AS
GEOGRAPHY
7036/1

Paper 1 Physical geography and people and the environment

Mark scheme

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

No student should be disadvantaged on the basis of their gender identity and/or how they refer to the gender identity of others in their exam responses.

A consistent use of 'they/them' as a singular and pronouns beyond 'she/her' or 'he/him' will be credited in exam responses in line with existing mark scheme criteria.

Further copies of this mark scheme are available from aqa.org.uk

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the typical performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

The notes for answers provide indicative content. Students' responses may take a different approach in relation to that which is typical or expected. It is important to stress that examiners must consider all a student's work and the extent to which this answered the question, irrespective of whether a response follows an expected structure. If in doubt the examiner should contact their team leader for advice and guidance.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Section A

Qu	Part	Marking guidance	Total marks
01	1	**Which of the following describes a cause of precipitation?** **C** When air is forced to rise over hills it cools, water vapour condenses forming clouds and water then falls to the surface of the Earth.	**1** **AO1 = 1**
01	2	**In the carbon cycle, what is respiration?** **B** Animal and plant cells use oxygen to free energy from stored carbohydrates, releasing carbon dioxide into the atmosphere.	**1** **AO1 = 1**
01	3	**Outline impacts of wildfires on major stores of carbon.** <u>Point marked</u> Award 1 mark per valid point with extra mark(s) for developed points (d). For example: <u>Notes for answers</u> **AO1** • Wildfires transfer carbon from the biosphere store to the atmosphere store (1), decreasing the size of the biosphere store and increasing the amount of atmospheric carbon (1d). • Carbon is converted from its solid state in vegetation to a gaseous state as CO_2 in the atmosphere (1). • Remaining ash from wildfires is incorporated into soils, increasing the amount of carbon stored in the ground (1). • By initially changing the size of the biosphere and atmospheric stores, wildfires upset equilibrium in the carbon cycle and feedback results in changes to other major stores (1). • With increased CO_2 in the atmosphere, there will be subsequent changes to other stores (1), for example more CO_2 may dissolve into the ocean store, increasing the hydrosphere store (1d). The notes for answers are not exhaustive. Credit any valid points.	**3** **AO1 = 3**

01	4	**Analyse the data shown in Figure 1.** **AO3** – There should be clear analysis of the distribution of lakes shown on the map. Analysis should consider the distribution of the volume of water stored in these lakes and their surface area. There should be data manipulation to support the analysis. Mark scheme **Level 2 (4–6 marks)** **AO3** – Clear analysis of the quantitative evidence provided, which makes appropriate use of data in support. Clear connection(s) between different aspects of the data and evidence. **Level 1 (1–3 marks)** **AO3** – Basic analysis of the quantitative evidence provided, which makes limited use of data and evidence in support. Basic connection(s) between different aspects of the data and evidence. Notes for answers **AO3** • There is clearly an uneven distribution of the number of lakes, their area and the volume of water stored in different countries. • More than twice as many countries with a large number of lakes are found in the northern hemisphere compared to the southern hemisphere. In fact, there are over a million lakes in the northern hemisphere compared to less than 50 000 in the southern hemisphere. Over 27 times more in the north. • There is significant variation in the number of lakes in different continents. North America has the most, 4 times as many as the 2nd most numerous, Asia. • There is a similar pattern in the distribution of the surface area of the lakes, with those of North America covering over 1.2 million km^2, over quarter million km^2 more than all the remaining lakes combined. • Norway and Sweden combined have 42 600 lakes, which is more than 3.5 times as many as Australia. However, the Australian lakes cover 700 km^2 more, but hold 5 times less water than those in Norway and Sweden. • There is some relationship between the number of lakes in a country and their total surface area. Canada, Russia and the USA are the top three in terms of number of lakes and they have the largest surface areas, with Canada being the largest for both variables, having over 8 times as many lakes as the USA covering 2.5 times the area. This pattern/relationship is not true for countries with smaller numbers of lakes, for example China has almost double the number of lakes as Kazakhstan, but both countries have almost the same area of lakes. • The relationship between the number of lakes in a country and the volume of water is more limited than the relationship between number of lakes and surface area. • There should be clear analysis of the distribution of lakes shown on the map. Analysis should consider the distribution and number of lakes, volume of water stored in these lakes and their surface area. There should be data manipulation to support the analysis. Credit any other valid analysis.	**6** **AO3 = 6**

01	5	**Assess potential impacts of climate change on a local river catchment you have studied.** **AO1** – Knowledge and understanding of the potential impacts of climate change. Knowledge and understanding of a case study of a river catchment at a local scale. **AO2** – Application of knowledge and understanding to analyse and assess the possible future impacts of climate change on a case study of a river catchment at a local scale. **Level 3 (7–9 marks)** **AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout. **AO2** – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Assessment is detailed and well-supported with appropriate evidence. **Level 2 (4–6 marks)** **AO1** – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant, though there may be some minor inaccuracy. **AO2** – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Assessment is evident and supported with clear and appropriate evidence. **Level 1 (1–3 marks)** **AO1** – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy. **AO2** – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Assessment is basic and supported with limited appropriate evidence. Notes for answers **AO1** • Drainage basins as open systems – inputs and outputs, to include precipitation, evapotranspiration and runoff; stores and flows, to include: interception, surface, soil water, groundwater and channel storage; stemflow, infiltration, overland flow and channel flow. Concept of water balance. • The key role of the carbon and water stores and cycles in supporting life on Earth with particular reference to climate. The relationship between the water cycle and carbon cycle in the atmosphere. The role of feedbacks within and between cycles and their link to climate change and implications for life of Earth. • Case study of a river catchment(s) at a local scale to illustrate and analyse the key themes above, engage with field data and consider the impact of precipitation upon drainage basin stores and transfers and implications for sustainable water supply and/or flooding.	**9** **AO1 = 4** **AO2 = 5**

		AO2 • Responses are likely to be heavily influenced by the exemplification and case study material. • Assessment is likely to be given of the nature of any predicted climate change in the named drainage basin. • Assessment may be given of predicted changes to the patterns and amount of precipitation the drainage basin is likely to receive. With accompanying assessment of the impact this is likely to have on stores and transfers of water in the basin. • Assessment may be given of any potential changes to flood risk in the drainage basin. It is likely that the response may come to the view that frequency and magnitude of flooding are both likely to increase. With accompanying assessment of the temporal and spatial impacts this may have. • Assessment may be given of the potential impact of climate change on the implications for water supply in the named drainage basin. As it is likely that the response will have predicted an increase in amount and unpredictability of precipitation, there is likely to be assessment of the possible impacts of this. • Some responses may assess the impact of climate change on a wider range of characteristics of the drainage basin. This could be creditworthy if the assessment focuses on issues that relate to the water cycle. Credit any other valid assessment as long as the argument is coherent and feasible.	

01	6	**Assess the contribution of natural carbon sequestration in reducing the impacts of human activity on climate change.** **AO1** – Knowledge and understanding of the natural sequestration of carbon. Knowledge and understanding of the impacts of human activity on climate change. **AO2** – Application of knowledge and understanding to assess the extent to which natural carbon sequestration reduces the impacts of human activity on climate change. <u>Notes for answers</u> **AO1** • Global distribution, and size of major stores of carbon – lithosphere, hydrosphere, cryosphere biosphere, atmosphere. • Factors driving change in the magnitude of these stores, over time and in space, including flows and transfers at plant, sere and continental scales. Photosynthesis, respiration, decomposition, combustion, carbon sequestration in oceans and sediments, weathering. • Changes in the carbon cycle over time, to include natural variation (including wildfires, volcanic activity) and human impact (including hydrocarbon fuel extraction and burning, farming practices, deforestation, land use changes). • The carbon budget and the impact of the carbon cycle upon land, ocean and atmosphere, including global climate.	**20** **AO1 = 10** **AO2 = 10**

		• The key role of the carbon and water stores and cycles in supporting life on Earth with particular reference to climate. The relationship between the water cycle and carbon cycle in the atmosphere. The role of feedbacks within and between cycles and their link to climate change and implications for life of Earth. • Human interventions in the carbon cycle designed to influence carbon transfers and mitigate the impacts of climate change. **AO2** • Assessment of the scale and nature of the impacts of human activity on climate change. • Assessment of the scale and nature of natural carbon sequestration in transferring carbon emitted into the atmosphere by human activity to other carbon stores. This may include assessment of the role played by vegetation and ocean stores. • Assessment of the scale and nature of human interventions to mitigate the impacts of climate change. • Assessment of the extent to which any amount of carbon removed from the atmosphere by natural sequestration is significant in relation to the scale of the impacts of human activity on the carbon cycle. • Responses may assess the significance of natural sequestration compared to human interventions. • Reponses may assess the significance of natural sequestration in the past and may also assess the possible level of its future significance. Any conclusion is acceptable, though should relate to the preceding content.	

Marking grid for Question 01.6

Level/ Mark range	Criteria/Descriptor
Level 4 (16–20 marks)	• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2). • Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2). • Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1). • Full and accurate knowledge and understanding of key concepts and processes throughout (AO1). • Detailed awareness of scale and temporal change which is well-integrated where appropriate (AO1).
Level 3 (11–15 marks)	• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2). • Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Generally clear and relevant knowledge and understanding of place(s) and environments (AO1). • Generally clear and accurate knowledge and understanding of key concepts and processes (AO1). • Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).
Level 2 (6–10 marks)	• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2). • Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1). • Some knowledge and understanding of key concepts, processes and interactions and change (AO1). • Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).
Level 1 (1–5 marks)	• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2). • Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2). • Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Very limited relevant knowledge and understanding of place(s) and environments (AO1). • Isolated knowledge and understanding of key concepts and processes (AO1). • Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies (AO1).
Level 0 (0 marks)	Nothing worthy of credit.

Qu	Part	Marking guidance	Total marks
02	1	**Which of the following are all sources of energy in the coastal system?** **A** Currents driven by temperature differences in the ocean, tidal flows driven by gravity and waves generated by wind.	**1** **AO1 = 1**
02	2	**Which of the following describes a process of mass movement at the coast?** **C** Where water acts as a lubricant between different layers of material in a cliff, gravity causes a downwards rotational movement.	**1** **AO1 = 1**
02	3	**Outline processes involved in the development of estuarine mudflat environments.** <u>Point marked</u> Award 1 mark per valid point with extra mark(s) for developed points (d). For example: <u>Notes for answers</u> **AO1** • Mudflats are formed by coastal deposition (1). • They form in estuaries where river and tidal flows meet (1). Saltwater flows gently into the estuary at high tide carrying large amounts of fine sediment. This meets the equally slow-moving river which has its own load of fine sediments (1d). • When the flows meet the fine clay particles aggregate (*clump*) together forming larger particles that are then heavy enough to sink to the bed (1). This process of flocculation continues at each high tide (1d). • The surface features of mudflats are continuously shaped by shifting tidal and river flows (1). • Mudflats may not be permanent features and are very susceptible to changes in sea level or river discharge and can be removed during severe storms (1). • As deposition leaves mudflats exposed more at high tides, vegetation begins to colonise, stabilising the mudflat and leading to the development of a saltmarsh and halosere (1). The notes for answers are not exhaustive. Credit any valid points.	**3** **AO1 = 3**

02	4	**Analyse the information shown in Figure 2.** **AO3** – There needs to be clear analysis of the distribution of the different proportions of population at risk of flooding in the different cities shown in the different climate change scenarios. There should be data manipulation to support the analysis. <u>Mark scheme</u> **Level 2 (4–6 marks)** **AO3** – Clear analysis of the quantitative evidence provided, which makes appropriate use of data in support. Clear connection(s) between different aspects of the data and evidence. **Level 1 (1–3 marks)** **AO3** – Basic analysis of the quantitative evidence provided, which makes limited use of data and evidence in support. Basic connection(s) between different aspects of the data and evidence. <u>Notes for answers</u> **AO3** • There is significant variation in the proportions of people at risk of coastal flooding, both now and in the different scenarios in the future. In the 2020 scenario the difference in the proportion of the populations at risk is 67, with only 3% at risk in Seoul and 70% at risk in Shanghai. In the 1 °C scenario the range is 78 and in the 2 °C scenario the range is 83. In both scenarios the worst affected city is still predicted to be Shanghai and Seoul is still predicted to be the least affected. • All cities are predicted to have an increase in the proportion of their populations at risk of coastal flooding, in both climate change scenarios. • The scale of the predicted increase in population at risk varies significantly between the cities. At the 1 °C scenario Osaka's at-risk population has the highest change, 20 percentage points, and a five-fold increase, whilst Seoul is only predicted to increase by 2 percentage points. At the 2 °C scenario Osaka is predicted to have almost 8 times the number of people at risk and Manila is predicted to have 3.5 times more, and Karachi, Dhaka, Hanoi, Tianjin and Tokyo are all predicted to have at least twice as many at risk. • Generally cities on mainland Asia (except Karachi, Tianjin and Seoul) already have the highest proportions at risk and are predicted to remain so compared to the cities in island nations such as Manila and Surabaya. Credit any other valid analysis.	**6** **AO3 = 6**

02	5	**Assess the potential impacts of climate change on the physical landforms of a local scale coastal landscape you have studied.** **AO1** – Knowledge and understanding of the potential impacts of climate change on landforms in coastal landscapes. Knowledge and understanding of a local scale coastal landscape. **AO2** – Application of knowledge and understanding to analyse and evaluate the potential impacts of climate change on the landforms of a local scale coastal landscape. **Level 3 (7–9 marks)** **AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout. **AO2** – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Assessment is detailed and well-supported with appropriate evidence. **Level 2 (4–6 marks)** **AO1** – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant, though there may be some minor inaccuracy. **AO2** – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Assessment is evident and supported with clear and appropriate evidence. **Level 1 (1–3 marks)** **AO1** – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy. **AO2** – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Evaluation is basic and supported with limited appropriate evidence. Notes for answers **AO1** • Recent and predicted climate change and potential impacts on coasts. • The relationship between process, time, landforms and landscapes in coastal settings. • Case study of a coastal landscape at a local scale to illustrate and analyse fundamental coastal processes, their landscape outcomes and engage with field data. **AO2** • Responses are likely to be heavily influenced by the exemplification and case study material. • Expect assessment of the predicted impacts of climate change to come to the view that sea levels are likely to increase and storm events may become more frequent and more extreme. Therefore, having a significant impact on the physical landforms. • Assessment may focus on the impact changes will have on coastal processes, including the rates of erosion, transport and deposition of	**9** **AO1 = 4** **AO2 = 5**

		sediment, and the potential impacts on the landscape features of the named coast. • Assessment may focus on the implications any impacts of climate change may pose in terms of flood and erosion risks and what impacts this may have on the landforms of the named coast. Assessment of this may come to the view that there is likely to be an increase in both and therefore significant changes to landforms. • Responses may come to an overall view that climate change is likely to have an overall significant impact on the physical landforms of the named local coastal landscape. Credit any other valid assessment as long as the argument is coherent and feasible.	

02	6	**'Adaptation will become more important than mitigation as a response to predicted sea level rise for people living in coastal environments.'** **To what extent do you agree with this view?** **AO1** – Knowledge and understanding of predicted sea level rise. Knowledge and understanding of adaption and mitigation as responses to potential sea level rise. **AO2** – Application of knowledge and understanding to assess the extent to which people living in coastal environments will be able to respond to predicted sea level rise using adaptation and mitigation strategies. <u>Notes for answers</u> **AO1** • Human intervention in coastal landscapes. Traditional approaches to coastal flood and erosion risk: hard and soft engineering. Sustainable approaches to coastal flood risk and coastal erosion management: shoreline management/integrated coastal zone management. • Recent and predicted climate change and potential impact on coasts. • Risks and opportunities for human occupation and development, and human responses of mitigation and adaptation. **AO2** • Although the question does not explicitly require reference to a named coastal environment it is reasonably likely that responses will be heavily influenced by exemplification and case study material. • Application of knowledge and understanding to assess the scale and nature of issues facing people living in coastal environments due to predicted sea level rise. These are likely to relate to increased flood and erosion risk. • Application of knowledge and understanding to assess the extent to which both adaptation and mitigation will be viable responses to the issues faced by those living in coastal environments. • Assessment should come to a view on whether adaptation or mitigation is likely to be the most important response. • Responses are required to assess the relative importance of adaption and mitigation as responses to predicted sea level rise, but is possible that other responses, such as resilience may also be assessed. Any conclusion is acceptable, though should relate to the preceding content.	**20** **AO1 = 10** **AO2 = 10**

Marking grid for Question 02.6

Level/ Mark range	Criteria/Descriptor
Level 4 (16–20 marks)	• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2). • Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2). • Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1). • Full and accurate knowledge and understanding of key concepts and processes throughout (AO1). • Detailed awareness of scale and temporal change which is well-integrated where appropriate (AO1).
Level 3 (11–15 marks)	• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2). • Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Generally clear and relevant knowledge and understanding of place(s) and environments (AO1). • Generally clear and accurate knowledge and understanding of key concepts and processes (AO1). • Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).
Level 2 (6–10 marks)	• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2). • Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1). • Some knowledge and understanding of key concepts, processes and interactions and change (AO1). • Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).
Level 1 (1–5 marks)	• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2). • Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2). • Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Very limited relevant knowledge and understanding of place(s) and environments (AO1). • Isolated knowledge and understanding of key concepts and processes (AO1). • Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies (AO1).
Level 0 (0 marks)	Nothing worthy of credit.

Qu	Part	Marking guidance	Total marks
03	1	**What is ablation?** **B** The loss of ice from a glacier as it melts and breaks up.	**1** **AO1 = 1**
03	2	**Which of the following describes a cold based-glacier?** **A** A generally large mass of ice, where the ice remains frozen throughout its profile, with an absence of meltwater at its base.	**1** **AO1 = 1**
03	3	**Outline processes leading to the occurrence of erratics.** <u>Point marked</u> Award 1 mark per valid point with extra mark(s) for developed points (d). For example: <u>Notes for answers</u> • Erratics result from glacial deposition (1). • A rock is eroded and entrained/picked up by a glacier (1). • A rock falls onto the surface of a glacier as a result of weathering or mass movement (1). • The rock is transported from its source location to its present location by the glacier (1). • Once deposited the rock's appearance may be little changed due to being transported by ice rather than liquid water (1). The notes for answers are not exhaustive. Credit any valid points.	**3** **AO1 = 3**

03	4	**Analyse the information shown in Figure 3a and Figure 3b.** **AO3** – There should be clear analysis of the area of glacier ice and amounts of average annual ice loss in different regions of the world. There should be data manipulation to support the analysis. <u>Mark scheme</u> **Level 2 (4–6 marks)** **AO3** – Clear analysis of the quantitative evidence provided, which makes appropriate use of data in support. Clear connection(s) between different aspects of the data and evidence. **Level 1 (1–3 marks)** **AO3** – Basic analysis of the quantitative evidence provided, which makes limited use of data and evidence in support. Basic connection(s) between different aspects of the data and evidence. <u>Notes for answers</u> **AO3** • There is significant variation in the area of glaciers in different regions. The area of glacier ice in the Antarctic region is over 17 times larger than in the area of ice in Iceland. • The Antarctic region dominates the area of glacier ice. Almost 46% of the total area of ice in these regions is found in the Arctic region. • After the Antarctic region, the other 5 regions account for just over 54% of the area of glacier ice between them. • The regions of the Andes and Iceland both have significantly smaller areas of glacier ice than all other regions. The glaciers of these two areas combined is less than two thirds of the area of glacier ice in the next largest region, Alaska. • There is also significant variation in the amount of ice lost from glaciers in the different regions. The range of, difference in, the amount of ice loss between the highest and lowest is 58 billion tonnes per year. • Alaska lost almost twice as much ice per year as the next highest region, Greenland. • There are some similarities between the patterns in both figures. Iceland and the Andes have both the smallest area of glaciers and lose the least amount of ice. • A significant difference between the two figures is that although the Antarctic region has the largest area of ice by far, the amount of ice lost in this region is the third smallest. Credit any other valid analysis.	**6** **AO3 = 6**

03	5	**Analyse the interaction between climate, vegetation and soil in a periglacial environment.** **AO1** – Knowledge and understanding of the climate, soils and vegetation in a periglacial environment.	**9** **AO1 = 4** **AO2 = 5**

AO2 – Application of knowledge and understanding to analyse the interaction between climate, vegetation and soils in a periglacial environment.

Level 3 (7–9 marks)
AO1 – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.
AO2 – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis is detailed and well-supported with appropriate evidence.

Level 2 (4–6 marks)
AO1 – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant, though there may be some minor inaccuracy.
AO2 – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Analysis is evident and supported with clear and appropriate evidence.

Level 1 (1–3 marks)
AO1 – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy.
AO2 – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis is basic and supported with limited appropriate evidence.

Notes for answers
AO1
- Physical characteristics of cold environments. Climate, soils and vegetation (and their interaction).
- Periglacial features and processes.
- Characteristics of periglacial landscapes.

AO2
- Although the question does not explicitly require reference to a named periglacial environment, it is likely that responses will be heavily influenced by exemplification and case study material.
- Expect analysis and assessment of the impact of significant seasonality of temperatures, with potentially extremely low temperatures in winter, on the amount and type of vegetation present.
- Analysis may assess the impact of short growing seasons, low amounts of sunlight, high winds and low temperatures on the amount and nature of vegetation. Reponses may also then analyse the extent to which vegetation has adaptations to cope with such conditions.
- Expect an analysis of the impact of low temperatures on the nature of the soil. This may include rates of soil formation, soil depth, soil structure and fertility.
- Analysis may also focus on the impact of climate on the presence of permafrost and the potential impacts this may have on vegetation.

		• Responses may come to an overall view that climate is the main driver of the interaction between soils and vegetation in a periglacial environment. Credit any other valid assessment as long as the argument is coherent and feasible.	

03	6	**'Sustainably managing human activity in fragile cold environments will become increasingly difficult in the future.'** **To what extent do you agree with this statement?** **AO1** – Knowledge and understanding of how human activity is managed in fragile cold environments. Knowledge and understanding of sustainability in cold environments. **AO2** – Application of knowledge and understanding to analyse and assess the difficulty of managing human activity in fragile cold environments in the future. <u>Notes for answers</u> **AO1** • Concept of environmental fragility. Human impacts on fragile cold environments over time and at a variety of scales. Recent and prospective impact of climate change. Management of cold environments at present and in alternative possible futures. • The physical characteristics of cold environments. Climate, soils and vegetation (and their interaction). **AO2** • It is likely that the direction taken will depend upon the cold environments chosen as exemplification, however the question does not dictate that the response refers to a case study. • Assessment of the nature and scale of issues relating to human activity in fragile cold environments. These are likely to focus on negative impacts on the physical environment and impacts on fauna and flora. • Assessment of the nature of strategies used to manage human activity in cold environments and the extent to which these are sustainable. • Responses need to have a focus on the future. - Expect assessment of the nature and scale of possible issues relating to human activity in the future. - Expect assessment of possible strategies to manage human activity sustainably in the future. • There should be clear assessment of the extent to which managing human activity sustainably in the future will become more or less difficult. Any conclusion is acceptable, as long as it is supported by the preceding content.	**20** **AO1 = 10** **AO2 = 10**

Marking grid for Question 03.6

Level/ Mark range	Criteria/Descriptor
Level 4 (16–20 marks)	• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2). • Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2). • Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1). • Full and accurate knowledge and understanding of key concepts and processes throughout (AO1). • Detailed awareness of scale and temporal change which is well-integrated where appropriate (AO1).
Level 3 (11–15 marks)	• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2). • Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Generally clear and relevant knowledge and understanding of place(s) and environments (AO1). • Generally clear and accurate knowledge and understanding of key concepts and processes (AO1). • Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).
Level 2 (6–10 marks)	• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2). • Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1). • Some knowledge and understanding of key concepts, processes and interactions and change (AO1). • Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).
Level 1 (1–5 marks)	• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2). • Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2). • Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Very limited relevant knowledge and understanding of place(s) and environments (AO1). • Isolated knowledge and understanding of key concepts and processes (AO1). • Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies (AO1).
Level 0 (0 marks)	Nothing worthy of credit.

Section B

Qu	Part	Marking guidance	Total marks
04	1	**What is risk sharing as a response to natural hazards?** **C** Where people and communities jointly invest in projects to protect against impacts and take out insurance against losses.	**1** **AO1 = 1**
04	2	**Which of the following describes tephra?** **B** Fragments of rock of any size ejected from a volcano during an eruption.	**1** **AO1 = 1**
04	3	**Outline characteristics of young fold mountains.** <u>Point marked</u> Award 1 mark per valid point with extra mark(s) for developed points (d). For example: <u>Notes for answers</u> **AO1** • Young fold mountains are found at collision/destructive plate margins (1). The distribution of the mountains is often linear following the line of the plate boundary (1d). • The layers of rock (often sedimentary) are often buckled and folded (1). The *upwards* folds are anticlines and the *downwards* folds are synclines (1d). • Young fold mountains formed relatively recently in geological terms, generally between 10–30 million years ago (1). Some, like the Himalayas, are still developing (1d). • They include the highest mountains with very steep slopes (1). The Andes has peaks over 6000m and the Himalayas has a number over 8000m (1d). • (1) mark reserved for a valid named example, if accompanied by other credit worthy content relating to valid characteristic(s) of fold mountains. (No credit for a named example on its own). The notes for answers are not exhaustive. Credit any valid points.	**3** **AO1 = 3**

04	4	**Analyse the information shown in Figure 4.** **AO3** – There should be clear analysis of the proportions of different hazards reported in each time period. Analysis should consider changes over time. There should be data manipulation to support analysis. Mark scheme **Level 2 (4–6 marks)** **AO3** – Clear analysis of the quantitative evidence provided, which makes appropriate use of data in support. Clear connection(s) between different aspects of the data and evidence. **Level 1 (1–3 marks)** **AO3** – Basic analysis of the quantitative evidence provided, which makes limited use of data and evidence in support. Basic connection(s) between different aspects of the data and evidence. Notes for answers **AO3** • The figure shows that there is very significant variation in the proportions of different types of hazards reported over the time period. • One major change is that for the first 50 years earthquakes are the most reported hazard, accounting for at least at least 40% throughout and peaking at 80% of reported hazards in the early 1920s. Between 1906 and 1935 earthquakes account for at least three fifths of all reported hazards. • From 1961 onwards earthquakes never account for more than a quarter of reported hazards, with the lowest proportion of earthquakes being recorded in 2006–2010, where they account for about a ninth of what they did in their peak in 1921–1925. • From 1950 the pattern changes and floods become the most reported hazard for the remainder of the time. In 1951–1955 floods account for 50% of reported hazards and remain above half of all reported until 2019. The peak dominance of floods is 2006–2010 when they accounted for almost four fifths of all hazards. • There is also significant variation in the smaller contributions made by the other hazards. For example, droughts range from 0% in 1911–1915 to about 30% in 1941–1945, whilst wildfires make no contribution in 4 of the time periods and account for less than 10% in all other periods except 1996–2000. Volcanoes have even greater variability, contributing 0% in 1921–1925 whilst having almost a one third of recorded hazards in 1900–1905. Credit any other valid analysis.	**6** **AO3 = 6**

04	5	**Evaluate the importance of the economic characteristics of place in influencing the level of risk people experienced from a recent volcanic event.** **AO1** – Knowledge and understanding of the risks posed by a recent volcanic event. Knowledge and understanding of the economic characteristics of place. **AO2** – Application of knowledge and understanding to analyse and assess how the economic characteristics of place affect the risk facing people from a recent volcanic event. **Level 3 (7–9 marks)** **AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout. **AO2** – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Evaluation is detailed and well-supported with appropriate evidence. **Level 2 (4–6 marks)** **AO1** – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant, though there may be some minor inaccuracy. **AO2** – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Evaluation is evident and supported with clear and appropriate evidence. **Level 1 (1–3 marks)** **AO1** – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy. **AO2** – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Evaluation is basic and supported with limited appropriate evidence. Notes for answers **AO1** • Nature, forms and potential impacts of natural hazards (geophysical, atmospheric and hydrological). Hazard perception and its economic and cultural determinants. Characteristic human responses – fatalism, prediction, adjustment/adaptation, mitigation, management, risk sharing – and their relationship to hazard incidence, intensity, magnitude, distribution and level of development. The Park model of human response to hazards. The Hazard Management Cycle. • Impacts: primary/secondary, environmental, social, economic, political. Short and long-term responses: risk management designed to reduce the impacts of the hazard through preparedness, mitigation, prevention and adaptation. • Impacts and human responses as evidenced by a recent volcanic event.	**9** **AO1 = 4** **AO2 = 5**

		• Factors contributing to the character of places: - endogenous: location, topography, physical geography, land use, built environment and infrastructure, demographic and economic characteristics. - exogenous: relationships with other places. **AO2** Responses are expected to show an understanding of the level of risk experienced by people during a recent volcanic event. There should be clear recognition of the learning from the Changing Places unit of the importance that the economic characteristics of the place played in the risks experienced. Reciting learned case study material does not constitute AO2. It is the integration of the place study ideas and concepts which allow access to AO2. • Responses will be influenced by the exemplification and chosen place. The answer depends on the nature of the economic characteristics of the place and the nature of the recent volcanic event. • Responses may assess the extent to which the endogenous economic characteristics of the place either increased or decreased the risks experienced during the volcanic event. • Responses may assess how the endogenous economic characteristics of the place helped or hindered the place's ability to manage the risks posed by the volcanic event. • Responses may assess how the presence, or lack, of economic connections with other places (exogenous characteristics), lessened or worsened the level of risk faced by the people. • Evaluation may be categorised in terms of economic, environmental or social risks, and a view given as to the extent to which the endogenous or exogenous economic characteristics of place allowed these risks to be mitigated. • In order to fully address the AO2 assessment element of the question, the response must come to a view as to how the economic characteristics of place affected the risks faced by the people in the place that experienced the volcanic event. Credit any valid assessment as long as the argument is coherent and feasible.	

04	6	**'The predictability of storm hazards allows people to prepare for them and mitigate their impacts.'** **How far do you agree with this statement?** **AO1** – Knowledge and understanding of the predictability of storm hazards. Knowledge and understanding of the factors affecting people's ability to be prepared for and mitigate the impacts of storm hazards. **AO2** – Application of knowledge and understanding to assess the extent to which storm hazards are predictable and how far this allows people to prepare for them and mitigate their impacts. <u>Notes for answers</u> **AO1** • The nature of tropical storms and their underlying causes. Forms of storm hazard: high winds, storm surges, coastal flooding, river flooding and landslides. Spatial distribution, magnitude, frequency, regularity, predictability of hazard events. • Impacts: primary/secondary, environmental, social, economic, political. Short and long-term response: risk management designed to reduce the impacts of the hazard through preparedness, mitigation, prevention and adaptation. • Impacts and human responses as evidenced by two recent tropical storms in contrasting areas. **AO2** • It is likely that the direction taken will depend upon the exemplification and evidence provided from the chosen recent tropical storms, however the question does not dictate that the response refers to a case study. • Assessment of the extent to which tropical storms are predictable. This may include assessment of the predictability of the temporal and spatial extent, and intensity of storms. • Assessment of the extent to which people are able to prepare for and mitigate the impacts of tropical storms. • The question requires that there is clear assessment of the extent to which the predictability of tropical storms affects the extent to which people are more or less able to be prepared for, and therefore mitigate their impacts. • Assessment may come to the view that there are other factors that are also important in affecting the extent to which people can be prepared for and therefore mitigate the impacts of tropical storms. This is valid. Any conclusion is acceptable, as long as it is supported by the preceding content.	**20** **AO1 = 10** **AO2 = 10**

Marking grid for Question 04.6

Level/ Mark range	Criteria/Descriptor
Level 4 (16–20 marks)	• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2). • Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2). • Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1). • Full and accurate knowledge and understanding of key concepts and processes throughout (AO1). • Detailed awareness of scale and temporal change which is well-integrated where appropriate (AO1).
Level 3 (11–15 marks)	• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2). • Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Generally clear and relevant knowledge and understanding of place(s) and environments (AO1). • Generally clear and accurate knowledge and understanding of key concepts and processes (AO1). • Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).
Level 2 (6–10 marks)	• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2). • Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1). • Some knowledge and understanding of key concepts, processes and interactions and change (AO1). • Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).
Level 1 (1–5 marks)	• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2). • Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2). • Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Very limited relevant knowledge and understanding of place(s) and environments (AO1). • Isolated knowledge and understanding of key concepts and processes (AO1). • Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies (AO1).
Level 0 (0 marks)	Nothing worthy of credit.

Qu	Part	Marking guidance	Total marks
05	1	**What is suburbanisation?** **C** The movement of people from living in central areas of a city to the outer edges.	**1** **AO1 = 1**
05	2	**Which of the following describes the ecological footprint of an urban area?** **D** The total area of productive land and water required to produce the resources required and absorb the waste produced in an urban area.	**1** **AO1 = 1**
05	3	**Outline potential impacts of urban areas on thunderstorms.** <u>Point marked</u> Award 1 mark per valid point with extra mark(s) for developed points (d). For example: <u>Notes for answers</u> **AO1** • Urban areas increase the frequency and/or intensity of thunderstorms (1). This is most likely in late afternoon or early evening in the summer (1d). • Many urban surfaces, such as concrete and tarmac, warm up faster and absorb more of the incoming solar radiation than surrounding rural areas (1). The resulting convectional uplift provides large amounts of energy for intense storms (1d). • In some urban areas the presence of tall buildings can aid/accelerate the convection updraughts of warm air (1). The notes for answers are not exhaustive. Credit any valid points.	**3** **AO1 = 3**

05	4	**Analyse the information shown in Figure 5.** **AO3** – There should be clear analysis of the proportions of different waste management strategies in the different countries. Analysis should consider differences shown in the data. There should be data manipulation to support analysis. <u>Mark scheme</u> **Level 2 (4–6 marks)** **AO3** – Clear analysis of the quantitative evidence provided, which makes appropriate use of data in support. Clear connection(s) between different aspects of the data and evidence. **Level 1 (1–3 marks)** **AO3** – Basic analysis of the quantitative evidence provided, which makes limited use of data and evidence in support. Basic connection(s) between different aspects of the data and evidence. <u>Notes for answers</u> **AO3** • The figure shows that there is very significant variation in the proportions of the different waste management strategies used in different countries. • The figure suggests that recycling and landfill are the two most popular strategies. Recycling is the dominant strategy in around one third of the countries, where it accounts for about half of the waste. In Italy and Belgium between three quarters and four fifths of waste is recycled. Landfill accounts for about half or more of the waste in just over another third of countries, accounting for over 95% in 3 countries - Romania, Serbia and Bulgaria. Generally, as the rates of recycling increase across the countries, the proportion of landfill falls. • Incineration without energy recovery is the least popular strategy, with it accounting for a negligible, or zero percentage of waste in more than three quarters of the countries, and between 1% and 4% in just one fifth of countries. • Norway and Denmark are the only countries employing a significant amount of energy recovery – incineration with energy recovery a quarter and a fifth respectively. • The use of backfilling (land reclamation) is variable. In about a fifth of countries its use is negligible or zero, whilst in about a third of the countries it accounts for between one third and two thirds of waste. In Iceland, Ireland and Malta it accounts for more than half of their waste. Credit any other valid analysis.	**6** **AO3 = 6**

05	5	**Evaluate the importance of the economic characteristics of place in determining the level of atmospheric pollution in an urban area you have studied.** **AO1** – Knowledge and understanding of shifting flows of money and investment in place. Knowledge and understanding of the level of atmospheric pollution in urban areas. **AO2** – Application of knowledge and understanding to analyse and assess how shifting flows of money and investment in place determine the level of atmospheric pollution in urban areas. **Level 3 (7–9 marks)** **AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout. **AO2** – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Assessment is detailed and well-supported with appropriate evidence. **Level 2 (4–6 marks)** **AO1** – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant, though there may be some minor inaccuracy. **AO2** – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Assessment is evident and supported with clear and appropriate evidence. **Level 1 (1–3 marks)** **AO1** – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy. **AO2** – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Assessment is basic and supported with limited appropriate evidence. Notes for answers **AO1** • Air quality: particulate and photo-chemical pollution. • Pollution reduction policies. • Environmental problems in contrasting urban areas: atmospheric pollution. • Strategies to manage these environmental problems. • How characteristics of places are shaped by shifting flows of money and investment. • Factors contributing to the character of places: - endogenous: location, topography, physical geography, land use, built environment and infrastructure, demographic and economic characteristics. - exogenous: relationships with other places.	**9** **AO1 = 4** **AO2 = 5**

		• Case study of an urban area to illustrate and analyse key themes set out above to include: - the nature and impact of physical environmental conditions with particular reference to the implications for environmental sustainability, the character of the study areas and the experience and attitudes of their populations. **AO2** Responses are expected to show an understanding of atmospheric pollution in urban areas. There should be clear recognition of the learning from the Changing Places unit of the importance that the shifting flows of money and investment in place play in affecting the level of atmospheric pollution in urban areas. Reciting learned case study material does not constitute AO2. It is the integration of the place study ideas and concepts which allow access to AO2. • Responses will be influenced by the exemplification and chosen urban area. • Responses are likely to evaluate the issues associated with atmospheric pollution in the urban area. This may include, but is not limited to, particulate and photo-chemical pollution, or air quality in general. • Responses may evaluate the factors affecting air quality in a high-income urban area. There may be evaluation of ways in which wealth has negative impacts on air quality and pollution such as transport and industry. There may also be evaluation of ways in which wealth has a positive impact, such as the ability to implement strategies to combat atmospheric pollution. • Responses may evaluate the factors affecting air quality in a low-income urban area. There may be an evaluation of ways in which poverty has negative impacts on air quality and pollution, such as a reliance on the burning of wood and other fossil fuels for heating and cooking. • Responses may evaluate the factors affecting air quality and pollution in an urban area that is experiencing rapid economic growth and urbanisation. • Expect evaluation to be illustrated and supported with examples from the chosen urban area. • In order to fully address the AO2 assessment element of the question, the response must come to a view as to the importance of the role played by economic characteristics of place on the level of atmospheric pollution in the urban area. Credit any valid assessment as long as the argument is coherent and feasible.	

05	6	**'The future development of mega cities will present increasing social and economic challenges for the people living in them.'** **To what extent do you agree with this statement?** **AO1** – Knowledge and understanding of the development of mega cities. Knowledge and understanding of the social and economic challenges facing people living in mega cities. **AO2** – Application of knowledge and understanding to assess the extent to which the future development of mega cities will have increased social and economic challenges for the people living there. <u>Notes for answers</u> **AO1** • Contemporary characteristics of mega cities. Urban characteristics in contrasting settings. Physical and human factors in urban forms. Spatial patterns of land use, economic inequality, social segregation and cultural diversity in contrasting urban areas, and the factors that influence them. • The emergence of mega cities and their role in global and regional economies. • Issues associated with economic inequality, social segregation and cultural diversity in contrasting urban areas. • Contemporary opportunities and challenges in developing more sustainable cities. • Case studies of two contrasting urban areas to illustrate and analyse key themes set out above, to include: - patterns of economic and social well-being - the nature and impact of physical environmental conditions with particular reference to the implications for environmental sustainability, the character of the study areas and the experience and attitudes of their populations. **AO2** • It is likely that the direction taken will depend upon the exemplification and evidence provided from the chosen mega cities, however the question does not dictate that the response refers to a case study. • Assessment of the scale and nature of the future development of megacities. Assessment may focus on the spatial or population growth, or economic and social development of mega cities. All approaches are valid. • Assessment of the scale and nature of possible future social and economic challenges for people living in mega cities. • The question specifies social and economic challenges, however assessment of these challenges relative to other challenges, such as environmental or political, would also be valid. • The question requires that there is clear assessment of the extent to which the future development of mega cities will become more socially and economically challenging for the people living in them. Any conclusion is acceptable, as long as it is supported by the preceding content.	**20** **AO1 = 10** **AO2 = 10**

Marking grid for Question 05.6

Level/ Mark range	Criteria/Descriptor
Level 4 (16–20 marks)	• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2). • Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2). • Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1). • Full and accurate knowledge and understanding of key concepts and processes throughout (AO1). • Detailed awareness of scale and temporal change which is well-integrated where appropriate (AO1).
Level 3 (11–15 marks)	• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2). • Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Generally clear and relevant knowledge and understanding of place(s) and environments (AO1). • Generally clear and accurate knowledge and understanding of key concepts and processes (AO1). • Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).
Level 2 (6–10 marks)	• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2). • Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1). • Some knowledge and understanding of key concepts, processes and interactions and change (AO1). • Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).
Level 1 (1–5 marks)	• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2). • Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2). • Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Very limited relevant knowledge and understanding of place(s) and environments (AO1). • Isolated knowledge and understanding of key concepts and processes (AO1). • Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies (AO1).
Level 0 (0 marks)	Nothing worthy of credit.