



AS

Geography

7036/1 Physical Geography and People and the Environment

Mark scheme

7036

June 2018

Version/Stage: 1.0 Final

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 Assessment Writer.

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

Description of Annotations

?	?
[	[
]	]
^	Omission
H Line	Underline incorrect
Highlight	Highlight examples
L1	Level 1
L2	Level 2
L3	Level 3
L4	Level 4
NAQ	Not answering question
Not Relevant	Not relevant
Off Page Comment	Off Page Comment
On Page Comment	On Page Comment
SEEN	Seen – every page must be annotated
Tick	Correct point
AO1	Assessment Objective 1
AO2	Assessment Objective 2
JUST	Just – partial
LF	Lift
NC	Not clear

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 average 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.

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, i.e. 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	Assessment Objectives (AOs)	Total marks
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Section A

01	1	Which of the following are all stores of water in a drainage basin? C	AO1	1
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01	2	Which one of the following could be a natural cause of variation in the water cycle? D	AO1	1
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01	3	Outline an example of positive feedback in the water cycle. Point marked Allow 1 mark for each valid point with additional marks for developed points. Notes for answers - Higher temperatures increase the melting of snow and ice (1) leading to a reduction of surface albedo (1) so more sunlight absorbed by land and sea (d). Temperatures increase further, which leads to further melting (d). - A response that outlines one example of positive feedback can achieve full marks. - Allow max (1) (d) for support with data regarding positive ice albedo effect. - Makes clear the nature of positive feedback, for example, a system where the effects of an action are increased or amplified by its subsequent knock-on effects (1) - accept any valid definition. Allow any valid example of positive feedback in the water cycle. Others may outline the feedback of warming, leading to evaporation, leading to enhanced warming due to water vapour as a greenhouse gas. For full marks response must show understanding of positive feedback, then have a sequence clearly showing how one action leads to a further action that increases/amplifies the initial action.	AO1 = 3	3
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01	4	Analyse the data shown in Figures 1 and 2. AO3 - Analysis makes clear links between carbon dioxide emissions and evidence provided in Figure 1 and Figure 2. Use and understanding of the map evidence are clear and accurate. Level 2 (4–6 marks) AO3 - Clear interpretation and 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 interpretation and evaluation of a geographical issue or question. Basic interpretation and assessment of the quantitative evidence provided, which makes limited use of the data in support. Basic connection(s) between different aspects of the data and evidence. Notes for answers. AO3 • By 2016 the map evidence suggests that globally there has been a significant increase in emissions over time. • By 2016 the map evidence suggests that globally there has been a significant change in the distribution of emissions. • Use of the key allows responses to quantify the extent of change and support points with evidence. • Responses should note the spatial differences in emissions illustrated in the maps. Points could include, but not exclusively: • In 1960 the USA is the only country with over 5,000 MtCO₂, by 2016 a number of countries have emissions over 2,000 MtCO₂, China, USA, India, Russia and Japan for example. • Use of the key suggests that in 1960 the USA has emissions around 3 times higher than the next highest emitting countries including Russia, Germany and China. • Use of the key suggests that by 2016, China is the only country with emissions over 10,000 MtCO₂, and its emissions are twice as large as India for example. • In 1960 the USA, western, central and eastern Europe, Russia and China account for a significant proportion of emissions. • Areas with the highest emissions in 1960 continue to have high emissions and still account for significant amounts of emissions. • Particularly significant rates of increase seem to be in South America, southern Europe, North Africa, the Middle East, and especially south, east and southeast Asia. (Some responses will support with evidence at country level, for example India's emissions increasing from more 100 MtCO₂ to several thousand MtCO₂). • Some responses may identify significant areas of the world with no significant/negligible emissions in 1960 (i.e. no dot or	AO3 = 6	6
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		have a tiny dot/proportional circle indicating significantly less than 100 MtCO₂) especially in Africa, the Middle East, Central America and much of southeast Asia, and how despite some of these countries still not showing any significant emissions, parts of South East Asia and the Middle East now show significant emissions. Some may illustrate with named countries as support. • Map evidence also shows that some European countries have seen significant growth e.g. Spain and Italy, and that lowest levels are still in Africa, and that there has been significant growth in Australia. • Some candidates may identify countries that have seen a reduction in their emissions, e.g. the UK. • Although the figures allow for simple visual interpretation and spatial and temporal comparison, some may use the scales in the key as evidence of amounts and rates of change, as examples above show. • All valid analytical points will be credited.		
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01	5	Assess the impact of natural changes to the carbon cycle upon life on Earth. AO1 – Knowledge and understanding of a range of natural changes to the carbon cycle. Knowledge and understanding of factors impacting life on Earth over time. AO2 – Application of knowledge and understanding to assess how natural changes to the carbon cycle affect life on Earth 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	AO1 = 4 AO2 = 5	9
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		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 • Systems concepts and their application to the carbon cycle: inputs – outputs, energy, stores/components, flows/transfers, positive/negative feedback and dynamic equilibrium. • 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 wild fires, volcanic activity) and their impact upon life on Earth. • The carbon budget and the impact of the carbon cycle upon land, ocean and atmosphere and thus life on Earth. • The key role of the carbon cycle in supporting life on Earth with particular reference to climate. The relationship between the carbon cycle and the atmosphere. The role of feedbacks within the cycle and their link to climate change and implications for life of Earth. AO2 Assessment: • The carbon cycle is a natural cycle of carbon between land, ice, oceans and the atmosphere. • Carbon is essential for all known life on Earth. Any natural variation in the cycle can have significant effects of life on Earth. • The carbon cycle is affected by natural events such as volcanic eruptions and wild fires leading to transfers of carbon to the atmosphere. • The carbon cycle is affected by long term cycles of natural warming and cooling of climate causing cycles of glacials and interglacials altering the various stores and transfers of carbon, and thus affecting climate and life on Earth. • Atmospheric concentrations of carbon (as carbon dioxide and methane) are significant factors in controlling the natural greenhouse effect. Natural changes to the concentrations of either/both natural greenhouse gases will affect both climate and life on Earth. • Natural variations to climate could affect vegetation cover and the scale of the biosphere carbon store. Natural sequestration stores carbon in trees. Natural factors can disrupt the role of		
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		vegetation in cycling and storing carbon, which in turn will affect the amount of atmospheric carbon and thus global climate, thus affecting both climate and life on Earth. • Expect some responses to assess how natural changes will disrupt various natural systems within the carbon cycle causing feedback. Responses then may assess the impact of both negative and positive feedback on the climate and life on Earth. • Responses could address a broad range of natural changes to the carbon cycle, this is valid, and responses could assess a broad range of effects. All valid changes and effects will be credited. Overall assessment may come to a view as to which factors may be more or less important in affecting life in Earth.		
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01	6	‘The size of major stores of water change over time more because of human activity than natural variation.’ To what extent do you agree with this statement? AO1 – Knowledge and understanding of the global distribution and size of major stores of water. Knowledge and understanding of the human and natural factors controlling the size of major stores of water. AO2 – Application of knowledge and understanding to analyse and evaluate the role of human activity and natural variation on the size of major stores of water and that human activity is the more important factor. Should come to a view on ‘extent’. Notes for answers AO1 • Systems in physical geography: systems concepts and their application to the water cycle; inputs, outputs, energy, stores/components, flows/transfers, positive/negative feedback, dynamic equilibrium. • Global distribution and size of major stores of water – lithosphere, hydrosphere, cryosphere and atmosphere. • Processes driving change in the magnitude of major stores of water over time and space, including flows and transfers: evaporation, condensation, cloud formation, causes of precipitation and cryospheric processes, at global scales with reference to varying timescales involved. • Human activities are likely to include farming practices, land use change and water abstraction. • 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. AO2 • Evaluation – The human activity and natural variation is not the focus of the question. It is the impact each set of factors has	AO1 = 10 AO2 = 10	20
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		on major stores of water and the extent to which human activity is more important. • Evaluation of the impact of human activities on major stores may address different temporal scales, from short term and temporary to longer term and permanent. Some will also assess the impact of human activities contributing to the enhanced greenhouse effect and climate change and global warming and its impact on stores of water – at present and in the future. • Evaluation of impacts of natural variation operating at different temporal scales, including evaporation, condensation, cloud formation, causes of precipitation and cryospheric processes. • Evaluation – The importance of different impacts may address different stores over a range of time scales. For example, over geological time scales natural factors controlling cycles of glacials and interglacials during the Pleistocene were the main factor in controlling the size of global stores of water. i.e. at the most simple level during glacials the cryospheric store increased at the expense of the ocean store. More sophisticated responses may elaborate on how other stores such as soil and atmospheric stores also change during these cycles. • Evaluation – Assessment may conclude that natural variation has been the main driver of change in major stores of water over past geological time scales, but that impacts associated with human activity have gained in importance over recent decades and may dominate in the future. Responses may give the view that in future human timescales, human activity may be the most important as it not only directly impacts the size of stores, but creates, possibly permanent, changes to processes of natural variation. • Evaluation – Responses must make a judgement on which factors are more important. Either view is valid as long as the response assesses the relative importance of the different factors and there is clear rationale based upon preceding content.		
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Marking grid for Question 1.6

Level/ Mark range	Criteria/Destructor
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.

02	1	Which of the following are all processes of coastal transportation? D	AO1 = 1	1
02	2	Which of the following describes a Dalmatian Coast? D	AO1 = 1	1
02	3	Outline the concept of eustatic sea level change. Point marked Allow 1 mark for each valid point with additional marks for developed points. Notes for answers • Eustatic sea level change is a global change in sea level due to an actual fall or rise in the level of the sea (1) – mark for any clear definition. • When global temperatures fall, during a glacial period, more precipitation falls as snow and is stored on land as ice and snow (1). Water cycled from the sea to the land (via evaporation, condensation and precipitation) does not immediately return to the sea so global sea levels fall (1) (d). • Or the opposite. As global temperatures rise, during an interglacial or due to enhanced global warming, more precipitation falls as rain, and snow and ice melt. (1). Less water is stored on land and returns to the sea, so global sea levels rise. (1)(d) • Some responses may refer to global sea levels rising due to the thermal expansion of sea water due to global temperatures rise due to the enhanced greenhouse effect (1). • Some responses may refer to changing global sea levels due to the changing geometry of ocean basins over geological timescales (1). • Allow max (1) (d) for support with data about levels/rates of sea level change over a given time.	AO1 = 3	3

02	4	Analyse the data shown in Figures 3 and 4. AO3 – Clear use of both Figure 3 and Figure 4 in analysing the changing nature of the coastal landforms and evidence provided. For full marks there must be use of both Figure 3 and 4. Level 2 (4–6 marks) Clear interpretation and 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) Basic interpretation and evaluation of a geographical issue or question. Basic interpretation and assessment of the quantitative evidence provided, which makes limited use of the data in support. Basic connection(s) between different aspects of the data and evidence. Notes for answers • The evidence suggests there have been significant changes to the coastal landforms. • Analysis of the data in the figures may include the following, but not exclusively: • The length and width of beach is different in all images. In 2005 there is only an approximately 2.5km stretch of beach along the northwest coast, by 2009 beach extends along the entire coast north of the river, with a 3.5km long beach that narrows as it extends south down the west coast, by 2013 a narrow beach extends along almost the entirety of the coast. Only a small stretch of the coast just south of the river mouth is without beach. • Figure 4 shows that there is about a 6 fold increase in the area of beach between 2005 and 2013. Figure 3 shows that there is an approximately 5 fold increase in the length of beach. • Figure 3 and Figure 4 show that there is no mud or tidal flat in 2005, but between 2009 and 2013 the area of mud flat increases 2.5 times and the area of tidal flat almost doubles. Therefore, the area of mud flat increases more than tidal flat, but the area of beach increases the most compared to both tidal and mud flats. • Responses could note significant changes evident between 2009 and 2013, a spit and associated mud and tidal flats, to the west of the river mouth, appear in 2009, but there is no evidence of these features in 2005. By 2013 the spit has completely disappeared, whilst the mud and tidal flats remain and have grown. Figure 4 shows that in 2009 the spit covers the largest area, being almost twice as extensive as the area of beach. • Data may be used from Figure 3 and Figure 4 to support points made with regard to evidence given from the map as shown above in relation to the changing extent of the beach.	AO3 = 6	6
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		Some may explore the extent of changes illustrated by manipulation of the evidence provided.		
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02	5	Assess the role of weathering in the development of coastal landforms. AO1 – Demonstrates knowledge and understanding of geomorphological processes of weathering. Knowledge and understanding of the development of coastal landforms. AO2 – Application of knowledge and understanding to analyse how different processes of weathering operating over different timescales have direct impacts on the development of distinctive coastal landforms. 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.	AO1 = 4 AO2 = 5	9
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		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 • Geomorphological processes of weathering. The specification does not specify named processes, but expect reference to processes of biological, chemical and physical/mechanical weathering. • 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. • Distinctively coastal processes: Sub-aerial weathering. The specification does not specify named processes, but expect reference to processes of biological, chemical and physical/mechanical weathering. • Origin and development of landforms of coastal erosion: cliffs and wave cut platforms, cliff profile features including caves, arches and stacks; factors and processes in their development. • Origin and development of landforms of coastal deposition. Beaches, simple and compound spits, tombolos, offshore bars, barrier beaches and islands and sand dunes; factors and processes in their development. • The relationship between process, time, landforms and landscapes in coastal settings. AO2 • Assessment – Responses may follow a sequence to illustrate how coastal processes create coastal landforms. • Assessment – Responses will refer to processes of weathering in the context of the coastal setting, with evaluation of the role of processes involved. Some may seek to highlight how weathering differs to other coastal processes such as erosion, transportation, deposition and mass-movement. • Assessment – Responses may assess how processes of weathering can be responsible for creating coastal landforms themselves, which contribute to distinctive coastal landscapes. • Assessment – Responses may consider the role of processes of weathering such as; mechanical or physical weathering, biological weathering, and various forms of chemical weathering. Assessment of the above will seek to show the extent to which they break down <i>in situ</i> the underlying rocks of the coastline, and the contribution this makes to the sequence of landform development. • Assessment – The processes of weathering identified thus change the shape and character of characteristic coastal landforms. Responses may suggest that coastal cliffs might		
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		be most obviously affected by such processes. • Assessment – Some responses will assess the role weathering plays in contributing to the development of coastal landforms alongside other coastal processes. Including how weathering can weaken coastal landforms such as cliffs making them more susceptible to processes of coastal erosion. Weathering also adds sediment to the shoreline which can then be used by other coastal processes: material can be picked up by waves and the wind and be used as agents of erosion, other material can be picked up by both waves and wind and via processes of coastal transportation moved and deposited elsewhere. • Assessment – some responses will also assess the role weathering plays in the formation of landforms of coastal erosion and deposition. • The key is that there is clear assessment of the link between the processes of weathering and the formation of coastal landforms.		
02	6	‘Sustainable approaches to coastal management will become more important than traditional approaches in dealing with the impacts of climate change.’ To what extent do you agree with this view? AO1 – Knowledge and understanding of sustainable and traditional approaches to coastal management. Knowledge and understanding of the impacts of climate change on coasts. AO2 – Application of knowledge and understanding to come to an evaluative conclusion as to whether sustainable approaches or traditional approaches will be more important in dealing with impacts of climate change. Analysis and evaluation of approaches to coastal management in dealing with impacts of climate change. Assessment of the view that sustainable approaches will be more important than traditional approaches. Should come to a view on ‘extent’. Notes for answers 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. • Eustatic, isostatic and tectonic sea level change: major changes in sea level in the last 10,000 years. Changes in sea level relative to the land should be considered in the context of the question. Whilst isostatic and tectonic will have little relevance, eustatic should feature in the context of possible	AO1 = 10 AO2 = 10	20

		impacts of climate change. • The relationship between process, time, landforms and landscapes in coastal settings. This should focus upon the link between processes such as sea level change, its negative impacts upon coastal landscapes and the different approaches used to deal with these impacts. Erosion and flooding may also be considered in this context. • Case study(ies) of coastal environment(s) at a local scale to illustrate and analyse fundamental coastal processes, their landscape outcomes in the context of the question and the challenge represented in their sustainable development. • Case study of a coastal landscape to illustrate and analyse how it presents risks and opportunities for human occupation and development and evaluate human responses of resilience, mitigation and adaptation. AO2 • Evaluation – Some will take the approach of evaluating the role and effectiveness of different approaches to coastal flood risk and erosion management. This may involve ideas such as cost benefit analysis of different approaches in different settings supported by illustrative examples. • Evaluation – Responses should provide an evaluation of what the impacts of climate change will be. The question does not set any spatial or temporal parameters on this, so responses may focus on local or global perspectives, but the specification does refer to recent and predicted climate change, so expect reference to the mid-20th to late 21st centuries. This may include impacts such as rising sea levels, increased frequency and magnitude of storm events and increased rates of coastal erosion. As long as evaluation is supported with appropriate evidence either approach is valid. • Evaluation – Responses should consider the role of coastal management as mitigating the negative impact of erosion and managing flooding. For traditional approaches expect reference to hard and soft engineering. Hard engineering is likely to consider the effectiveness/importance of groynes, revetments, sea walls and rip rap. Soft engineering is likely to consider beach nourishment, dune regeneration, planting vegetation or managed retreat. In the context of the question the effectiveness/importance of both hard and soft approaches together should be assessed. Sustainable approaches are likely to consider shoreline management and integrated coastal zone management. • Evaluation – In the context of the question it is the effectiveness or validity of the different approaches to coastal management that should be assessed, in relation to specific threats from climate change. • Evaluation – expect responses to illustrate their evaluation of the issues raised by the question with reference to both/either local or global scale case studies. Overall assessment – Expect responses to come to the view that sustainable approaches will become more important, however,		
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		some will argue that different locations will require a combination of different approaches depending upon the specific nature of the impacts of climate change in that location and the nature of the coastline being managed and protected. Either view is valid as long as the response assesses the relative importance of the different approaches and there is clear rationale based upon preceding content.		
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Marking grid for Question 2.6

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.

03	1	What is the geomorphological process of plucking? C	AO1	1
03	2	Which of the following describes a till plain? D	AO1	1
03	3	Outline the concept of the glacial budget. Point marked Allow 1 mark for each valid point with additional marks for developed points. Notes for answers • In a glacial system this refers to the balance between glacial inputs (accumulation) and glacial outputs (ablation) (1). • Allow one mark for examples of glacial inputs and outputs, for example – snow fall, avalanches, rock fall from valley sides, ice melt, evaporation, calving of icebergs, etc. (1) • When there is a balance between the inputs and outputs then a glacial system is said to be in a state of dynamic equilibrium. If one of the elements of the system changes then adjustments are made to other elements to maintain equilibrium (1). • If there is a balance between these inputs and outputs the glacier would be in equilibrium and the snout would remain in the same position (1). The point on a glacier where inputs and outputs cancel each other out is known as the equilibrium line (1) (d). As the balance between accumulation and ablation shifts so will the equilibrium line. (1)(d) • If inputs exceed outputs then the mass of the glacier will increase (1) and the glacier may advance (1). OR If outputs exceed inputs then the mass of the glacier will decrease (1) and the glacier may retreat (1) • The balance between inputs and outputs can vary seasonally (1).	AO1 = 3	3
03	4	Analyse the data shown in Figures 5 and 6. AO3 – Clear use of both Figure 5 and Figure 6 in analysing the changing nature of the amount of ice in Antarctica and Greenland. Use and understanding of the map evidence is clear. Level 2 (4–6 marks) 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) Basic analysis of the quantitative evidence provided, which	AO3 = 6	6

		makes limited use of the data in support. Basic connection(s) between different aspects of the data and evidence. Notes for answers • Responses should seek to analyse the variation in changes to ice shown in the evidence provided. • Responses should refer to the map evidence and suggest there was significant change to ice height in both Antarctica and Greenland. • Analysis in responses may note that spatially there has been ice loss across almost the whole of Greenland. Evidence from the map and key may be given in support. • Responses will probably note that there is much more spatial variation in Antarctica, with the majority of the island gaining ice. One area to the <i>left hand side</i> of the landmass had significant ice loss. Evidence from the map and key may be given in support. • Some responses may refer to both figures to analyse the contrast in spatial variations of changes in ice, for example, Figure 5 suggests that the majority of the area of Antarctica has gained ice, yet Figure 6 suggests that nowhere in Greenland is has gained ice. • Some may suggest that considering the significant size difference between both locations, that Greenland is losing a significantly larger proportion of its ice than Antarctica. • Analysis may include manipulation and use of data from Figure 5 and Figure 6 to support points. • Responses that only refer to 1 location will remain in Level 1.		
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03	5	Assess the extent to which erosion has been the dominant process in a local scale glaciated environment that you have studied. AO1 – Knowledge and understanding of the glacial processes, environments and landforms of a local scale glaciated environment. AO2 – Application of knowledge and understanding that assesses the importance of glacial erosion over time to produce glacial landforms in a local scale glaciated 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. Analysis and 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. Analysis and 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. Analysis and evaluation is basic and supported with limited appropriate evidence. Notes for answers AO1 • Origin and development of glaciated landscapes. • Erosional and depositional landforms: corries, arêtes, glacial troughs, hanging valleys, truncated spurs, roches moutonnées. Characteristic glaciated landscapes. • The relationship between process, time, landforms and landscapes in glaciated settings: characteristic glaciated landscapes. • Fluvio-glacial processes: meltwater erosion, transportation and	AO1 = 4 AO2 = 5	9
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		deposition. • Periglacial features and processes: permafrost, active layer and mass movement. • Geomorphological processes – weathering: frost action, nivation; ice movement: internal deformation, rotational, compressional, extensional and basal sliding; erosion: plucking, abrasion; transportation and deposition. • Systems in physical geography: systems concepts and their application to the development of glaciated 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. • A local scale glaciated landscape is a dynamic environment which continues to develop through contemporary but mainly reflect former climatic conditions of associated with the Pleistocene era. • Knowledge and understanding of a glaciated environment at a local scale to illustrate and analyse fundamental glacial processes and their landscape outcomes. AO2 • Assessment – Responses should follow a sequence to illustrate how glacial processes create glacial landforms, that over time create the chosen local scale glaciated landscape. • Assessment – Responses may highlight how it is a combination of a range of different geomorphological processes operating at different rates over different timescales, alongside glacial erosion processes, that produce the chosen local scale glaciated landscape. • Assessment – Glaciated landscapes result from the combination of a range of processes of weathering (frost action and nivation), glacial erosion (plucking and abrasion), transportation, deposition and fluvioglacial and periglacial processes. Responses should come to a view on the importance of erosion in respect to the other processes. • Assessment – Expect responses to show that the contemporary landscape was shaped by glacial processes, including erosion, during cycles of colder periods during the Pleistocene but, since the last glacial retreat, it has been shaped by other processes other than erosion which may include periglacial and fluvioglacial processes, alongside weathering and mass-movement. • Assessment – there should be clear assessment of the role of processes of erosion alongside other processes in the development of the chosen local scale glaciated environment. • Assessment – Responses are likely to explore the characteristics of a range of landscape features and landforms included in AO1 above, but aspects such as the scale, orientation and combination of landforms should be recognisable for the named local scale environment. • Assessment – responses will need to clearly identify the specific landforms and features that combine to form the		
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		named local scale glaciated landscape. The key is that there is a clear assessment of the importance of erosion and of the link between the glacial processes, time and the subsequent local scale glaciated environment. To access and move through Level 2, the response must actively seek to analyse the importance of the role of erosion at work in one specific named local scale location. Generic reference to larger scale environments such as “alpine”, the Alps, the Himalayas is not “local scale”, and so responses should remain in Level 1.		
03	6	Assess the potential impact of climate change on periglacial landscapes. AO1 – Knowledge and understanding of the features of periglacial landscapes. Knowledge and understanding the possible impacts of climate change on periglacial landscapes. AO2 – Application of knowledge and understanding to analyse and evaluate how climate change will impact upon the characteristics of periglacial landscapes. Response should have clear assessment of the impacts of climate change. Notes for answers AO1 - Physical characteristics of cold environments. Climate, soils and vegetation (and their interaction). - The global distribution of cold environments. Some may take the approach that climate change may cause changes to the distribution and geographical extent of periglacial landscapes. - Periglacial features and processes – permafrost, active layer, mass movement. Responses may take the view that climate change may affect the rates at which periglacial processes operate and thus affect the nature of periglacial features. - Periglacial landforms: patterned ground, ice wedges, pingos, blockfields, solifluction lobes, terracettes, thermokarst. Characteristic periglacial landscapes. - The relationship between process, time, landforms and landscapes in periglacial landscapes. - Concepts of environmental fragility. Human impacts on fragile cold environments over time. Recent and prospective impact of climate change. Management of cold environments at present and in alternative possible futures. - Landscapes from beyond the UK. Illustrative examples of named periglacial landscapes. - The concept of landform and landscape and how related landforms combine to form characteristic landscapes. - Systems in physical geography. In addressing the extent to which change is irreversible responses may consider ideas of positive/negative feedback and dynamic equilibrium. AO2	AO1 = 10 AO2 = 10	20

		• Assessment – Expect responses to address the nature of climate change and highlight the impacts of this on the climate conditions in periglacial landscapes. The focus of the question is not the nature of the climate change <i>per se</i>, but the impact this change brings to periglacial landscapes. • Assessment – it is expected that responses will focus on current and future impacts of climate change on periglacial landscapes, however the question does not prevent candidates from including reference to past climate change and associated impacts. • Assessment – There should be assessment of the connection between climate and periglacial processes. Expect responses to suggest that future climate change will lead to current periglacial environments becoming warmer, and therefore lead to changes to cycles of freezing and thawing, extended summers/warm seasons, shorter winters/cold seasons and possibly increased levels of precipitation as rain rather than snow. Expect illustrative evidence in support. • Assessment – Responses should provide assessment of how changes to periglacial processes caused by future climate change will then affect the nature of periglacial features and thus the nature of characteristic periglacial landscapes overall. Features affected may include the depth and extent of (different categories of) permafrost, depth of active layer, alongside changes to the characteristics and distribution of patterned ground, ice wedges, pingos, blockfields, solifluction lobes, terracettes and thermokarst. This may be presented in relation to specific named periglacial landscapes and be supported with appropriate illustrative evidence. • Assessment – responses may assess the extent to which any changes are likely to become permanent/irreversible due to future climate change. • Assessment – In the context of alternate possible futures some responses may seek to assess impacts on the human population of periglacial environments. The focus of the question is the periglacial landscape itself; however some may illustrate the extent and nature of impacts of climate change through illustration of how changes to the landscape may impact on life in such environments. • Assessment – some may seek to assess the extent to which changes to periglacial landscapes become irreversible with an analysis of the concept of feedback. For example, as climate warms, permafrost melts releasing more greenhouse gases into the atmosphere which may accelerate warming further thus leading to more melting, and so this positive feedback inevitably leads to irreversible change. Overall assessment – Expect responses to come to the view that future climate change may cause irreversible impacts, however, some will argue that the extent to which this is true will depend on the nature of the impacts in different periglacial settings, which is valid as long as relevant illustrative evidence is given in support. The response should provide assessment that comes to a view on the nature and or extent of the impacts resulting from climate		
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		change. Any views are legitimate as long as there is clear rationale based upon preceding content.		
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Marking grid for Question 3.6

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.

Section B

Qu	Part	Marking guidance	Assessment Objectives (AOs)	Total marks
04	1	Which of the following best describes an island arc? A	AO1 = 1	1
04	2	Which of the following are all hazards resulting from seismic events? B	AO1 = 1	1
04	3	Outline the process of slab pull in relation to plate movement. Point marked Allow 1 mark for each valid point with additional marks for developed points. Notes for answers - Slab pull is associated with destructive plate margins (1) OR where one plate is being subducted under another (1). - The subducting plate is generally more dense and less buoyant than the opposing plate so is forced to sink (1). Gravity acts on the leading edge of the subducting plate (1) this action then helps to 'pull' the rest of the plate with it (1)(d). - Allow max (1)(d) for support with data regarding rates of plate movement associated with slab pull. E.g. 2 to 8 cm per year.	AO1 = 3	3
04	4	Analyse the data shown in Figures 7 and 8. AO3 – Clear use of evidence provided in Figures 7 and 8 which through analysis identifies variation in the frequency of the tropical storm hazard in different parts of the world. Use and understanding of the map and data is clear. Level 2 (4–6 marks) 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 = 6	6

		Basic analysis of the quantitative evidence provided, which makes limited use of the data in support. Basic connection(s) between different aspects of the data and evidence. Notes for answers • Responses should seek to analyse the variation in the frequency of the tropical storm hazard shown in the evidence provided. • Responses should refer to the map evidence and suggest that tropical storm frequency is not distributed even across the tropical storm basins. • Analysis in some responses may highlight that there are more storm basins in the northern hemisphere than the south, and similarly there are more than double the number of storm basins in the eastern hemisphere than the western hemisphere. • Analysis in some responses may highlight that there are more storm basins found to the western side of oceans than the east. • Expect responses to give map evidence to support points such as those above. • The Pacific Ocean experiences the highest number of storms. Expect evidence in support. • The Atlantic Ocean, having only 1 basin has the lowest number of storms compared to other oceans with basins. • The Northwest Pacific basin has the highest number of storms, around 5 times more than the North Indian basin, the basin with the lowest number. • Responses can draw out variation in frequency in many ways including the use and manipulation of data/evidence from the figures in support. Use of both resources in supporting the assessment is required for full marks.		
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04	5	Assess the impacts of a recent wildfire event upon people's lived experience of the place. AO1 – Knowledge and understanding of the impacts of a recent wildfire event. Knowledge and understanding of people's lived experience of the place. Knowledge and understanding of the effects of the impacts of a recent wildfire event on people lived experience of the place. AO2 – Application of knowledge and understanding to evaluate the impacts of a recent wildfire event and the effect of these on the lived experience of the people in the place under investigation. Level 3 (7–9 marks) AO1 – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin	AO1 = 4 AO2 = 5	9
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	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 and 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. Analysis and 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. Analysis and evaluation is basic and supported with limited appropriate evidence. Notes for answers AO1 • Nature of wildfires. Impacts: primary/secondary, environmental, social, economic, political. • Impacts as evidenced by a recent wildfire event. • The ways in which students' own lives and those of others are affected by continuity and change in the nature of place. • People's lived experience of the place where they live in the past and the present. AO2 Responses are expected to show an understanding of the impact of a recent wildfire event. There should be a clear recognition of the learning from the Changing Places unit in assessing the impact of events such as wildfires and how they affect the peoples' lived experience of the place. 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 recent wildfire event named in the response. • Assessment – For example, wild fires such as that in Fort McMurray, Alberta, Canada in May-June 2016, may feature in responses. There should be clear application of knowledge which shows how the impacts left their mark on the people and		
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		place. Although no deaths or serious injuries were linked directly to the fire, other economic, environmental and social impacts were considerable. This caused significant distress and emotional damage to people. Whole communities were forced to evacuate along roads clogged with traffic surrounded by fires on either side. Over 80,000 people were forced to leave. Many have still to return. The physical destruction and absence of people has transformed the character of the place. With the almost complete destruction of some communities and their own personal experiences of the wildfire the peoples' sense of that place will have been greatly affected. • Assessment – Some neighbourhoods escaped almost unscathed, whilst in others all buildings were completely destroyed. Even following reconstruction this will significantly alter the character, and therefore sense of place. • Assessment – Many sources also reflect on the considerable mental health impacts for both victims and relief workers, with many suggesting this needs to be considered as part of the response to future possible events. • Assessment – some responses may consider the perception of Fort McMurray and how this was represented in the media. • Overall Assessment will reflect on the degree to which different aspects of peoples' lived experience of place was affected by the wildfire. It is the level and clarity of assessment in the response that will allow it to through Level 2.		
04	6	The severity of the impacts of the volcanic hazards experienced in a place is affected more by the nature of plate boundaries than the level of development of the place.' To what extent do you agree with this view? AO1 – Knowledge and understanding of the nature of volcanic hazards. Knowledge and understanding of the effects of the nature of plate boundaries and levels of development on the impacts of volcanic hazards. AO2 – Application of knowledge and understanding to assess how the nature of plate boundaries and levels of development affect the severity of the impacts of volcanic hazards. Judgements should be made about the importance of the nature of plate boundaries compared to the level of development in determining the severity of the impacts of volcanic hazards experienced. Notes for answers AO1 • Nature, forms and potential impacts of natural hazards (geophysical). • Hazard perception and its economic and cultural determinants. • Characteristic human responses – fatalism, prediction, adjustment/adaptation, mitigation, management, risk sharing –	AO1 = 10 AO2 = 10	20

		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. • Earth structure and internal energy sources. Plate tectonic theory of crustal evolution: tectonic plates; plate movement; gravitational sliding; ridge push, slab pull; convection currents and sea floor spreading. • Destructive, constructive and conservative plate margins. Characteristic volcanic processes. Associated landforms – volcanoes. • Magma plumes and their relationship to plate movement. • The nature of vulcanicity and its relation to plate tectonics: forms of volcanic hazard: nuées ardentes, lava flows, mudflows, pyroclastic and ash fallout, gasses/acid rain, tephra. Spatial distribution, randomness, magnitude, frequency, regularity and predictability of hazard events. • Impacts: primary/secondary, environmental, social, economic, political. Short and long-term responses: risk management designed to reduce the impacts of the hazards through preparedness, mitigation, prevention and adaptation. • Impacts and human responses as evidenced by a recent volcanic event. AO2 • Analysis – Responses are expected to give an assessment of the nature and severity of volcanic hazards associated with different plate margins. • Analysis - Some responses may suggest that plate boundaries have little impact on some volcanic hazards as they are associated with magma plumes and hot spots, and occur at some distance from plate boundaries. • Analysis – Responses are expected to include a discussion of the extent to which the level of development affects the nature and severity of volcanic hazards experienced. Expect discussion of the role of development in affecting characteristic human responses to volcanic hazards. • Analysis – The specific nature of the content of the response may depend on the illustrative examples used in support. In some instances the nature of the plate boundary is clearly significant as it either leads to very severe volcanic hazards on one the hand, or hazards that are perceived to be much less severe on the other, and responses may compare hazards at destructive versus constructive plate margin settings. • Analysis – Responses may address the effect that the level of development has on the impacts of volcanic hazards via a comparison of the severity of the impacts experienced in places considered to be at different levels of development. • Analysis – Some responses may suggest that places considered to be at higher levels of development may experience more severe impacts due to the extent of potential costs to the economy, infrastructure and possessions, whilst the impacts in places at lower levels of development may		
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		experience less severe impacts in this regard. • Expect responses to use illustrative examples to support points made, and reference to any place experiencing volcanic hazards is valid, and this approach may enhance the quality of the response. • Analysis – Expect responses to include a discussion of level of economic development and its impact on the ability to cope with the hazard risk. However, equal weighting could be given to other factors such as cultural and social factors that may have just as great an impact, or greater, on hazard perception and therefore the ability to cope with the risk, and so affect the severity of the impacts. • Overall the response must make clear links between how the nature of plate boundaries and level of development affect the severity of the impacts of volcanic hazards. • Any overall conclusion is legitimate as long as there is clear rationale based upon preceding content.		
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Marking grid for Question 4.6

Level/ Mark range	Criteria/Destructor
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.

05	1	Which of the following best describes a world city? B	AO1	1
05	2	Which of the following is a form of air pollution where exhaust fumes interact with sunlight to produce low-level ozone? C	AO1	1
05	3	Outline the process of suburbanisation. Point marked Allow 1 mark for each valid point with additional marks for developed points. Notes for answers - The process by which people, services and employment move outwards towards the edges of an urban area (1). This may involve the ‘infilling’ and building on vacant land between more central areas and the edge of the urban area (1) (d). The urban area may grow into the surrounding rural area or engulf neighbouring villages (1) (d). (Not just simply stating the idea of ‘urban sprawl’ without elaboration as above). - Suburbanisation is linked to urban growth and is generally associated with continued economic development as cities develop economically and the population increases (1). It is facilitated by the development of transport networks (roads and railways) and an increase in private car ownership (1). - In some urban areas suburbanisation results from wealthier more aspirational residents seeking a perceived better quality of life away from the central urban area (1) (+1 for exemplification). - Allow (1) (d) for support with evidence from a named urban area.	AO1 = 3	3
05	4	Analyse the data shown in Figures 9 and 10. AO3 – Clear use of evidence provided in Figure 9 and Figure 10 which through analysis identifies spatial variation in these characteristics of the population in Preston. Use and understanding of the map evidence is clear Level 2 (4–6 marks) Clear analysis of the quantitative evidence provided which makes appropriate use of data in support. Clear connections between different aspects of the data and evidence. Level 1 (1–3 marks) Basic analysis of the quantitative evidence provided, which makes limited use of the data in support. Basic connection(s)	AO3 = 6	6

		between different aspects of the data and evidence. Notes for answers • Evidence suggests that there is considerable spatial variation in levels of deprivation in Preston, with large areas in both the least and most deprived categories in the country. Initially map evidence may also suggest there is significant variation in the distribution of those who cannot speak English also. • Expect responses to note the main concentration of the highest levels of deprivation in a continuous area stretching west to east, from Adelphi, through the city centre, Avenham, Deepdale and Fishwick to Ribbleson and Grange to the east. There are two more isolated areas of high levels of deprivation to the west in Ashton-on-Ribble and, Tanterton and Ingol. • There is a general improvement in levels of deprivation with distance from the city centre (other than the area to the east identified above). Significant areas of Penwortham, Fulwood and Fulwood Row are in the least deprived in the country. • Expect responses to note some similarities between the two maps. As the percentage of non-English speakers is highest in some of the most economically deprived areas of the city, especially those closest to the city centre, including Avenham, Deepdale and Fishwick. • Some will note that the key and scale used on Figure 10 indicates that although there is a significant spatial variation in non-English speakers, the actual numbers concerned are very low. • Responses should fully engage with, manipulate and analyse the evidence provided to support points made about the spatial variation in both figures.		
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05	5	Assess the impact on the character of a place of a river restoration and conservation project in a damaged urban catchment. AO1 – Knowledge and understanding of a river restoration and conservation project in a damaged urban catchment. Knowledge and understanding of the principals associated with understanding factors affecting the character of place. AO2 – Application of knowledge and understanding to assess the impact of a river restoration and conservation project in a damaged urban catchment on the character of that place. 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 and	AO1 = 4 AO2 = 5	9
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	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. Analysis and 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. Analysis and evaluation is basic and supported with limited appropriate evidence. Notes for answers AO1 • River restoration and conservation in damaged urban catchments with reference to a specific project. Reasons for and aims of the project; attitudes and contributions of parties involved; project activities and evaluation of project outcome. • Issues associated with catchment management in urban areas. • Urban characteristics. Physical and human factors in urban forms. • How places are known and experienced, how their character is appreciated, the factors and processes which impact upon places and how they change and develop over time. • Factors contributing to the character of places: Endogenous: location, topography, physical geography, land use, built environment and infrastructure, demographic and economic characteristics. • The ways in which students' own lives and those of others are affected by continuity and change in the nature of places and our understanding of place. AO2 Responses are expected to show an understanding of a river restoration and conservation project in a damaged urban catchment on the character of that place. There should be a clear recognition of the learning from the Changing Places unit in assessing the impact of such schemes and how they affect aspects of the character of the place. Reciting learned case study material does not constitute AO2. It is the integration of the		
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		place study ideas and concepts which allow access to AO2. • Assessment – Expect reference to a specific named river restoration project. There is no specification about the location of this project, but it must be in a named urban area. • Assessment – responses should show understanding and give assessment of the reasons for the named project. • Assessment – expect responses to give details of and assess activities involved in the project. • Assessment – expect responses to show understanding and give assessment of the project outcomes. • Assessment – to move through the upper levels the response must evaluate how the activities of the project and their outcomes specifically affected the character of the place where the project was implemented. There could be assessment of how the project affected different aspects of the character of the place, that could include: location, topography, physical geography, land use, built environment and infrastructure, demographic and economic characteristics. • Assessment – may seek to assess different categories of impacts of the project on the character of the place, including: positive and negative impacts; economic impacts; social impacts; environmental impacts; Impacts on the built environment. • Assessment – some may assess how different parties involved in the project may interpret the impacts on the character of the place differently. Overall Assessment – There must be clear linkage between the impact of a river restoration and conservation project in a damaged urban catchment and the character of that place.		
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05	6	‘Environmental issues in urban areas will always emerge despite attempts to be more sustainable.’ With reference to two contrasting urban areas that you have studied, to what extent do you agree with this statement? AO1 – Knowledge and understanding of the nature of a range of impacts urban areas have on both local and global environments. Knowledge and understanding of case studies of two contrasting urban areas. AO2 – Application of knowledge and understanding to assess the negative extent of environmental impacts of urban areas in two contrasting urban areas. Assessment should come to a view about the extent to which the environmental impacts of urban areas are negative. Notes for answers AO1 • Environmental impact of urban areas in two contrasting urban areas. Ecological footprint of urban areas. Dimensions of sustainability: natural, physical, social and economic. Nature	AO1 = 10 AO2 = 10	20
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		and features of sustainable cities. Concept of liveability. • Environmental problems in contrasting urban areas: atmospheric pollution, water pollution and dereliction. • Case studies of contrasting urban areas to illustrate and analyse the nature and impact of physical environmental conditions. With particular reference to the implications for environmental sustainability, the character of the urban areas and the experience and attitudes of their populations. • The impact of urban forms and processes on local climate and weather. • Urban temperatures: the urban heat island effect. Precipitation: frequency and intensity. Fogs and thunderstorms in urban environments. Wind: the effects of urban structures and layout on wind speed, direction and frequency. Air quality: particulate and photo-chemical pollution. • Urban precipitation, surfaces and catchment characteristics; impacts on drainage basin storage areas; urban water cycle: water movement through urban catchments. • The environmental impacts of alternative approaches to waste disposal: unregulated, recycling, recovery, incineration, burial, submergence and trade. AO2 • Assessment – Expect to see a wide range of approaches to this question however as the focus of the question originates from the ‘sustainable urban development’ element of the specification, responses will probably assess sustainability in the contrasting urban areas as the focus of their assessment. • Assessment – Responses should seek to address the extent to which the contrasting urban areas have negative environmental impacts. Impacts may originate from factors such as: transport, energy production/consumption, construction, waste management, urban form, water management, food production/consumption. • Assessment – Responses should seek to address the nature of the environmental impacts. Impacts are likely to focus on air, water and land, which are all valid. • Assessment – Responses should seek to address how environmental impacts differ between the urban areas. • Assessment – Expect clear case study detail in support. The level of detail and assessment of extent to which environmental impacts are negative in the contrasting urban areas will be important in differentiating candidates. • Assessment – there should be some explicit element which considers the question. For example, some may conclude that the environmental impacts of both urban areas are negative and the areas are not sustainable as urban living automatically has some negative environmental impacts. However, the question seeks to elicit assessment of which urban area has the most negative environmental impacts. Some may argue that the larger and most rapidly urbanising of the two areas		
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		has the greatest negative environmental impacts Any overall conclusion is legitimate as long as there is clear rationale based upon preceding content.		
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Marking grid for Question 5.6

Level/ Mark range	Criteria/Destructor
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.