AQA

AS
GEOGRAPHY
7036/1

Paper 1 Physical geography and people and the environment

Mark scheme

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2 3 6 A 7 0 3 6 / 1 / M S

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.

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.

Qu	Part	Marking guidance	Total marks

Section A

01	1	**Which of the following describes the groundwater store?** **C** Water stored in the ground below the water table.	**1** **AO1 = 1**

01	2	**Which of the following are all natural drivers of change in the water cycle?** **A** Causes of precipitation, cloud formation, seasonal changes	**1** **AO1 = 1**

01	3	**Outline the distribution of major stores of water.** <u>Point marked</u> Award one mark for each valid point with additional mark(s) for developed points (d). For example: <u>Notes for answers</u> • Major stores of water include the lithosphere, hydrosphere, cryosphere and atmosphere (1) for identifying two or more of these stores. • The lithosphere store includes all liquid water in the rocks and soil as groundwater and soil moisture (1) this accounts for about a 1/3 of fresh water on earth (1d). • The hydrosphere includes all liquid water in and on the Earth's surface, including rivers, lakes, seas and oceans (1). Oceans account for almost 97% of all water on Earth (1d). • The cryosphere store includes all water stored as ice in glaciers, ice caps, ice sheets and as sea ice (1). Ice accounts for about 2/3 of all fresh water on Earth (1d). • The atmosphere store includes water stored as water vapour and as clouds (1). By volume the atmosphere is the smallest of the major stores of water (1d). • The biosphere store includes water stored in living organisms (plants and animals) (1). • If only 1 store is covered maximum of 2 marks. The notes for answers are not exhaustive. Credit any valid points.	**3** **AO1 = 3**

01	4	**Figure 1 shows information about the cumulative emissions of carbon dioxide (CO_2) produced from burning fossil fuels and manufacture of cement between 2000 and 2017 for selected countries.** **Analyse the information shown in Figure 1.** **AO3** – There should be clear analysis of the changes to the emissions of the carbon dioxide over time. There should be some analysis of differences in the data for the different countries. There should also 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** • All countries have increased the total amount of CO_2 they have emitted. Basic responses may support such a statement with evidence from the graph without engaging with the logarithmic scale. • The total increase and rate of increase in emissions is lowest in the UK then Germany. The UK's total CO_2 emissions have increased by just over 10% and Germany's by around 15%. • China and India have seen the most rapid increase in total emissions. The total amount of CO_2 emitted by India has more than doubled over the time period, adding almost 30 billion tonnes to their total. Although visually China's line has a similar steepness to India's the logarithmic scale shows that the magnitude of increase in China's emissions is significantly larger. China almost triples the amount of CO_2 it has emitted, adding almost 130 billion tonnes to its total. • China is now responsible for more CO_2 emitted into the atmosphere than India, Japan and the UK added together. • The total amount of CO_2 emitted by the USA is significantly larger than all other countries at all times shown. At the start of the period USA had emitted about 20 billion more tonnes of CO_2 than all the other countries added together. • Even though the USA had increased its total emissions by about 30% (or about a third), to almost 400 billion tonnes, China had narrowed the gap significantly. In 2000 China had emitted about a ¼ of the CO_2 of that emitted by the USA, but in just 17 years it had added around 130 billion tonnes of CO_2, meaning it had now emitted just over ½ what America had. Credit any other valid analysis.	**6** **AO3=6**

01	5	**Evaluate how future human intervention in the carbon cycle could affect the size of different major stores of carbon.** **AO1** – Knowledge and understanding of possible human intervention in the carbon cycle in the future. Knowledge and understanding of the nature of different major stores of carbon. **AO2** – Application of knowledge and understanding in evaluating how people will seek to change the size of different stores of carbon in the future. **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** • Global distribution, and size of major stores of carbon – lithosphere, hydrosphere, cryosphere biosphere, atmosphere. • 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 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 on Earth.	**9** **AO1 = 4** **AO2 = 5**

		• Human interventions in the carbon cycle designed to influence carbon transfers and mitigate the impacts of climate change. **AO2** (evaluation) • The main issue that future human intervention will be seeking to address is the human induced enhanced greenhouse effect and climate change. • Responses will be influenced by the human interventions used as exemplification. • Value judgements on how interventions will attempt to reduce the volume and rate of transfer of carbon from other stores into the atmosphere store. • Judgements on how mitigation will seek to reduce the size of the atmospheric store of carbon by increasing the size of other major stores, for example by afforestation, carbon capture and storage/sequestration. • Judgements may be made on the scale of any future interventions in terms of the amount of change required in different major stores to address the climate change issue. • Others may provide judgements on the extent to which they feel any future interventions will be successful in changing the size of major stores of carbon. • Whilst the specification asserts that human intervention in the carbon cycle relates to activities that seek to address changes in the carbon cycle to mitigate the impacts of climate change. Some candidates may give a judgement that some human interventions (or actions) may be viewed as having a positive or negative impact on the carbon cycle. This can be credit worthy as long as the response seeks evaluate the impact of this intervention (action) on stores of carbon. Credit any other valid evaluation as long as the argument is coherent and feasible.	

01	6	**'Climate change will significantly affect flooding and/or the potential for sustainable water supply.'** **With reference to a local scale river catchment you have studied, how far do you agree with this statement?** **AO1** – Future impacts of climate change on the water cycle. The potential impact of this on flooding and/or the potential for sustainable water supply in a local scale drainage basin. **AO2** – Application of knowledge and understanding to assess how much impact future climate change will have in the local scale drainage basin. 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. • Runoff variation and the flood hydrograph. • Changes in the water cycle over time to include natural variation including storm events, seasonal changes and human impact including farming practices, land use change and water abstraction. • 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 on Earth. • Human interventions in the carbon cycle designed to influence carbon transfers and mitigate the impacts of climate change. • 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. **AO2** • The direction taken will depend upon the chosen local scale river catchment. • It is likely (but not inevitable) that the chosen case study will be located within the UK and that here climate change is likely to increase rainfall and make extreme climate events, like storms, more common and more severe. For some case studies the predicted increase in sea levels and coastal storms may also be relevant. • Judgements that future climate change may lead to more intense and more regular flooding in the catchment. Further assessment may relate to the extent that current, or possible future flood management strategies, will be able to deal with the increased flood risk. These may be illustrated with information relating to the level of impact from a recent flood event in that catchment. • Some catchments may be experiencing a decrease in flood risk as increased temperatures and changing weather patterns may increase	**20** **AO1 = 10** **AO2 = 10**

		drought conditions at certain times of the year for the chosen catchment. • Some catchments may play an important role in the local water supply at present. The responses could conclude that a future increase in flooding due to climate change could disrupt such supply. Increased rainfall levels may pose a significant risk for catchments where rivers are dammed to create reservoirs as part of the water supply infrastructure. Such dams may become unsustainable should rainfall increases significantly. • Whilst the focus of the question is an assessment of the impact of climate change, some responses may come to the view that other factors are more or less significant in affecting flooding or water supply. This is acceptable, but there should be some assessment of the significance of climate change. Any conclusion is acceptable, as long as it is supported by 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. • 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 describes a process of sub-aerial weathering in coastal environments?** **A** The breakdown of rock on an exposed cliff face due to the action of repeated changes in temperature.	**1** **AO1 = 1**
02	2	**Which of the following are all landforms associated with coastal erosion?** **D** Cliffs, stacks, wave cut platforms	**1** **AO1 = 1**
02	3	**Outline the process of coastal deposition.** <u>Point marked</u> Allow 1 mark for each valid point with additional mark(s) for developed points. <u>Notes for answers</u> • Coastal deposition occurs when the water that is transporting the material loses energy (1). • Causes of this loss of energy include: o An alteration in the source of the energy (1) eg weakening current (1d) **or** drop in wind speed (1d) **or** the point at which a tide changes (1d). o If the flow of water discontinues (1) eg where opposing currents meet, like at the end of a spit (1d) causing turbulence and a slowing of the flow (1d). o An increase in friction/drag between the water and the seabed (1d) more energy is needed to overcome the friction so less material can be transported and so larger particles are deposited (1d). o A sudden increase in load (1d), for example from a river or landslide (1d), the energy of the water is not strong enough to transport the additional sediment, so material is deposited (1d). • Coastal deposition occurs when there is an increase in the size and/or quantity of load (1). • Constructive waves deposit sediment on beaches (1). This is because the swash (wave) has enough energy to carry the sediment onto the beach, but the backwash does not have enough energy to bring it back down, so the material is deposited (1d). The notes for Answers are not exhaustive. Credit any valid points.	**3** **AO1 = 3**
02	4	**Figure 2 shows information about average annual sea surface temperatures for 1980 to 2014 compared to the average global sea surface temperature between 1993 and 2012.** **Analyse the information shown in Figure 2.**	**6** **AO3 = 6**

		AO3 – There should be clear analysis of the changes in SST over time. Expect to see analysis of patterns and trends. There should be some analysis of differences in the data for the different sea areas. There should also 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** • Between 1980 and 2014 the surface temperatures of all the seas have gone from being below the global average to being above the global average. Suggesting that all these sea areas have warmed (or the global average has lowered), with some fluctuation. • Whilst all sea areas begin below the global average and all finish above it (except the North Sea that is the same temperature as the average) there is significant variation in the amount of change relative to the average for the different sea areas. • The Mediterranean Sea has the most significant temperature change relative to the global average. In 1980 the Mediterranean is almost 0.8 ^{o}C cooler than the average but is almost 0.4 ^{o}C warmer than average by 2014, with a range of about 1.2 ^{o}C around the average. • The North Atlantic shows the least variation relative to the average throughout the period. Of the 5 sea areas the North Atlantic is over 0.1 ^{o}C closer to the average, than the others in 1980, and by 2014 the North Atlantic is only about 0.05 ^{o}C warmer than the average. • The North Sea, Baltic Sea and North Atlantic all become warmer than the average during 2001–2002, whilst the Black Sea and Mediterranean Sea, that both end up between 0.3 and 0.4 C^{o} warmer than average, do not become warmer than average until 1 to 2 years later than the other sea areas. • Since 2010–2011, the three sea areas that became warmer than the average first, all became less warm relative to the mean by 2014. In 2010 all were at least 0.06 C^{o} warmer than the average but were almost exactly the same temperature as the average by 2014. Credit any other valid analysis.	

02	5	**Assess the possible impacts of sea level change on estuarine saltmarsh environments.** **AO1** – Predictions of possible future sea level rise. Estuarine saltmarsh environments. **AO2** – Application of knowledge and understanding to assess the impacts of any future sea level change on estuarine saltmarsh environments. **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** • Systems in physical geography: systems concepts and their application to the development of coastal landscapes – inputs, outputs, energy, stores/components, flows/transfers, positive/negative feedback, dynamic equilibrium. The concepts of landform and landscape and how related landforms combine to form characteristic landscapes. • Estuarine mudflat/saltmarsh environments and associated landscapes; factors and processes in their development. • Recent and predicted climatic change and potential impact on coasts. • Geomorphological processes: weathering, mass movement, erosion, transportation and deposition. • The relationship between process, time, landforms and landscapes in coastal settings.	**9** **AO1 = 4** **AO2 = 5**

		AO2 (Assessment): • Estuarine saltmarshes defined or outline of their features to establish an understanding of the focus of the question. • Judgements on the possible extent of future sea level change. It is commonly stated that global sea levels have risen by about 15 cm in the 20th Century and could rise between 30 to 110 cm by 2100 depending on greenhouse gas emissions. Sources suggest that a 200 cm rise is not impossible. • Value judgements on the likely impact of the possible sea level rise. • Judgement that as sea level rises the intertidal zone, where the saltmarshes are currently found, will move further landward, and that at least initially, the extent of existing saltmarsh may shrink. • Judgement that many current saltmarshes could become permanently submerged and so cease to exist. • Another view is that as sea levels rise the tidal extent of the river may retreat further inland, and so the zone where the fresh river water and salty sea water interact also moves further inland than at present and new salt marshes may begin to form in this area. • Some may judge that the processes of deposition will move further inland and that currents and tides may transport sediment from the newly submerged saltmarshes to be deposited further landward than their current position. Credit any other valid assessment as long as the argument is coherent and feasible.	

02	6	**'Sustainable approaches to coastal flood and erosion risk are the only way forward in managing coasts.'** **With reference to a local scale coastal environment you have studied, how far do you agree with this statement?** **AO1** –Sustainable and traditional approaches to managing coastal flood and erosion risk. A local scale coastal environment. **AO2** – Application of knowledge and understanding to assess the extent to which there are different viable approaches to managing future coastal flood and erosion risk in the named local environment. **Notes for answers** **AO1** • Recent and predicted climatic change and potential impact on coasts. • 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. • Case study(ies) of coastal environment(s) at a local scale to illustrate and analyse fundamental coastal processes, their landscape outcomes as set out above and engage with field data and challenges represented in their sustainable management.	**20** **AO1 = 10** **AO2 = 10**

		AO2 • The direction taken will depend upon the chosen local scale coastal environment. • Application of knowledge and understanding of sustainable approaches to coastal flood and erosion risk. The specification states that these include integrated shoreline management plans (ISMP) and shoreline management. However, in respect to the chosen case study it may be that the management approaches are more traditional and coverage of this is valid as long as the AO2 content of the answer focuses on the extent to which these will be sustainable into the future. • Response may attempt to define what is meant by sustainable in the context of coastal management. • The question invites candidates to engage in a debate and suggests that the case for sustainable approaches is not an open and closed case. An exploration of situations where the statement may not be true is valid. • Exploration of any aspect of sustainability as long as it is relevant in the context of the case study is valid. A case may be given for the economic, environmental or social sustainability of approaches to future coastal management. • Depending upon the chosen coast, future management strategies will include an assessment of approaches that either: hold the line; advance the line; managed retreat; or do nothing. • Responses may conclude that following cost benefit analysis, coastal managers may decide that some stretches of coastline are so important that traditional hard engineering strategies will still need to be deployed, and although socially and economically sustainable it may not be environmentally sustainable. Any conclusion is acceptable, as long as it is supported by the preceding content.	

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. • Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies (AO1).
Level 0	Nothing worthy of credit.

(0 marks)	

Qu	Part	Marking guidance	Total marks
03	1	**Which of the following describes a process of weathering in cold environments?** **A** The breakdown of rock in a hollow under a snow patch as a result of frost action.	**1** **AO1=1**
03	2	**Which of the following are all periglacial landforms?** **A** Blockfields, patterned ground, terracettes	**1** **AO1 = 1**
03	3	**Outline characteristics of warm based glaciers.** Point marked Allow 1 mark for each valid point with additional mark(s) for developed points. Notes for answers • Warm based glaciers tend to be found in temperate maritime environments, and/or at lower latitudes (1). • Warm based glaciers are often valley glaciers (1). • Warm based glaciers tend to be hundreds of metres to a few kilometres wide and hundreds of metres to tens of kilometres long (1). • Warm based glaciers are found in locations with considerable accumulations of snow in the winter, but warm enough temperatures for melting in springtime (1). • Warm based glaciers have relatively fast rates of glacial movement (1) and therefore are more likely to erode, transport and deposit material (1d). • Basal sliding is a dominant feature of ice movement in warm based glaciers (1). This occurs due to the presence of meltwater at the base of warm based glaciers (1d). • With depth the temperature of ice generally increases towards the base of a warm based glacier (1) with the ice at the base of the glacier being at or near the pressure melting point (1d). Any valid characteristic of warm based glaciers accepted. The notes for answers are not exhaustive. Credit any valid points.	**3** **AO1 = 3**
03	4	**Figure 3 shows information about the cumulative change in glacial mass of six European glaciers compared to 1945 levels.** **The change in ice mass is measured in cubic metres (m^3) of water equivalent.** **On the y-axis '0' represents glacial mass in 1945.** **Analyse the information shown in Figure 3.**	**6** **AO3 = 6**

		AO3 – There should be clear analysis of the changes in the mass of the glaciers over time. Expect to see analysis of patterns and trends. There should be some analysis of differences in the data for the different glaciers. There should also 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 no single clear pattern or trend in the data. Three of the glaciers have lost a significant volume of ice, whilst the others have gained ice following some fluctuation. • The Sarennes Glacier had already lost the most ice by 1980 and had lost over 15,000 m^3 of ice more than the Gries Glacier. No other glacier loses more ice than the Sarennes glacier at any point during the time period. By 2014 the Arennes Glacier has lost 4 times more ice than in 1980. • Even though they have lost less ice than the Sarennes Glacier, the extent of change in the mass of the Gries and Vernagtferner Glaciers is more marked. By 2014 the Gries has lost 25 times more ice than in 1980, and the Vernagtferner has lost 10 times more ice in 2014 than it had gained in 1980. • None of the three glaciers that see an increase in their mass see rates of increase in ice accumulation that compare to the rate at which the three losing glaciers have seen an increase in their ice loss. In 2014 the Nigardsbreen Glacier has gained just over 3.5 times the amount it gained by 1980, whilst the Alfotbreen and Engabreen glaciers both gain between 2 and 3 times what they gained by 1980 by 2014. Credit any other valid analysis.	

03	5	**Assess the importance of processes of erosion in the formation of one or more landforms found in a glaciated landscape.** **AO1** – Processes of erosion and deposition in cold environments. Landforms found in glaciated landscape. **AO2** – Application of knowledge and understanding to assess which processes were responsible for the formation of landforms found in a glaciated landscape. **Level 3 (7–9 marks)**	**9** **AO1 = 4** **AO2 = 5**

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
- The concepts of landform and landscape and how related landforms combine to form characteristic landscapes.
- Geomorphological processes – weathering: frost action, nivation; ice movement: internal deformation, rotational, compressional, extensional and basal sliding; erosion: plucking, abrasion; transportation and deposition.
- Origin and development of glaciated landscapes.
- Erosional and depositional landforms: corries, arêtes, glacial troughs, hanging valleys, truncated spurs roches moutonnées. Characteristic glaciated landscapes.
- Origin and development of landforms and landscapes of glacial deposition: drumlins, erratics, moraines, till plains. Characteristic glaciated landscapes.
- The relationship between process, time, landforms and landscapes in glaciated settings: characteristic glaciated and periglacial landscapes.
- Case study(ies) of glaciated environment(s) at a local scale to illustrate and analyse fundamental glacial processes, their landscape outcomes as set out above and engage with field data.

AO2 (Assessment):
- Responses will be influenced by the exemplification and landform/s chosen.
- Judgement that some landforms are mainly the result of processes of erosion, illustrated with reference to roche moutonnée, for example,

		with different erosion processes shaping different elements of the feature. • Others will judge that there are landforms where processes of erosion play little role in their formation, illustrated with reference to landforms like drumlins, for example, where the material forming the landform results from deposition which is then shaped as the glacier continues to move over it. • Others will judge that some landforms in a glaciated landscape were not influenced at all by processes of erosion, illustrated with reference to features such as scree slopes, for example, resulting from weathering and processes of mass movement. • Some may judge that processes of erosion were partly responsible for the formation of some landforms alongside other processes. For example, features such as eskers could not be formed without processes of erosion providing the material that was transported in the sub-glacial streams and then subsequently deposited. Credit any valid assessment as long as the argument is coherent and feasible.	

03	6	**'Climate change will present greater opportunities than challenges for human occupation and development.'** **With reference to a cold environment that you have studied, how far do you agree with this statement?** **AO1** – Potential opportunities and challenges for people of predicted climate change. Case study(ies) of glaciated environment(s). Case study of glaciated landscape beyond the UK. **AO2** – Application of knowledge and understanding to assess the extent to which the case study area will experience more opportunities than challenges from future climate change. <u>Notes for answers</u> **AO1** • The named cold environment could be a glacial/glaciated, periglacial or fluvioglacial environment. • The relationship between process, time, landforms and landscapes in glaciated settings: characteristic glaciated and periglacial landscapes. • 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. • Case study(ies) of glaciated environment(s) at a local scale to illustrate and analyse fundamental glacial processes, their landscape outcomes. • Case study of a contrasting glaciated landscape from beyond the UK to illustrate and analyse how it presents challenges and opportunities for human occupation and development and evaluate human responses of resilience, mitigation and adaptation.	**20** **AO1 = 10** **AO2 = 10**

		AO2 • The direction taken will depend upon the chosen cold environment. • There should be knowledge and understanding of the concept of opportunities and challenges for people, in the context of the chosen cold environment. • There should also be knowledge and understanding of the nature of predicted climate change. This is likely to suggest that global temperatures are likely to continue to increase over the coming century. It is believed that the extent of this warming is likely to be higher in polar latitudes so the impacts of predicted climate change could be quite considerable. • Assessment should focus on the impacts of predicted climate change on people and the human environment. There will be reference to impacts on nature and the physical environment, but the response should seek to assess how these will impact on the future for people. • Assessment of the view that climate change is likely to create more challenges than opportunities for human occupation and development. • Some may come to the view that there may be more opportunities than challenges created by predicted climate change for human occupation and development. Any conclusion is acceptable, as long as it is supported by the preceding content.	

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. • Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies (AO1).
Level 0	Nothing worthy of credit.

(0 marks)	

Qu	Part	Marking guidance	Total marks

Section B

04	1	**Which of the following are all forms of volcanic hazards?** **D** Nuées ardentes, pyroclastic fallout, acid rain	**1** **AO1 = 1**

04	2	**Which of the following describes magma plumes?** **B** Areas within the mantle where hotter, less-dense magma rises towards the surface.	**1** **AO1 = 1**

04	3	**Summarise the main features of the Hazard Management Cycle.** <u>Point marked</u> Allow 1 mark for each valid point with additional mark(s) for developed points. <u>Notes for answers</u> • The hazard management cycle is a cycle/model/process that shows the attempts to minimise/mitigate the losses from a hazard (1). • The cycle illustrates that the management of the hazard is continuous (1) and includes a number of phases in the management of the hazard: response, recovery, mitigation and preparation (1d). • The cycle indicates that the response phase to a hazard event is improved upon from the previous event (1), as lessons learnt from the response to the previous event are applied in the preparation phase in readiness for the next event (1d). • The cycle is applicable to any hazard as it does not prescribe any timescale for any phase (1). Allow any valid feature of the hazard management cycle. The notes for answers are not exhaustive. Credit any valid points.	**3** **AO1 = 3**

04	4	**Figure 4 and Figure 5 show information about deaths from natural disasters as a share of total deaths in each country in 1990 and 2017.** **Analyse the information shown in Figure 4 and Figure 5.** **AO3** – Responses should use the resource effectively and appropriately showing understanding of the maps. There should be an understanding of any changes shown and analysis of patterns and identification of potential anomalies. There should be use/manipulation of data in support. <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** • It is clear that in both years that natural disasters account for a very small proportion of deaths globally. In both 1990 and 2017 only one country has more than 1% of deaths attributed to natural hazards, Iran in 1990 and Puerto Rico in 2017. • In both years the majority of countries in both Africa and South America have no deaths due to natural hazards, with only four countries having any deaths from natural hazards in both continents in 1990, this reduces to three countries in South America in 2017, but the number triples in Africa. • In many countries in southeast Asia and Australasia the proportion of deaths due to natural hazards was 10 times smaller in 2017 than in 1990. • In 2017 many countries with deaths relating to natural hazards are found on or between the tropics. This is especially true in Africa, The Americas and Asia. This pattern is less evident in 1990. • A minority of countries had over 0.01% of deaths due to natural hazards in both years. Mostly these occurred in small clusters of countries, for example in Central America and north-western South America, south Asia (Bangladesh, India and Nepal) and Thailand and Vietnam. • The maps suggest that as a cause of death the significance of natural hazards was significantly lower globally in 2017 than in 1990. Credit any other valid analysis.	**6** **AO3 = 6**

04	5	**Evaluate the relative importance of endogenous factors in how people experienced a recent seismic event that you have studied.** **AO1** – Impacts and human responses as evidenced by a recent seismic event. The different factors that contribute to the hazard experienced in the place. **AO2** – Application of knowledge and understanding to evaluate the factors responsible for the nature and impacts of the seismic event in the case study environment, especially the endogenous factors. **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** • The nature of seismicity and its relation to plate tectonics: forms of seismic hazard: earthquakes, shockwaves, tsunamis, liquefaction, landslides. • Impacts and human responses as evidenced by a recent seismic event. • Factors contributing to the character of places: o Endogenous: location, topography, physical geography, land use, built environment and infrastructure demographic and economic characteristics. o Exogenous: relationships with other places.	**9** **AO1 = 4** **AO2 = 5**

		AO2 Responses are expected to show an understanding of the nature of the seismic hazard experienced in the case study location and the factors contributing to this hazard. There should be clear recognition of the learning from the Changing Places unit in evaluating the relative importance of endogenous factors. 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 case study chosen. The answer depends on the nature of the seismic hazard experienced, and factors affecting the characteristics of the chosen place. • Responses may seek to explicitly give a judgement solely on the importance of the contribution of endogenous factors to the seismic hazard experienced. The AO2 evaluative content would come from judging the relative importance of endogenous factors (listed in AO1) against each other. - A candidate may judge that their place experiences earthquake hazards primarily due to its *location* close to/on a destructive plate margin, however other factors such as poorly built buildings, lack of land-use planning and poverty exacerbate the hazards the population experience. Concluding that one endogenous factor is more important than the others. • Others may seek to address the AO2 evaluative element of the question by evaluating the importance of endogenous factors against other factors such as exogenous factors. - Although endogenous factors are important, for example the geographical location, somehow exogenous factors may actually improve or worsen the nature of the hazard experienced. Concluding that although obviously important, endogenous factors are just one factor in contributing to the hazard experienced. Credit any valid evaluation as long as the argument is coherent and feasible and that both the Hazards and Changing Places elements have been addressed to meet the AO2 requirements.	

04	6	**'The Park model shows that the human response to a hazard always leads to an improvement in quality of life from that before the event.'** **With reference to a recent wildfire event you have studied, how far do you agree with this statement?** **AO1** – The Park model of human response to hazards. Response to a recent wildfire event. **AO2** – Application of knowledge and understanding to assess the extent to which the Park model illustrates how the response to a wildfire event leads to an improvement in quality of life for the people affected.	**20** **AO1 = 10** **AO2 = 10**

Notes for answers

AO1

- 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.
- Fires in nature – Short and long-term responses; risk management designed to reduce the impacts of the hazard through preparedness, mitigation, prevention and adaptation.
- Impact and human responses as evidenced by a recent wildfire event.

AO2

- The direction taken will depend upon the chosen recent wildfire event.
- Illustration of how the model outlines how wildfires will have different impacts over time, and that it outlines a number of stages in the response:
  - A period prior to the wildfire event where the quality of life is *normal* for the chosen location. With assessment of the extent to which there was any preparation, planning or prevention able to take place before the wildfire.
  - A period immediately following the wildfire, with assessment of the extent to which the quality of life rapidly falls in the immediate aftermath, the extent to which efforts were made to preserve life and the built environment in this stage.
  - A phase referred to as the relief phase. With assessment of the extent to which search and rescue efforts and medical services were provided to help limit further loss of quality of life. The Park model would suggest that quality of life should begin to improve from this point, responses may assess the extent to which it did for their wildfire.
  - In the rehabilitation phase Park's model implies that as the recovery process continues quality of life begins to return to *normal*. With assessment of the extent to which this was true for their wildfire.
  - Park's reconstruction phase suggests that the rebuilding of infrastructure and property and the revival of agriculture will then see life return to a *normal* quality of life and lessons will be learnt for responding to future events. With assessment of the extent to which this is true for their wildfire.
- Variations on the Park model allow for situations where the response to the event leads to different outcomes, including worse quality of life than before, the same quality of life as before, or even an improved quality of life to before the event. With assessment of the extent to which any of these outcomes are true for their wildfire.
- Responses will assess the extent to which the response to the chosen wildfire event – before, during and after it – led to outcomes suggested by the Park model.
- Credit any valid assessment as long as the argument is coherent and feasible and that both the Park model and case study elements have been addressed to meet the AO2 requirements.

Any conclusion is acceptable, as long as it is supported by the preceding content.

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. • 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	**Which of the following describes river restoration?** **B** Managing a river to reinstate natural processes, improve biodiversity and create a better environment for people and wildlife.	**1** **AO1 = 1**
05	2	**Which of the following are all characteristics of urban climate compared to the surrounding rural area?** **A** Higher temperatures, higher amounts of precipitation and lower average wind speeds.	**1** **AO1 = 1**
05	3	**Outline characteristics of cultural and heritage quarters in urban areas.** <u>Point marked</u> Award one mark for each relevant point with extra mark(s) for developed points (d). For example: <u>Notes for answers</u> • In recent decades some cities have established cultural and heritage quarters to attempt to stimulate growth and revitalise the economy (1), in the arts and creative industries (1d). • Some cultural and heritage quarters focus on promoting tourism and the consumption of art, culture or heritage-based activities (1), with appropriate example (1d). • Some cultural and heritage quarters have developed more recently where the focus is to stimulate the production of culture (1), often by creating business space for creative industries (1d), with appropriate example (1d). Allow any valid feature of cultural and heritage quarters. The notes for answers are not exhaustive. Credit any valid points.	**3** **AO1 = 3**

05	4	**Figure 6 and Figure 7 show information about levels of urbanisation in 1950 and 2016.** **Analyse the information shown in Figure 6 and Figure 7.** **AO3** – Responses should use the resource effectively and appropriately showing understanding of the maps. There should be an understanding of any changes shown and analysis of patterns and identification of potential anomalies. There should be use/manipulation of data in support. <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 maps show that globally the level of urbanisation has increased significantly between 1950 and 2016. • In 1950 Belgium is the only country with over 80% of its population living in urban areas. By 2016 most of northern Europe, large areas of both North and South America, much of Arabia, Japan and South Korea in east Asia and Australia and New Zealand are all now at least 80% urban. • In 1950 considerable areas of Africa and south, east and southeast Asia have less than 1/5 of their population living in urban areas. By 2016 the number of countries with such low levels of urbanisation has decreased significantly, with about 6 countries in Africa, including Niger and South Sudan, Sri Lanka and Nepal in south Asia and Papua New Guinea in southeast Asia. • The rate of change in levels of urbanisation has been quite considerable in a number of countries. Levels have more than doubled from between 20–40% to over 80% in many countries, including Brazil and Colombia in South America and Saudi Arabia. Western Sahara has seen its rate of urbanisation more than double, whilst Gabon has seen the rate of urbanisation quadruple. • Analysis incorporating map skills like referring to differences in levels of urbanisation in different latitudes is of course acceptable. Credit any other valid analysis.	**6** **AO3 = 6**

05	5	**Assess the extent to which past and present processes of development may have affected levels of atmospheric pollution in an urban area that you have studied.** **AO1** – Atmospheric pollution in urban areas. Past and present processes of development in urban areas. **AO2** – Application of knowledge and understanding to assess the extent to which past and present processes of development may have affected levels of atmospheric pollution in an urban area. **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, water pollution and dereliction. • Strategies to manage these environmental problems. • Concept of liveability. • The concept of place and the importance of place in human life and experience. • Past and present processes of development • Case studies of two contrasting urban areas to illustrate and analyse key themes set out above, to include: o patterns of economic and social well-being o the nature and impact of physical environmental conditions	**9** **AO1 = 4** **AO2 = 5**

		with particular reference to the implications for environmental sustainability, the character of the study areas and the experience and attitudes of their populations. **AO2** There should be clear recognition of the learning from the Changing Places unit in assessing the effect of past and present processes of development on levels of atmospheric pollution in the chosen urban area. 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. Assessment will depend on the place named in the response. • Responses may come to the view that atmospheric pollution may have significantly increased as the urban area initially developed. For example, as factories and homes used increasing amounts of fossil fuels. Features of the specific aspects of development and air pollution relating to the named urban area may be used in support. • Responses may assess the impact of different stages/periods of development on atmospheric pollution in the named urban area – for example periods of deindustrialisation; suburbanisation; urban sprawl; development of transport networks, etc. • Responses may assess periods of development in the named urban area when efforts were made to reduce atmospheric pollution – support should relate to the specific urban area, but may include: introduction of smokeless zones; land use planning; traffic management; changes to public transport, etc. • Some may assess the impacts in terms of spatial or temporal extent of the impacts of past and present processes of development. Credit any valid assessment as long as the argument is coherent and feasible and that both the Urban Environments and Changing Places elements have been addressed to meet the AO2 requirements. Whatever place is chosen assessment should show understanding of effect of past and present processes on atmospheric pollution in that place.	

05	6	**'It is clear that the ecological footprint of major urban areas will only increase in the future.'** **With reference to an urban area you have studied, how far do you agree with this statement?** **AO1** –The ecological footprint of major urban areas. Sustainable urban development. **AO2** – Application of knowledge and understanding to assess whether a worsening of the ecological footprint of major urban areas is inevitable. <u>Notes for answers</u> **AO1** • Impact of urban areas on local and global environments. Ecological footprint of major urban areas. Dimensions of sustainability: natural, physical, social and economic. Nature and features of sustainable cities. Concept of liveability. • Contemporary opportunities and challenges in developing more sustainable cities. • **Case study** of an urban area to illustrate and analyse key themes set out above, to include: o Patterns of economic and social well-being o The nature and impact of physical environmental conditions with particular reference to the implications for environmental sustainability, the character of the study area and the experience and attitudes of their population. **AO2** • The direction taken will depend upon the chosen urban area. • There should be knowledge and understanding of the concept of ecological footprint in the context of urban areas. Without this, responses will struggle to access the highest levels of the mark scheme. It relates to the impact humans have on the Earth's natural ecosystems, in terms of the total area of land and water required to produce the resources the population requires and to absorb the waste produced by them. • It is accepted that levels of urbanisation will continue to increase into the future. If this is the case for the chosen urban area, then it may conclude by agreeing with the statement. As the number of people living in the urban area increases it may be inevitable that they will require more resources and produce more waste. Expect illustration with supportive details from the case study. • Some may debate the statement. It may be that despite increased numbers of people living in the urban area there might be the prospect of strategies being developed to help the urban area become more sustainable and attempt to decrease its ecological footprint. Expect support from reference to strategies that would seek to reduce the impact of transport. Others could suggest that the urban area may be seeking to improve the sustainability of its energy supply. • Assessment could explore issues relating to managing waste in urban areas with the aim of reducing the ecological footprint.	**20** **AO1 = 10** **AO2 = 10**

		Credit any valid assessment as long as the argument is coherent and feasible and that both ecological footprint and case study content elements have been addressed to meet the AO2 requirements. Any conclusion is acceptable, as long as it is supported by the preceding content.	

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. • 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.