GCE AS MARKING SCHEME

SUMMER 2019

AS (NEW)
GEOGRAPHY - UNIT 1
2110U10-1

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INTRODUCTION

This marking scheme was used by WJEC for the 2019 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

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

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

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GCE GEOGRAPHY

SUMMER 2019 MARK SCHEME

UNIT 1: CHANGING LANDSCAPES

Guidance for Examiners

Positive marking

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

The mark scheme for this unit includes both point-based mark schemes and banded mark schemes.

Point-based mark schemes

For questions that are objective or points-based the mark scheme should be applied precisely. Marks should be awarded as indicated and no further subdivision should be made. Each creditworthy response should be ticked in red ink. Do not use crosses to indicate answers that are incorrect. The targeted assessment objective (AO) is also indicated.

Banded mark schemes

For questions with mark bands the mark scheme is in two parts.

The first part is advice on the indicative content that suggests the range of concepts, processes, scales and environments that may be included in the learner's answers. These can be used to assess the quality of the learner's response.

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

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Assessment Objective	Strands	Elements
AO1 Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change, at a variety of scales.	N/A	This AO is a single element.
AO2 Apply knowledge and understanding in different contexts to interpret, analyse and evaluate geographical information and issues.	N/A	1a - Apply knowledge and understanding in different contexts to analyse geographical information and issues.
		1b - Apply knowledge and understanding in different contexts to interpret geographical information and issues.
		1c - Apply knowledge and understanding in different contexts to evaluate geographical information and issues
AO3 Use a variety of relevant quantitative, qualitative and fieldwork skills to: • investigate geographical questions and issues • interpret, analyse and evaluate data and evidence • construct arguments and draw conclusions.	1 - investigate geographical questions and issues	N/A
	2 - interpret, analyse and evaluate data and evidence	
	3 - construct arguments and draw conclusions	

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

Banded mark schemes Stage 1 – Deciding on the band

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

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

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

Banded mark schemes Stage 2 – Deciding on the mark

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

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

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

The specialised concepts from the specification that apply in the indicative content are underlined.

The mark scheme reflects the layout of the examination paper. Mark questions 1 and 2 or questions 3 and 4 in Section A, all questions in Section B. If the candidate has responded to all questions in Section A, mark all these responses. Award the higher marks attained; further possible rubric infringements will be discussed at the marking conference.

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

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Section A: Changing Landscapes

Either: Coastal Landscapes

1. (a) (i) Use **Figure 1** to compare the shoreline changes shown at Location 1 and 2. Skills: 3.6	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
Award 1 mark for any of the following up to a maximum of 5 marks					5		**5**

Indicative content

- both decrease/show erosion
- Location 1 has most decrease/erosion and greatest range
- Location 1 is the only one to show increase/advancement of shoreline beyond original position
- Both show periods of increase/advancement
- Location 1 1960 – Location 2 1969 advancement
- Location 1 have steeper decline/rate of erosion
- Location 2 shows less fluctuation in rates of erosion
- Credit one mark for use of data to back up/illustrate each comparison, up to max. 2.

Marking guidance

Do not credit description of both locations in isolation, a comparison is required. Credit other valid points.

(ii) Suggest how wave type could explain the overall change from 1945-2014. Content: 1.1.4	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
			3				**3**

Indicative content

Award 1 mark for any of the following with 2 marks for development related to overall change from 1945-2014.

- (Increase in incidence of) destructive waves [1], increases energy/power [1] leads to greater backwash [1] removes sediment from the coastline [1] and increases shoreline retreat.

Marking guidance

Do not credit further use of data from Figure 1.

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(b) Examine the role of coastal transport processes in the formation of **one** landform of coastal deposition. Content: 1.1.6	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	5			3			**8**

Indicative content

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

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1
AO1 content encompasses knowledge and understanding of the processes of coastal transport and one landform of coastal deposition. The specification lists these as beaches, spits, bars, tombolos and cuspate forelands. It is also possible to accept dunes, salt marshes and tidal flats. The content will depend upon the impact chosen and may include:

- Knowledge and understanding of the processes of coastal transport – suspension, saltation and traction.
- Knowledge and understanding of the methods of transport – longshore drift, currents, tides
- Knowledge and understanding of the characteristics of one landform of coastal deposition
- Knowledge and understanding of the link between processes of transport and one landform of coastal deposition
- Knowledge and understanding of other processes that may link to the formation of one landform of coastal deposition – human activity, erosion that provides the sediment
- Knowledge and understanding of relevant case study material.

AO2
AO2.1c content encompasses the application of knowledge and understanding to examine the role of longshore drift in the formation of one landform of coastal deposition. The content may vary according to the landform but may include:

- Examination of the relative role of longshore drift
- Examination of the role of other processes
- Examination of the role changing over time
- Examination of the role of longshore drift and other processes in different locations.

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Award the marks as follows:		
	AO1 (5 marks)	**AO2.1c (3 marks)**
Band	*Demonstrates knowledge and understanding of coastal transport systems and the formation of one landform of coastal deposition.*	*Applies knowledge and understanding to examine the role of coastal transport, and other, systems in the formation of landforms of coastal deposition.*
3	**4-5 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed example(s). Demonstrates detailed and accurate knowledge and understanding of coastal transport systems and their link to one landform of coastal deposition. Demonstrates detailed and accurate knowledge and understanding of other processes and their link to one landform of coastal deposition. Well annotated sketches / diagrams / maps may be used and should be credited.	**3 marks** Applies knowledge and understanding to produce a thorough and coherent examination that is supported by evidence. Applies knowledge and understanding to produce a thorough and coherent examination of the role of coastal transport and other systems in the formation of landforms of coastal deposition.
2	**2-3 marks** Demonstrates partial knowledge and understanding through the use of appropriate example(s). Demonstrates partial knowledge and understanding of coastal transport systems and their link to one landform of coastal deposition. Demonstrates partial knowledge and understanding of other processes and their link to one landform of coastal deposition. Generalised sketches / diagrams / maps may be used and should be credited.	**2 marks** Applies knowledge and understanding to produce a partial examination that is supported by evidence. Applies knowledge and understanding to produce a partial examination of the role of coastal transport and other systems in the formation of landforms of coastal deposition.
1	**1 mark** Demonstrates limited knowledge and understanding through the use of limited example(s). Demonstrates limited knowledge and understanding of coastal transport systems and their link to one landform of coastal deposition. Demonstrates limited knowledge and understanding of other processes and their link to one landform of coastal deposition. Basic sketches / diagrams / maps may be used and should be credited.	**1 mark** Applies knowledge and understanding to produce an examination with limited coherence and support from some evidence. Applies knowledge and understanding to produce a limited examination of the role of coastal transport and other systems in the formation of landforms of coastal deposition.
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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2. (a) (i) Use **Figure 2** to describe the links between time, space and process. Skills: 8.4	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
Award 1 mark for any of the following up to a maximum of 5 marks					5		**5**

Indicative content

- spatial scale of process increases with time – micro scale over minutes whilst macro over centuries
- magnitude of process increases with time – waves operate over minutes whilst flood cycles operate over years
- magnitude of process changes with spatial scale
- type of process changes with time/spatial scale – marine to fluvial and glacial
- for each of the above points allow support from resource for 1 development mark in each instance.

Credit other valid points.

(ii) Explain why changes in sea level take place over millennia. Content: 1.1.8	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
Award 1 mark for any of the following		3					**3**

Indicative content

Award 1 mark for any of the following reasons with up to 2 marks for development points.

The specification requires understanding of either isostatic or eustatic changes so do not expect both to be addressed. The content will depend upon the cause chosen and may include:

- global increase in temperatures in interglacial periods
- melting of glaciers
- meltwater moves to oceans
- water in ocean store increases
- rise in sea level *(slowly/over a long period of time)*
- global decrease in temperature in glacial periods
- water locked into glaciers
- water in ocean store decreases
- fall in sea level *(slowly/over a long period of time)*
- glacial weight removed from land
- isostatic recovery takes place *(slowly/over a long period of time)*
- weight of glaciers causing compression
- isostatic subsidence *(slowly/over a long period of time).*

Marking guidance

Credit comments that explain the slow nature of these large scale changes. Credit other valid points.

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(b) Examine the importance of geology in the formation of **one** landform of coastal erosion. Content: 1.1.4, 1.1.5	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	5			3			**8**

Indicative content

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

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1
AO1 content encompasses knowledge and understanding of the influence of geology on the formation of one coastal landform. The specification lists the characteristics of geology as lithological factors of mineral composition, hardness and solubility of rocks and structural geology including bedding, dip, joints, folding and faulting. The majority of candidates will link these to the formation of landforms of erosion which are stated in the specification as cliffs, headlands and bays, cave-arch-stack-stump sequence and wave-cut platforms, geos and blowholes. Other factors may also be included dependent upon the landform chosen. Wave energy, human intervention and time may form the basis of such responses. The content will depend upon the impact chosen and may include:

- Knowledge and understanding of the influence of geology
- Knowledge and understanding of the characteristics of one landform of coastal erosion
- Knowledge and understanding of the link between geology and one landform of coastal erosion
- Knowledge and understanding of other processes that may link to the formation of one landform of coastal erosion
- Knowledge and understanding of relevant case study material.

AO2
AO2.1c content encompasses the application of knowledge and understanding to examine the role of geology in the formation of one landform of coastal erosion. The content may vary according to the landform but may include:

- Examination of the relative role of geology
- Examination of the role of other processes
- Examination of the role changing over time
- Examination of the role of geology and other processes in different locations.

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Award the marks as follows:		
	AO1 (5 marks)	**AO2.1c (3 marks)**
Band	*Demonstrates knowledge and understanding of geology and the formation of one landform of coastal erosion.*	*Applies knowledge and understanding to examine the role of geology, and other factors, in the formation of landforms of coastal erosion.*
3	**4-5 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed example(s). Demonstrates detailed and accurate knowledge and understanding of geology and its link to one landform of coastal erosion. Demonstrates detailed and accurate knowledge and understanding of other processes and their link to one landform of coastal erosion. Well annotated sketches / diagrams / maps may be used and should be credited.	**3 marks** Applies knowledge and understanding to produce a thorough and coherent examination that is supported by evidence. Applies knowledge and understanding to produce a thorough and coherent examination of the role of geology, and other factors, in the formation of landforms of coastal erosion.
2	**2-3 marks** Demonstrates partial knowledge and understanding through the use of appropriate example(s.) Demonstrates partial knowledge and understanding of geology and its link to one landform of coastal erosion. Demonstrates partial knowledge and understanding of other processes and their link to one landform of coastal erosion. Generalised sketches / diagrams / maps may be used and should be credited.	**2 marks** Applies knowledge and understanding to produce a partial examination that is supported by evidence. Applies knowledge and understanding to produce a partial examination of the role of geology, and other factors, in the formation of landforms of coastal erosion.
1	**1 mark** Demonstrates limited knowledge and understanding through the use superficial example(s). Demonstrates limited knowledge and understanding of geology and its link to one landform of coastal erosion. Demonstrates limited knowledge and understanding of other processes and their link to one landform of coastal erosion. Well annotated sketches / diagrams / maps may be used and should be credited.	**1 mark** Applies knowledge and understanding to produce an examination with limited coherence and support from some evidence. Applies knowledge and understanding to produce a limited examination of the role of geology, and other factors, in the formation of landforms of coastal erosion.
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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Or: Glaciated Landscapes

3. (a) (i) Use **Figure 3** to describe variations in the area covered by the last Welsh Ice Cap. Skills: 3.6	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
Award 1 mark for any of the following up to a maximum of 3 marks					5		**5**

Indicative content

- Overall increase
- low fluctuating 35-26 thousand years BP
- rapid increase 26-24 thousand years BP
- gradual fluctuating decline 24-21 thousand years BP
- rapid decline 21-20 thousand years BP
- steady with minor fluctuations 20-10 thousand years BP
- credit data to support trends
- accept comment on the peak area (40,000km^2 c.23,500 years BP).

Credit other valid points.

(ii) Explain why there are periodic increases in the area covered by the last Welsh Ice Cap. Content: 1.2.4	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
		3					**3**

Indicative content

Award 1 mark for any of the following with max. 2 for development related to periodic increases. Specification looks at changes in the context of glacial budget. Content may include:

- increase in snowfall – increases input relative to output
- decline in temperature – decreases melting so more water is stored as ice
- decline in ablation – means less lost as output
- increased storage of ice in glaciers
- accept reference to sunspot activity
- accept reference to Milankovitch cycles
- accept reference to volcanic activity leading to decreasing temperatures
- accept reference to increased albedo leading to decreasing temperatures.

Credit other valid points.

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(b) Examine the importance of plucking and abrasion in the formation of **one** macro-scale landform of glacial erosion. Content: 1.2.5	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	5			3			**8**

Indicative content

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

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1
AO1 content encompasses knowledge and understanding of the processes of plucking and abrasion. Answers need to link the processes to the formation of landforms of glacial erosion which are stated in the specification as macro-scale glacial erosional landforms including cirques, pyramidal peaks, arêtes, glacial troughs, ribbon lakes, hanging valleys and truncated spurs. Answers may refer to the importance as a comparison of the processes before or during the formation of the selected landform or their importance in the production of different features of the landform. The content will depend upon the impact chosen and may include:

- Knowledge and understanding of the processes of plucking and abrasion
- Knowledge and understanding of the characteristics of one landform of glacial erosion
- Knowledge and understanding of the link between process and one landform of glacial erosion
- Knowledge and understanding of relevant case study material

AO2
AO2.1c content encompasses the application of knowledge and understanding to assess the role of plucking and abrasion in the formation of one landform of glacial erosion. The content may vary according to the landform but may include:

- Examination for each of the relative role of each process at different stages of formation of the selected landform
- Examination for each of the relative role of each process at different features of the selected landform
- Examination of each role in different locations – e.g. where different geologies are found.

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Award the marks as follows:		
	AO1 (5 marks)	**AO2.1c (3 marks)**
Band	*Demonstrates knowledge and understanding of how plucking and abrasion form the characteristics of one landform of glacial erosion.*	*Applies knowledge and understanding to examine the importance of plucking and abrasion in the formation of one landform of glacial erosion.*
3	**4-5 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed example(s). Demonstrates detailed and accurate knowledge and understanding of the processes of plucking and abrasion. Demonstrates detailed and accurate knowledge and understanding of their link to one landform of glacial erosion. Well annotated sketches / diagrams / maps may be used and should be credited.	**3 marks** Applies knowledge and understanding to produce a thorough and coherent examination that is supported by evidence. Applies knowledge and understanding to produce a thorough and coherent examination of the importance of plucking and abrasion in the formation of one landform of glacial erosion.
2	**2-3 marks** Demonstrates partial knowledge and understanding through the use of appropriate, example(s). Demonstrates partial knowledge and understanding of the processes of plucking and abrasion. Demonstrates partial knowledge and understanding of their link to one landform of glacial erosion. Generalised sketches / diagrams / maps may be used and should be credited	**2 marks** Applies knowledge and understanding to produce a partial examination that is supported by evidence. Applies knowledge and understanding to produce a partial examination of the importance of plucking and abrasion in the formation of one landform of glacial erosion.
1	**1 mark** Demonstrates limited knowledge and understanding through the use superficial example(s). Demonstrates limited knowledge and understanding of the processes of plucking and abrasion. Demonstrates limited knowledge and understanding of their link to one landform of glacial erosion. Basic sketches / diagrams / maps may be used and should be credited.	**1 mark** Applies knowledge and understanding to produce an examination with limited coherence and support from some evidence. Applies knowledge and understanding to produce a limited examination of the importance of plucking and abrasion in the formation of one landform of glacial erosion.
	0 marks Response not creditworthy or not attempted	0 marks Response not creditworthy or not attempted

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4. (a) (i) Use **Figure 4** to outline the role of glacial and post glacial processes as causes of the Oso landslide. Skills: 7.1, 8.3	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
Award 1 mark for any of the following					5		**5**

Indicative content

- Glacial – layers of sand and silt laid down by glaciers
- Loosely consolidated and easy to erode
- Steep sided valley
- Unstable slopes
- Post glacial erosion by river on base of slope
- Undercuts so unstable
- Role of present day weather
- Credit use of data to support trends.

Credit other valid points.

(ii) Using **Figure 4b**, suggest **one** economic impact of the Oso landslide on the town of Steelhead Haven. Content: 1.2.9	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
		3					**3**

Indicative content

Award 1 mark for identification of impact and 2 marks for the development of economic consequences.

- Destruction of houses [1] resulting in personal economic losses [1] and/or cost of rebuilding [1]
- Destruction of infrastructure e.g. roads [1] costs of clearance [1] cost of repairs for infrastructure [1]
- Destruction of property [1] increase in insurance premiums [1] because insurance companies will have to pay for damage/rebuilding of houses/businesses
- Destruction of infrastructure e.g. roads [1] blockage of main road stops deliveries to local businesses [1] local businesses suffer adverse economic effects/loss of trade [1]
- Destruction of landscape e.g. Whitehorse Trail [1] loss of tourism revenue [1] secondary impacts on local businesses [1] positive economic effects from dark tourism [1].

Credit other valid development points that are explicitly related to economic impacts.

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(b) Examine the success of **one** strategy used to manage the impacts of **either** glacial processes and landforms on human activity **OR** human activity on glacial processes and landforms. Content: 1.2.10	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	5			3			**8**

Indicative content

This question requires candidates to demonstrate their ability to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1

Impacts of glacial processes and landforms on human activity	***Impacts of human activity on glacial processes and landforms***
AO1 content encompasses knowledge and understanding of one strategy used to manage impacts of glacial processes or landforms on human activity.	*AO1 content encompasses knowledge and understanding of one strategy used to manage impacts of human activity on glacial processes or landforms.*
Glacial process/landform impacts on human activity may include those that result from: • glacial lake outburst floods • avalanches/landslides • glacial surges • permafrost thawing.	Human activity impacts on glacial process/landforms may include those that result from: • climate change and glacier retreat • exploitation of mineral resources • exploitation of landforms for water supply.
Strategies used to manage are varied but can be seen as those used to **predicting** the hazard, **prevent** the impact, **prepare** for the impact or **response** to the impacts. Other approaches may focus on the strategy for a **particular location** and thus have a number of strands. Answers should provide a description of the strategy and how it operates.	Strategies used to manage are varied but can be seen to be those that **modify** the impact such as planning controls or respond to the impact such strategies to combat climate change and responses to changing glacial processes. Other approaches may focus on the strategy for a **particular location** and thus have a number of strands. Answers should provide a description of the strategy and how it operates.

Success may be seen as extent to which the strategy overcomes impacts which could refer to economic, demographic or social. The content will depend upon the impact chosen and may include:

- Knowledge and understanding of the characteristics of the strategy
- Knowledge and understanding of the operation of the strategy
- Knowledge and understanding of the measures of success
- Knowledge and understanding of relevant case study material.

AO2

AO2.1c content encompasses the application of knowledge and understanding to examine the success of strategy in overcoming the impacts of process or landform. The content may vary according to the landform but may include:

- Examination of the overall success in relation to prediction, preparation, prevention or response.
- Examination of the relative success in relation to different impacts – economic, social and demographic
- Examination of relative success in different places.

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Award the marks as follows:		
	AO1 (5 marks)	**AO2.1c (3 marks)**
Band	*Demonstrates knowledge and understanding of the characteristics of the selected strategy and its operation.*	*Applies knowledge and understanding to examine the success of the strategy.*
3	**4-5 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed example(s). Demonstrates detailed and accurate knowledge and understanding of the characteristics and operation of the selected strategy. Demonstrates detailed and accurate knowledge and understanding of the impacts of the glacial process or landform. Well annotated sketches / diagrams / maps may be used and should be credited.	**3 marks** Applies knowledge and understanding to produce a thorough and coherent examination that is supported by evidence. Applies knowledge and understanding to produce a thorough and coherent examination of the success of the strategy.
2	**2-3 marks** Demonstrates partial knowledge and understanding through the use of appropriate example(s). Demonstrates partial knowledge and understanding of the characteristics and operation of the selected strategy. Demonstrates partial knowledge and understanding of the impacts of the glacial process or landform. Generalised sketches / diagrams / maps may be used and should be credited.	**2 marks** Applies knowledge and understanding to produce a partial examination that is supported by evidence. Applies knowledge and understanding to produce a partial examination of the success of the strategy.
1	**1 mark** Demonstrates limited knowledge and understanding through the use of superficial example(s). Demonstrates limited knowledge and understanding of the characteristics and operation of the selected strategy. Demonstrates limited knowledge and understanding of the impacts of the glacial process or landform. Basic sketches / diagrams / maps may be used and should be credited.	**1 mark** Applies knowledge and understanding to produce an examination with limited coherence and support from some evidence. Applies knowledge and understanding to produce a limited examination of the success of the strategy.
	0 marks Response not creditworthy or not attempted	**0 marks** Response not creditworthy or not attempted

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Section B: Tectonic Hazards

5. (a) (i) Use **Figure 5a** to describe the global distribution of earthquakes above magnitude 7. Skills: 3.3	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
Award 1 mark for any of the following					5		**5**

Indicative content

- Along plate boundaries
- Pacific Ring of Fire/in coastal regions/along coasts
- Cluster in Indonesia
- Cluster in west coast of North/Central/SouthAmerica
- Cluster to the SE of South America
- Cluster in Philippines/Papua New Guinea
- Cluster in Japan
- Cluster in Alaska/Aleutian islands.

Credit candidates who have successfully distinguished between distribution at different magnitudes e.g. M7+ and M8.

Credit comments on areas where there are few earthquakes max. 1 e.g. Europe
Do not credit very general distribution points e.g. 'in Asia'.

Credit other valid points.

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(ii) Use **Figures 5a** and **5b** to explain why there are global variations in tectonic risk. Content: 1.3.1, 1.3.4	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
		9					**9**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

The question requires candidates to apply their wider geographical knowledge and understanding to analyse the information shown on the maps. The maps show variation in some of the physical and human elements of tectonic risk noted in the specification. Answers may examine the distribution of magnitude/rural population/urban population/megacities and analyse how they impact upon tectonic risk. Content may include:

- Description and analysis of the distribution of earthquake magnitude and links to risk
- Description and analysis of urban size/population density with reference to increases in risk
- Description and analysis of the distribution of urban population with reference to the distribution of earthquakes
- Credit development of explanation of risk linked to other factors **identifiable on the maps** e.g. countries have different levels of economic development that affects their ability to mitigate against tectonic risk etc.

Award the marks as follows:

Band	Marks	
3	**7-9**	Applies knowledge and understanding to construct a well-developed discussion of earthquake magnitude, urban/rural population distribution and million cities to explain variations in tectonic risk. Applies knowledge and understanding to construct well-developed and balanced arguments supported by appropriate evidence from **both figures**.
2	**4-6**	Applies knowledge and understanding to construct a partial discussion of earthquake magnitude, urban/rural population distribution and million cities to explain variations in tectonic risk. Applies knowledge and understanding to construct partially developed and generalised arguments supported by mostly appropriate evidence.
1	**1-3**	Applies knowledge and understanding to construct a limited discussion of earthquake magnitude, urban/rural population distribution and million cities to explain variations in tectonic risk. Applies knowledge and understanding to construct limited and basic arguments supported by **limited** evidence.
	0	Response not creditworthy or not attempted.

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(b) Describe the following characteristics of an earthquake: P wave; S wave; focus; epicentre. Content: 1.3.3	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
Award a maximum of 2 marks for the description of each earthquake characteristic.	8						**8**

Indicative content

P wave: fastest wave [1] first wave to be recorded by a seismograph [1] compressional wave [1] a longitudinal earthquake wave [1] travels through solid rock and liquids [1]

S wave: slower than P waves [1], second wave to reach a seismograph [1] shear wave [1] is a wave where the ground moves perpendicular to the direction of the travel of the wave [1] can only travel through solid rock [1]

focus: the location where the earthquake begins [1]. The ground/rock ruptures at this spot [1], the place from which seismic waves radiate outward in all directions [1]

epicentre: is the point on the earth's surface [1] vertically above the focus [1] earthquake damage tends to be greater at this point [1].

Marking guidance

Credit other valid points but **do not allow** double credit for repeat of same point e.g. P waves are faster than S waves/S waves are slower than P waves or focus is below epicentre/epicentre is above focus.

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6. (a) Use the information in **Figure 6a** to compare the devastation caused by the major earthquakes of 2016. Content: 1.3.3, 1.3.4	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					9		**9**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

There is no credit for the selection of the most/worst devastating earthquake. Answers should make use of data and information in the table to put forward plausible ideas based on wider geographical knowledge and understanding. Content may include:

- Reference to, and comparison of, the differences in mortality – Ecuador highest, NZ lowest
- Reference to, and comparison of, the differences in economic loss - Japan highest, Ecuador lowest
- Reference to, and comparison of, the amount of loss that was insured – NZ mostly insured losses, Italy least insured
- Reference to, and comparison of, the magnitude of the earthquakes.

Marking guidance

Organisation of response can be through individual measures or through an analysis of overall impacts per earthquake. Where there is thorough description/analysis of the data but no comparison, response is limited to lower Band 2, max. 4.

Award the marks as follows:

Band	Marks	
3	**7-9**	Uses quantitative skills to analyse and interpret data to construct a well-developed comparison of devastation. Uses quantitative skills to construct well-developed and balanced arguments supported by appropriate evidence.
2	**4-6**	Uses quantitative skills to analyse and interpret data to construct a partial comparison of devastation. Uses quantitative skills to construct partially developed and generalised arguments supported by mostly appropriate evidence.
1	**1-3**	Uses quantitative skills to analyse and interpret data to construct a limited comparison of devastation. Uses quantitative skills to construct limited and basic arguments supported by appropriate evidence.
	0	Response not creditworthy or not attempted.

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(b) Spearman's rank was used to test the correlation between the number of buildings damaged and population density in the 2016 Ecuador earthquake. (i) Calculate the values for A, B and C in **Figure 6b**.	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					3		**3**

Indicative content

(i) A= 5 B= 6 C= 36

Credit Error Carried Forward (ECF). If the candidate has calculated the value of A incorrectly but has calculated B and C correctly on the basis of A, give credit for correct method in B and C.

e.g. A= 4 B= 7 C= 49
A= 6 B= 5 C= 25

In both these cases, the candidate would score 2 marks.

(ii) Use **Figure 6c** to comment on the nature and significance of the relationship between the number of buildings damaged and population density. Skills: 2.1.14	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					2		**2**

Indicative content

Positive correlation [1], not statistically significant [1].

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(c) Use **Figures 6a 6b and 6d** to suggest why it was difficult to respond to this earthquake. Content: 1.3.5	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
			10				**10**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

The question is asking for application of knowledge and understanding to interpret the resources. These focus on a number of aspects that make responses to earthquakes difficult. Answers should apply the information to the issue of difficulty. This may include:

- reference to the magnitude of the earthquake
- reference to the mortality and difficulty in dealing with removal of bodies, diseases that result from a large number of deaths
- reference to loss of economic power
- reference to the scale of building damage
- reference to the difficulty in distribution of aid
- reference to the destruction of infrastructure
- reference to the scale of homelessness
- reference to the trauma of inhabitants
- reference to the demographic structure and % of the population who are dependent
- reference to the ability of the population to follow government/aid agency advice due to low levels of literacy in certain areas.

Award the marks as follows:

Band	Marks	
3	**8-10**	Demonstrates detailed and accurate application of knowledge and understanding to explain the reasons why responses to earthquakes are difficult. Wide-ranging use of the resources to support arguments.
2	**4-7**	Demonstrates partial application of knowledge and understanding to explain the reasons why responses to earthquakes are difficult. Partial use of the resources to support arguments.
1	**1-3**	Demonstrates limited application of knowledge and understanding to explain the reasons why responses to earthquakes are difficult. Limited or inaccurate reference to resources to support arguments.
	0	Response not creditworthy or not attempted.

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7. (a) Explain why there are differences in the characteristics of shield and cinder volcanoes. Content: 1.3.2	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	5	3					**8**

Indicative content

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

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1
AO1 content encompasses knowledge and understanding of the characteristics of shield and cinder volcanoes.

Characteristics of shield volcano:

- Large size/volume
- gentle slopes/broad
- single vent/fissure
- composition – lava [usually basic/basaltic/mafic]
- effusive eruptions.

Characteristics of cinder volcano:

- smaller size
- steep slopes
- usually central vent/bowl shaped crater
- composition – fragmental material [pyroclastic fragments/volcanic ash/cinder]
- explosive eruptions.

AO2
AO2.1a content encompasses an ability to explain the differences between shield and cinder volcanoes by explaining the **processes** that create the differing characteristics. Explanations should be **linked** to characteristics to gain credit. Possible examples could include

- Different viscosity and gas content of lava will lead to different slope angles – steeper slopes in cinder volcanoes (as higher water and silica content) and gentler slopes in shield volcanoes (as small amount of gas and silica)
- Shield volcanoes usually consist of lava whilst cinder volcanoes are made of ash/fragmental material which is the result of different lava types
- Location of volcanoes on different plate margins/hot spots result in different processes and lava types.

Marking guidance

Accept answers that are structured according to differing characteristics as well as answers structured according to volcano type.

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Award the marks as follows:		
	AO1 (5 marks)	**AO2.1a (3 marks)**
Band	*Demonstrates knowledge and understanding of two hazards resultant from volcanic processes.*	*Applies knowledge and understanding to compare of the level of hazard caused by two volcanic processes.*
3	**4-5 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed examples. Demonstrates detailed and accurate knowledge and understanding of volcanic process and their link to the formation of two hazards. Demonstrates detailed and accurate knowledge and understanding of the threat caused by two volcanic hazards. Well annotated sketches / diagrams / maps may be used and should be credited.	**3 marks** Applies knowledge and understanding to produce a thorough and coherent assessment that is supported by evidence. Applies knowledge and understanding to produce a thorough and coherent comparison of the level of hazard caused by two volcanic processes.
2	**2-3 marks** Demonstrates partial knowledge and understanding through the use of appropriate examples. Demonstrates partial knowledge and understanding of volcanic process and their link to the formation of two hazards. Demonstrates partial knowledge and understanding of the threat caused by two volcanic hazards. Generalised sketches / diagrams / maps may be used and should be credited.	**2 marks** Applies knowledge and understanding to produce a partial assessment that is supported by evidence. Applies knowledge and understanding to produce a partial comparison of the level of hazard caused by two volcanic processes.
1	**1 mark** Demonstrates limited knowledge and understanding through the use of superficial examples. Demonstrates limited knowledge and understanding of volcanic process and their link to the formation of two hazards. Demonstrates limited knowledge and understanding of the threat caused by two volcanic hazards. Basic sketches / diagrams / maps may be used and should be credited.	**1 mark** Applies knowledge and understanding to produce an assessment with limited coherence and support from some evidence. Applies knowledge and understanding to produce a limited comparison of the level of hazard caused by two volcanic processes.
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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(b) Explain variations in the impacts of **one** volcanic eruption. Content: 1.3.2	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	10						**10**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

AO1
AO1 content encompasses knowledge and understanding of the impacts of one volcanic eruption. The specification outlines a number of impacts - demographic, economic and social impacts of volcanic hazards on people and the built environment including primary and secondary effects – and candidates may refer to this structure in their answer. Other answers may comment upon the physical impacts of volcanic hazards and refer to atmosphere, damage to vegetation and changes to landscape. These are also creditworthy.

Variation needs to be examined in the context of one eruption and could address elements such as urban/rural, distance, social and economic divisions and preparation. Some candidates may address positive impacts.

The content will depend upon the impact chosen and may include:

- Knowledge and understanding of human impacts of one volcanic eruption
- Knowledge and understanding of the physical impacts of one volcanic eruption
- Knowledge and understanding of variations in the impacts of one volcanic eruption.

Answers that do not address variation or do not address **one** named volcanic eruption should be limited to mid Band 2, max. 6.

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Award the marks as follows:		
Band	**Marks**	
3	**8-10**	Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed examples. Demonstrates detailed and accurate knowledge and understanding of the impacts of one volcanic eruption. Demonstrates detailed and accurate knowledge and understanding of variations in the impacts of one volcanic eruption. Well annotated sketches / diagrams / maps may be used and should be credited.
2	**4-7**	Demonstrates partial knowledge and understanding through the use of appropriate examples. Demonstrates partial knowledge and understanding of the impacts of one volcanic eruption. Demonstrates partial knowledge and understanding of variations in the impacts of one volcanic eruption. Generalised sketches / diagrams / maps may be used and should be credited. LIMIT MARKS FOR ANSWERS THAT DO NOT ADDRESS VARIATION.
1	**1-3**	Demonstrates limited knowledge and understanding through the use of superficial examples. Demonstrates limited knowledge and understanding of the impacts of one volcanic eruption. Demonstrates limited knowledge and understanding of variations in the impacts of one volcanic eruption. Basic sketches / diagrams / maps may be used and should be credited.
	0	Response not creditworthy or not attempted.

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