropriately.</p>	<p style="text-align: center;"><b>5-8 marks</b></p> <p>Demonstrates limited application either to analyse or interpret or evaluate in order to produce a limited response where most points are generalised or of limited relevance to the question.</p> <p>Limited synthesis between different elements of the question.</p> <p>Demonstrates application of knowledge and understanding through the limited application of some specialised concepts.</p>	<p style="text-align: center;"><b>2 marks</b></p> <p>The response uses some qualitative skills to produce a response with superficial structure, with minimal coherence.</p>
<p><b>1</b></p>	<p style="text-align: center;"><b>1-4 marks</b></p> <p>Demonstrates poor knowledge with errors and minimal understanding and linkage to the question.</p> <p>No use of examples or, if evident, lack relevance to the question asked.</p> <p>Geographical terminology is rarely used within the response.</p>	<p style="text-align: center;"><b>1-4 marks</b></p> <p>Demonstration of application either to analyse or interpret or evaluate is poor, producing a response which lacks coherence and is unsupported by appropriate evidence.</p> <p>Synthesis between different elements of the question is poor.</p> <p>Demonstrates application of knowledge and understanding through the superficial application of basic specialised concepts.</p>	<p style="text-align: center;"><b>1 mark</b></p> <p>The communication in the response is incomplete.</p>
	<p style="text-align: center;"><b>0 marks</b></p> <p>Response not creditworthy or not attempted.</p>	<p style="text-align: center;"><b>0 marks</b></p> <p>Response not creditworthy or not attempted.</p>	<p style="text-align: center;"><b>0 marks</b></p> <p>Response not creditworthy or not attempted.</p>

## Section B: Contemporary Themes in Geography

3. To what extent is temperature the greatest influence on the structure and functioning of ecosystems? [45 marks]  
AO1 [20] AO2.1c [20] AO3.3 [5]

### Focus: 3.2.2

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

### 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.

### AO1

Knowledge and understanding of the structure and functioning of ecosystems could include:

- The structure of an ecosystem consists of a series of storage units or trophic levels including autotrophs (primary producers), heterotrophs (consumers) and saprotrophs (decomposers), each of which have ecological niches
- An ecosystem is a discrete structural, functional and life sustaining environmental system. The environmental system consists of biotic and abiotic components in a habitat. Biotic components of the ecosystem include the living organisms; plants, animals and microbes, whereas the abiotic component of the system includes basic inorganic elements and compounds, such as soil, water, oxygen, phosphates and a variety of organic compounds (by-products of organic activities or death) (place / system / interdependence)
- It also includes such physical factors as moisture, wind currents and solar radiation. Radiant energy from the sun is the only significant energy source for any ecosystem (place / system / interdependence/ thresholds)
- An ecosystem is a dynamic system, which relies on the interaction of biotic and abiotic components (place / system / interdependence / equilibrium / thresholds)
- The ecosystem concept including energy flows (place / system / interdependence)
- Levels of primary productivity linked to the presence of limiting factors including temperature, moisture, light and nutrient availability (place/ system / interdependence)
- Temperature controls the rate of plant metabolism, which in turn determines the amount of photosynthesis. Biological metabolic activity occurs within the range 0-50°C, with an optimum range of 15-25° C (thresholds)

## AO2

Application of knowledge and understanding is deployed to discuss the extent to which temperature has the greatest influence on the structure and functioning of ecosystems. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- Temperature controls the rate of plant metabolism, which in turn determines the amount of photosynthesis. Temperatures need to reach a critical level for an ecosystem to function (thresholds)
- The influence of temperature can be inferred from the relationship between climatic belts and the distribution of biomes (place / causality / interdependence / scale)
- The influence of climate change and associated global warming on shifting biomes is indicative of the importance of temperature in influencing the structure and functioning of ecosystems (causality / feedback)
- Ecosystems are complex and rely on a variety of interlinked processes to function effectively. The complexity and interconnections between the limiting factors makes it difficult to isolate and examine the relative importance of temperature (interdependence)
- Temperature and moisture also influence the rate of weathering and therefore nutrient availability (interdependence)
- As water is a principal requirement for photosynthesis, in the absence of water the importance of temperature diminishes (interdependence)
- Humans are increasingly influencing the structure and functioning of ecosystems through harvesting, the application of fertilisers, controlled environments and climate change (adaptation / causality / resilience)

## AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the structure and functioning of ecosystems
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about the extent to which temperature has the greatest influence on the structure and functioning of ecosystems

Credit other valid approaches.

4. 'The Arctic tundra biome cannot be used sustainably'. Discuss. [45 marks]  
AO1 [20] AO2.1c [20] AO3.3 [5]

**Focus: 3.2.6/7**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

**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.

**AO1**

Knowledge and understanding of the use of the Arctic tundra biome could include:

- Threats to the Arctic tundra, including climate change, mineral exploitation and tourism (causality / place / risk / thresholds)
- Conflicts with indigenous population (inequality)
- Consequences of exploiting the Arctic tundra include physical impacts such as environmental degradation, climate change, loss of unique flora and fauna and human impacts such as migration, food supply problems, loss of unique heritage and culture (place / risk / sustainability)
- Strategies used to manage the Arctic tundra biome and the promotion of good practices (mitigation / adaptation / sustainability / resilience)

**AO2**

Application of knowledge and understanding is deployed to discuss whether the Arctic tundra biome can be used sustainably. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- There are positive as well as the negative outcomes of human activity in the Arctic tundra (mitigation / adaptation / resilience / sustainability)
- Comparison of the success of different measures employed in different environments (place)
- Changes in the use of strategies over time (time scales)
- Evidence for success by referring to indicators: indicators covered may include social, environmental and demographic measures of improvement indicative of progress made
- The scale of the strategy(ies) employed – local / regional / global (scale)
- The longevity of the strategy(ies) (sustainability)
- Unsustainable use of the Arctic Tundra may destroy the realisable role of services and place humans at risk when the system loses equilibrium (equilibrium / thresholds)

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the use of 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 about whether the Arctic tundra biome can be used sustainably

Credit other valid approaches.

5. 'Political factors are the main influence on the demographic characteristics of India.' Discuss. [45 marks]

AO1 [20] AO2.1c [20] AO3.3 [5]

**Focus: 3.3.2**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

**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.

**AO1**

Knowledge and understanding of the demographic characteristics of India and the factors influencing India's demographic characteristics could include:

- India's population size (1.25 billion), distribution (high concentration in the Ganges Plain), growth (Stage 3 of DTM) and structure (gender imbalance)
- Physical factors influencing population distribution (water supplies, accessibility, upland interior and water shortages) (causality)
- Economic factors influencing population distribution, growth and structure (globalisation)
- Social factors influencing population growth and structure including education
- Cultural factors influencing population growth and structure including attitudes to gender and the caste system
- Political factors influencing population distribution, growth and structure including population policies
- Migration flows and ethnicity

**AO2**

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

- The interdependence of physical, economic, political, social and cultural factors (interdependence)
- Changes in the importance of factors over time influencing population distribution (time scales). India's urban communities have grown significantly associated with the unprecedented rate of urbanisation since the economic reforms of 1991 (globalisation)
- Variation over space (place) as there are differences between states. 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 (globalisation). The highest growth rates, in Nagaland, can be linked to the political factor of the influx of refugees from Burma

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the demographic characteristics of India and the factors influencing India's demographic characteristics
- 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 the demographic characteristics of India are mainly influenced by political factors

Credit other valid approaches.

## 6. Evaluate strategies to improve the sustainability of urban communities in India.

[45 marks]  
AO1 [20] AO2.1c [20] AO3.3 [5]

### Focus: 3.3.7

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

### 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.

### AO1

Knowledge and understanding of strategies to improve the sustainability of urban communities in India could include:

- Strategies implemented at an international level such as the UN-HABITAT/UNEP Sustainable Cities Programme which promotes environmental, social and economic sustainability of cities through an Environmental Planning and Management (EPM) approach which is characterized by a broad-based, participatory decision-making process facility. Between 2008-13 5 projects were completed in India (globalisation)
- Strategies implemented at the municipal/state level such as the Bangalore (Bengaluru) Master Plan by the Bangalore Development Authority
- Strategies implemented by NGOs at a local level e.g. Mythri working to improve water, sanitation and waste management in Bangalore's slums
- Strategies implemented to deal with specific aspects of urban sustainability such as inequalities, water and sanitation or transport e.g. banning auto-rickshaws in Delhi to combat vehicle pollution (mitigation/ sustainability)

### AO2

Application of knowledge and understanding is deployed to evaluate the success of strategies used to improve the sustainability of urban communities in India. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- Evidence for success by making reference to indicators: indicators covered may include social, environmental or economic measures of improvements in levels of sustainability made
- The scale of the strategy, with improvements in the sustainability of small-scale, bottom-up, participatory strategies in urban communities being more effective
- Comparison of improvements in levels of sustainability of similar strategies employed in different environments (place)
- Improvements in the success of strategies over time (time scales)
- The scale of the challenges that require sustainable solutions due to the unprecedented speed of urbanisation in India
- The reliance on the co-ordination of agencies for the success of strategies, which sometimes fail to act together (interdependence)
- The need for greater transparency, accountability, public participation and decision making

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about strategies to improve the sustainability of urban communities 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 about the success of strategies used to improve the sustainability of urban communities in India

Credit other valid approaches.

7. 'Political factors are the main influence on the demographic characteristics of China.' Discuss. [45 marks]

AO1 [20] AO2.1c [20] AO3.3 [5]

**Focus: 3.3.2**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

**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.

**AO1**

Knowledge and understanding of the demographic characteristics of China and the factors influencing China's demographic characteristics 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)
- Physical factors influencing population distribution (water supplies, accessibility, upland interior and water shortages) (causality)
- Economic factors influencing population distribution, growth and structure (globalisation)
- Social factors influencing population growth and structure including education
- Cultural factors influencing population growth and structure including the prejudice against girls and Confucianism
- Political factors influencing population distribution, growth and structure including the hukou system, population policies, family planning and women's reproductive health

**AO2**

Application of knowledge and understanding is deployed to evaluate the influence of political factors on the demographic characteristics of China. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. This evidence could include:

- The interdependence of physical, economic, political, social and cultural factors (interdependence)
- Changes over time (time scales). 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 the employment opportunities in urban areas and SEZs
- 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 (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)

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the demographic characteristics of China and the factors influencing China's demographic characteristics
- 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 the demographic characteristics of China are mainly influenced by political factors

Credit other valid approaches.

**8. Evaluate strategies to improve the sustainability of urban communities in China.**  
[45 marks]  
AO1 [20] AO2.1c [20] AO3.3 [5]

**Focus: 3.3.7**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

**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.

**AO1**

Knowledge and understanding of strategies to improve the sustainability of urban communities in China could include:

- Strategies implemented at an international level such as the UN-HABITAT/UNEP Sustainable Cities Programme promotes environmental, social and economic sustainability of cities through an Environmental Planning and Management (EPM) approach which is characterized by a broad-based, participatory decision-making process facility. Between 2008-13 6 projects were implemented in China, 3 of which are ongoing (globalisation)
- Strategies implemented at a national level such as the construction of eco-cities e.g. Tianjin. Cities are units of central government.
- Strategies implemented to deal with a specific aspect of urban sustainability in China e.g. reforming the *hukou* household-registration system to provide equal access to quality services for all citizens

**AO2**

Application of knowledge and understanding is deployed to evaluate the success of strategies used to improve the sustainability of urban communities in China. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- Evidence for success by making reference to indicators: indicators covered may include social, environmental or economic measures of improvements in levels of sustainability made
- Comparison of improvements in levels of sustainability of similar strategies employed in different environments (place)
- Improvements in the success of strategies over time (time scales)
- Spatial variations in levels of urban sustainability as eastern Chinese cities are challenged by more and greater problems of sustainability
- The reliance on the co-ordination of state authorities (which own urban land) and collectives(which own rural land) for the success of strategies, with integration of the land market (urban and rural) an essential pre-requisite (interdependence)
- The need for greater transparency, accountability, public participation and decision making
- The scale of the challenges that require sustainable solutions due to the unprecedented speed of urbanisation in China (scale)

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about strategies to improve the sustainability of urban communities 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 about the success of strategies used to improve the sustainability of urban communities in China

Credit other valid approaches.

9. Discuss the importance of different economic factors in the development of two or more Sub-Saharan African countries. [45 marks]

AO1 [20] AO2.1c [20] AO3.3 [5]

**Focus: 3.3.10**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

**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.

**AO1**

Knowledge and understanding of economic factors influencing the development of Sub-Saharan African countries could include:

- The influence of free trade and trade blocs in promoting and hindering development including subsidies and tariffs, quotas and protectionism (interdependence / causality)
- The influence of MNCs, including foreign direct investment, outsourcing and offshoring (globalisation / interdependence)
- The influence of tourism and fair trade (globalisation / sustainability)
- Neo-colonial influences can lead to instability: 'the resource curse' and conflict, including the issue of conflict minerals (globalisation)
- Availability of aid
- The quality of infrastructure

**AO2**

Application of knowledge and understanding is deployed to examine the importance of different economic factors in the development of 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 different economic factors. Kenya and The Gambia have established a strong tourism base and tourism is a valuable development tool, but the tourist infrastructure is mainly provided by MNCs (interdependence)
- The importance of different economic factors varies spatially (within a country and according to the countries selected for examination). Tourism is more important as a development tool for countries with a developed tourist infrastructure (causality / place)

- The importance of different economic factors varies temporally. The Tripartite Free Trade Agreement (TFTA), which was signed in Cairo in 2015 amalgamating three of Africa’s trading blocs, SADC, EAC and COMESA, will positively impact on development. Kenya’s tourism industry has been disrupted periodically by political instability and terrorism. MNC investment in Ethiopia has grown and the country is predicted to become the ‘New China’ with the increased exploitation of solar and geothermal energy (causality / place)
- The importance of different economic factors may vary according to scale. Tourism may be more important at the national scale (The Gambia), but fair trade at the local scale (Njau, The Gambia) (scale)
- Evidence provided to highlight the influence of different economic factors in the development of Sub-Saharan African countries. Indicators covered may include trade statistics, tourist numbers, contribution to GDP from different economic sectors

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the economic factors influencing the development of 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 about the importance of different economic factors in the development of Sub-Saharan African countries

Credit other valid approaches.

**10. Evaluate strategies to manage the causes and consequences of desertification in two or more Sub-Saharan African countries. [45 marks]**

**AO1 [20] AO2.1c [20] AO3.3 [5]**

**Focus: 3.3.13**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

**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.

**AO1**

Knowledge and understanding of the causes and consequences of desertification and strategies to manage these could include:

- Causes of desertification include natural processes (drought, high rates of evapotranspiration and infrequent/intense precipitation) and socio-economic processes (overgrazing, over-cultivation, deforestation and poor irrigation) (causality)
- Consequences of desertification include physical (water table lowering, rivers and wells dry up, land degradation and vegetation loss) and human (migration, food supply problems, famine, malnutrition, and death) (place / risk / sustainability)
- Strategies to address the causes of desertification (sustainability / mitigation / adaptation) include livestock management, forestry management e.g. The Great Green Wall, water and land management and education
- Strategies to address the consequences of desertification include the development and promotion of good practices in terms of soil and water conservation techniques (stone bunds, magic stones in Burkina Faso) to mitigate against the effects (mitigation / resilience / sustainability)
- Strategies that make use of technology transfer e.g. smart irrigation techniques
- Adaptive strategies include the use of drought resistant crops (adaptation)
- Strategies implemented to manage the consequences of migration such as refugee camps, aid and the provision of health services

**AO2**

Application of knowledge and understanding is deployed to evaluate strategies to manage the causes and consequences of desertification. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- Comparison of the success of different measures employed in different environments (place)
- Improvements in the use of strategies over time (time scales)
- Evidence for success by referring to indicators: indicators covered may include social, environmental and demographic measures of improvement indicative of progress made
- The scale of the strategies employed – local / regional / global (scale)
- The longevity of the strategies (sustainability)

- Possible changes to either causes or consequences could occur in the light of climate change and tipping points could be reached (thresholds)
- The interdependence of strategies to manage both the causes and consequences of desertification (interdependence) such as forestry management to prevent soil erosion and increase the water-holding capacity of the soil
- Different strategies (forestry management and introducing solar and wind power to reduce dependence on wood as an energy source) achieve similar objectives (interdependence)

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about strategies to manage the causes and consequences of desertification
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions evaluating strategies to manage the causes and consequences of desertification

Credit other valid approaches.

11. **'The most important physical factors determining the supply of energy are geological. 'Discuss.** [45 marks]  
AO1 [20] AO2.1c [20] AO3.3 [5]

**Focus: 3.4.2**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

**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.

**AO1**

Knowledge and understanding of the physical factors determining the supply of energy could include:

- Geological factors influence oil and gas traps and the formation of deltaic swamps in which coal formed. Direct access to fossil fuel reserves is a coincidence of 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)
- Certain forms of renewable energy are constrained by climatic factors. 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)
- 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)
- Certain locations provide favourable conditions for sustainable energy generation from waves, tides (tidal power is restricted to a few estuaries with a very large tidal range such as the River Severn) and biofuels(causality)

**AO2**

Application of knowledge and understanding is deployed to examine the importance of geological factors in 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). In terms of 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 (time scales). 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 subglacial water courses. This can in some cases cause locally very large relative changes 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 (Swansea Bay tidal lagoon) (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

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the physical factors 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 the importance of geological factors in determining the supply of energy

Credit other valid approaches.

12. 'The greatest influence on the changing demand for energy is population growth.'

To what extent do you agree?

[45 marks]

AO1 [20] AO2.1c [20] AO3.3 [5]

**Focus: 3.4.3**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

**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.

**AO1**

Knowledge and understanding of the factors that influence the changing demand for energy 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)
- Demographic factors as numbers of people, their dynamics and location
- The number of people has a direct impact on the demand for energy, 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 demand for energy, 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)
- 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 to 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 more 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 led to the transport of 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)

## AO2

Application of knowledge and understanding is deployed to discuss the extent to which population growth influences the changing demand for energy. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- The interdependence of economic, demographic, social and technological factors (interdependence)
- The relative importance of factors varies spatially. In countries at a very low level of economic development, population growth may be more important (causality / place)
- The relative importance of factors varies temporally. The recent rise in demand for energy in NICs and BRICs is mostly associated with economic factors (causality / place)
- 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
- Population growth is 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)

## AO3

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the factors that influence the changing demand for 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 the extent to which population growth influences the changing demand for energy

Credit other valid approaches.

13. 'The impacts of hazards associated with low-pressure systems are more severe than those associated with high-pressure systems.' Discuss. [45 marks]  
AO1 [20] AO2.1c [20] AO3.3 [5]

**Focus: 3.5.5**

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

**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.

**AO1**

Knowledge and understanding of the impacts of hazards associated with low-pressure and high-pressure systems could include:

- Definition of severity linked to scale, duration, intensity, frequency, spatial concentration, numbers affected and cost
- Demographic effects associated with both low-pressure and high-pressure systems such as deaths and migration (risk / inequalities / place / scale)
- Economic effects such as losses due to the cessation of production and costs of damage, such as the effects on economic activity and infrastructure. HEP production reduced as a long-term economic consequence of drought. (causality / sustainability / risk / place / scale)
- Social effects may include observations on health, homelessness, bereavement (low-pressure systems) and food supply problems, famine, health, bereavement and water rationing (high-pressure systems)
- Effects on the environment such as landslides and salinisation (low-pressure systems) effect on the water table, soil water movement, land degradation and vegetation, impacts on water-resource systems when rivers may be used for water supply, reservoirs emptied (high-pressure systems) (risk / inequalities / place / scale / sustainability / interdependence)

**AO2**

Application of knowledge and understanding is deployed to discuss whether the impacts of hazards associated with low-pressure systems are more severe than the impacts of hazards associated with high-pressure systems. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- Characteristics of hazard (causality) as the more intense the low-pressure system and the longer the duration of the high-pressure system, the greater the severity of impacts
- Nature of onset of hazard (causality) as the speed of onset is much faster for low-pressure than high-pressure systems (the latter are often referred to as a 'creeping hazard'). As a result, the hazards associated with low-pressure systems are more likely to be associated with more severe impacts
- Category of impact (demographic, economic, social, environmental). The social impact of bereavement is severe for both hazards associated with low-pressure and high-pressure systems. Economic impacts (infrastructure damage caused by low-pressure hazards and crop damage caused by high-pressure hazards) may be more severe for a higher income country with a more advanced economy

- Levels of development. High income countries affected by low-pressure and high-pressure systems may have more strategies in place to mitigate against the impacts of hazards, reducing their severity (resilience)
- The severity of impact may vary seasonally (time-scales). In temperate regions (causality) the hazards associated with winter anticyclones (such as frost and fog plus pollution leading to impacts such as difficult driving conditions and dangers for shipping) and winter low-pressure systems (flooding) may be more severe than summer anticyclonic drought or summer low-pressure systems
- Interdependence of impacts for example wildfires cause impacts in the short-term (loss of life and property) and in the long-term (cessation of agricultural production) affecting their severity (time scales)
- Variations over space. The high-pressure hazard of drought has severe impacts over a much larger geographical area than hazards associated with low-pressure hazards (scale)

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the impacts of hazards associated with low-pressure and high-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 about whether hazards associated with low-pressure systems are more severe than those associated with high-pressure systems

Credit other valid approaches.

## 14. Evaluate strategies to mitigate and adapt to climate change.

[45 marks]

AO1 [20] AO2.1c [20] AO3.3 [5]

### Focus: 3.5.7

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

### 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.

### AO1

Knowledge and understanding of strategies used to mitigate and adapt to climate change could include:

- Replacing fossil fuel consumption with renewable energy options – solar, wind, biogas, HEP, geothermal (mitigation)
- Energy conservation. Governments encourage citizens to insulate homes, switch to energy efficient light bulbs, avoid leaving appliances on stand-by. Developers are urged to build zero-carbon homes (mitigation)
- Transport policies to reduce congestion and air pollution. e.g. tax reduction on small cars (mitigation)
- Recycling policies to reduce emissions from manufacturing and costs and emissions from landfill (mitigation)
- Carbon offsetting. Governments can buy carbon offsets to meet emissions targets (mitigation)
- Change behaviour. Education programmes that encourage energy conservation (mitigation)
- Research. Governments promote technological solutions such as drought-resistant crops (adaptation)
- Forestry. Policies that limit deforestation and conserve and restore existing forests (mitigation)
- Relocate. Abandon areas for a less risky location e.g. Kiribati (adaptation)
- Share the loss. As costs occur, relief is provided by governments (adaptation)
- Modify the threat. Costs are reduced by some form of protection e.g. a flood barrier (adaptation / resilience)

### AO2

Application of knowledge and understanding is deployed to evaluate the success of strategies used to mitigate and adapt to climate change. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include:

- Evidence for success by making reference to indicators: indicators covered will be mainly environmental (reduction in emissions), but may include social (participation in education schemes) or economic (savings in cost of landfill) measures of improvement indicative of progress made

- The scale of the strategy. Comparison may be made between the success of strategies implemented at the national level with those at a local or international scale (scale)
- Relative merits of different strategies. Renewables are unlikely to take over from fossil fuels as they involve considerable investment and new infrastructure whilst energy conservation measures provide an attractive option as it saves the consumer money (mitigation)
- The interdependence of strategies. Some policies at the local level reinforce those at a national level such as tax reduction on small cars (national) and congestion charging (local)
- The interdependence of schemes at a local, national and international level. Some national strategies are introduced in response to international agreements or supranational (EU) directives (globalisation)

### **AO3**

Skills evidenced could include:

- The skill of presenting well-constructed, coherent and logical arguments about the strategies used to mitigate and adapt to climate change
- The skill of constructing relevant diagrams (qualitative skills) which are annotated to meet the requirements of the question
- The skill of reaching conclusions about the success of strategies used to mitigate and adapt to climate change

Credit other valid approaches.