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# INTERNATIONAL AS GEOGRAPHY GG01A

Paper 1A: Physical Geography 1 Hot Desert Systems and Landscapes

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Mark scheme

January 2022

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\*221Xgg01a/MS\*

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

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

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# International AS Geography mark scheme

## How to mark

### Aims

When you are marking your allocation of scripts your main aims should be to:

- recognise and identify the achievements of students
- place students in the appropriate mark band and in the appropriate part of that mark band (high, low, middle) for **each** Assessment Objective
- record your judgements with brief notes, annotations and comments that are relevant to the mark scheme and make it clear to other examiners how you have arrived at the numerical mark awarded for each Assessment Objective
- ensure comparability of assessment for all students, regardless of question or examiner.

### Approach

It is important to be **open-minded** and **positive** when marking scripts.

The specification recognises the variety of experiences and knowledge that students will have. It encourages them to study geography in a way that is relevant to them. The questions have been designed to give them opportunities to discuss what they have found out about geography. It is important to assess the quality of **what the student offers**.

Do not mark scripts based on the answer **you** would have written. The mark schemes have been composed to assess **quality of response** and not to identify expected items of knowledge.

### Assessment Objectives

This component requires students to:

AO1	Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change, at a variety of scales.
AO2	Apply knowledge and understanding in different contexts to interpret, analyse and evaluate geographical information and issues.
AO3	Use a variety of relevant quantitative, qualitative and fieldwork skills to: <ul style="list-style-type: none"> <li>• investigate geographical questions and issues</li> <li>• interpret, analyse and evaluate data and evidence</li> <li>• construct arguments and draw conclusions.</li> </ul>

### The marking grids

Do not think of levels equaling grade boundaries.

Depending on the part of the examination, the levels will have different mark ranges assigned to them. This will reflect the different weighting of Assessment Objectives in particular tasks and across the examination as a whole.

## Using the grids

Having familiarised yourself with the descriptors and indicative content, read through the answer and annotate it (as instructed below) to identify the qualities that are being looked for and that it shows. You can now check the levels and award a mark.

### 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 descriptors for that level. The descriptors for the level indicate the different qualities that might be seen in the student's answer for that level. If it meets all the descriptors for 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 descriptors and the answer. With practice and familiarity you will find that for better answers you will be able to skip through the lower levels of the mark scheme quickly.

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.

### Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark.

It is often best to start in the middle of the level's mark range and then check and adjust. If there is a lot of indicative content fully identifiable in the work you need to give the highest mark in the level. If only some is identifiable or it is only partially fulfilled, then give the lower mark.

The exemplar materials used during standardisation will also help. There will be an answer in the standardising materials that 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 of 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.

In addition to the levels descriptors, question specific indicative content is provided as a guide for examiners. This is not intended to be exhaustive and you must credit other valid points.

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

## Annotating scripts

You should write a summative comment at the end for each Assessment Objective and indicate the marks for each Assessment Objective being tested at the end of the answer in the margin in sequence. It is vital that the way you arrive at a mark should be recorded on the script. This will help you with making accurate judgements and it will help any subsequent markers to identify how you are thinking. Please do not write negative comments about students' work or their alleged aptitudes.

Section A – Living with Hazards

Total for this section: 40 marks

Question	Part	Marking guidance	Total marks
01	1	<p><b>Which of the following describes the theory of magma plumes?</b></p> <p>Key – A: Concentrated areas of radioactive decay in the mantle create localised thermal currents of magma.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
01	2	<p><b>Which of the following describes the characteristics of multi-hazardous environments?</b></p> <p>Key – D: Two or more hazards occur in these areas. Societies in these locations are vulnerable to the hazards presented.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
01	3	<p><b>Which of the following can <u>all</u> occur at conservative plate margins?</b></p> <p>Key – A: Earthquakes occur; rocks fracture creating fault lines; aftershocks happen until the crust settles.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
01	4	<p><b>The Park model outlines:</b></p> <p>Key – B: a timeline of a hazard and its impact on the quality of life following the hazard event.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
01	5	<p><b>The following two statements:</b></p> <ul style="list-style-type: none"> <li>• developing planning regulations, such as building from natural products that would not pollute if they burn;</li> <li>• allowing wildfires to take their natural course to benefit ecosystems;</li> </ul> <p><b>are both examples of:</b></p> <p>Key – A: adapting to wildfires.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
02		<p><b>Figure 1</b> shows global data for earthquakes with at least one fatality between 1997 and 2018.</p> <p><b>Analyse the data shown in Figure 1.</b></p>	<p><b>6</b></p> <p><b>AO3=6</b></p>

Level	Marks	Descriptor
2	4 – 6	<b>AO3</b> – Clear selection and analysis of the evidence that has been provided linked to the relationship between earthquake magnitude and fatalities.
1	1 – 3	<b>AO3</b> – Some basic selection and analysis of the evidence that has been provided linked to the relationship between earthquake magnitude and fatalities.
0	0	No creditable content.

### Indicative Content

There is a variety of ways of approaching this unseen material. Students must select the relevant data from the graph and look at patterns and relationships between earthquake magnitude and the number of fatalities. Students should look at the figure and see anomalies and links between the data.

### **AO3**

- The majority of earthquakes have a magnitude of between 4 and 7.
- The number of earthquakes above magnitude 8 is relatively low and even fewer over magnitude 9 (15 earthquakes).
- Few earthquakes from the data lead to more than 10 000 fatalities (12).
- Four of the earthquakes led to more than 100 000 fatalities including the Sumatra earthquake.
- The relationship does show that many higher magnitude earthquakes lead to higher numbers of fatalities – but the relationship is more complex.
- A positive but weak correlation.
- The number of fatalities increases with earthquake magnitude, but at magnitude 7, it levels off to around several hundreds of thousands.
- Some lower magnitude (5–7) earthquakes can lead to similar numbers of fatalities as the earthquakes of 8.5 to 9+ magnitude as seen in the example of Athens (magnitude 5+) causing ~100 fatalities.
- The positive correlation between magnitude and fatalities is supported by the Sumatra, Izmit and Tohoku earthquakes – with high fatalities over 10 000 and magnitudes of above 7.
- 100% of earthquakes of a magnitude of 5.5 or lower have fatalities of less than 100 people.
- 8 out of 15 earthquakes with a magnitude 9 or above lead to 100 or less fatalities.

Question	Part	Marking guidance	Total marks
03		<p><b>‘Types of volcanic eruptions can be explained through knowledge and understanding of tectonic plate margins.’</b></p> <p><b>Discuss the extent to which you agree with this statement.</b></p> <p><b>AO1</b> – Knowledge and understanding of vulcanicity and tectonic plate margins.</p> <p><b>AO2</b> – Application of knowledge and understanding to analyse why different plate margins are associated with different types of vulcanicity.</p>	<p><b>9</b></p> <p><b>AO1=4</b> <b>AO2=5</b></p>

Level	Marks	Descriptor
3	7 – 9	<p><b>AO1</b> – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change associated with specific plate margins and different types of vulcanicity.</p> <p><b>AO2</b> – Applies knowledge and understanding to the novel situation, offering detailed analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are thorough and relevant.</p>
2	4 – 6	<p><b>AO1</b> – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change associated with specific plate margins and different types of vulcanicity.</p> <p><b>AO2</b> – Applies knowledge and understanding to the novel situation, offering clear analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are evident and relevant.</p>
1	1 – 3	<p><b>AO1</b> – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change associated with specific plate margins and different types of vulcanicity.</p> <p><b>AO2</b> – Applies limited knowledge and understanding to the novel situation, offering some basic analysis and evaluation, drawn from the context provided. Connections and relationships between different aspects of study are basic and of limited relevance.</p>
0	0	No creditable content.

Indicative Content

This question requires knowledge of tectonic processes. Students should link the incidence of volcanic eruptions to plate tectonic theory. Students should make links between the types of volcanic activity and their relationships to plate margins and magma plumes and identify to what extent they believe that knowledge of this relationship is important.

**AO1**

- Volcanic eruptions occur in areas around destructive and constructive plate margins.
- Volcanic activity occurs as a result of magma plumes in areas without plate margins.
- In some cases there are both magma plumes and a plate boundary (eg Iceland).
- Destructive plate margins are where tectonic plates collide/converge.
- Subduction is necessary for a volcanic eruption at a destructive margin; therefore volcanic eruptions do not occur with continent to continent convergence.
- When an oceanic plate collides with a continental plate the oceanic plate is subducted as it is denser.
- When two oceanic plates collide the faster or denser plate is subducted.
- At depths of 100 to 700 km melting occurs within the Benioff zone due to heat and friction.
- As the magma created is less dense than the asthenosphere which surrounds it, it rises into plumes and may reach the surface.
- When subduction occurs there is greater friction and pressure creating more explosive volcanic eruptions.
- The magma is more likely to be composed of andesite or rhyolite and therefore may create pyroclastic flows and more Vesuvian, Peléan and Plinian eruptions.
- Constructive plate margins are when tectonic plates separate.
- Submarine volcanic eruptions may occur when plates diverge and basaltic magma rises from the asthenosphere, which cools and forms new crust.
- Constructive plate margins are associated with more effusive eruptions due to the lower amounts of pressure and lack of subduction.
- Similarly, at constructive margins with continental divergence, fissure type volcanoes occur and erupt basaltic magma.
- Basaltic volcanoes with generally more effusive eruptions are found over magma plumes.
- Icelandic, Hawaiian and Strombolian eruptions tend to occur at magma plumes and constructive margins.

**AO2**

- Linking volcanic activity and type of magma to the plate margin.
  - Destructive margins producing andesite and rhyolite, which leads to more violent and explosive eruptions.
  - Constructive margins (and magma plumes) have less pressure as there is not subduction therefore experience more effusive eruptions and basaltic magma.
- Analysis of how the plate margin works and the processes involved lead to different types of magma.
- Analysis of how different types of magma create different types of eruptions and therefore different materials erupted.
- The relative importance of plate margins in determining the volcanic eruption.
- Examples to help show how different volcanoes and eruptions are linked to plates.
- Linking and applying ideas on plate margins and associated processes to the nature of vulcanicity and eruptions.
- Analysis of how eruptions may be more complex and based on more than just the margin eg how long since the last eruption? Is there also a magma plume? Has older material blocked the vent to build up pressure? Has a secondary vent been created?



- Discussion and evidence provided to evaluate whether the nature of volcanicity can be understood through knowledge and understanding of tectonic plate margins.

Question	Part	Marking guidance	Total marks
04		<p><b>‘The success of a response to a tropical storm is most influenced by hazard perception and its cultural determinants in the areas affected.’</b></p> <p><b>Evaluate this statement with reference to <u>one or more</u> tropical storms you have studied.</b></p> <p><b>AO1</b> – Knowledge of impacts and responses to one or more tropical storms. Knowledge of the concept of a cultural determinant of hazard perception.</p> <p><b>AO2</b> – Application of knowledge and understanding to evaluate whether cultural determinants of hazard perception shape the success of the response to tropical storms.</p>	<p><b>20</b></p> <p><b>AO1=10</b> <b>AO2=10</b></p>

Level	Marks	Descriptor
4	16 – 20	<p><b>AO2</b> – Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question.</p> <p><b>AO2</b> – Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout.</p> <p><b>AO2</b> – Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.</p> <p><b>AO1</b> – Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout.</p> <p><b>AO1</b> – Full and accurate knowledge and understanding of key concepts and processes throughout.</p> <p><b>AO1</b> – Detailed awareness of scale and temporal change which is well integrated where appropriate.</p>
3	11 – 15	<p><b>AO2</b> – Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question.</p> <p><b>AO2</b> – Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding.</p> <p><b>AO2</b> – Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.</p> <p><b>AO1</b> – Generally clear and relevant knowledge and understanding of place(s) and environments.</p> <p><b>AO1</b> – Generally clear and accurate knowledge and understanding of key concepts and processes.</p>

		<b>AO1</b> – Generally clear awareness of scale and temporal change which is integrated where appropriate.
<b>2</b>	<b>6 – 10</b>	<p><b>AO2</b> – Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question.</p> <p><b>AO2</b> – Some partially relevant analysis and evaluation in the application of knowledge and understanding.</p> <p><b>AO2</b> – Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.</p> <p><b>AO1</b> – Some relevant knowledge and understanding of place(s) and environments which is partially relevant.</p> <p><b>AO1</b> – Some knowledge and understanding of key concepts, processes and interactions and change.</p> <p><b>AO1</b> – Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies.</p>
<b>1</b>	<b>1 – 5</b>	<p><b>AO2</b> – Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question.</p> <p><b>AO2</b> – Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence.</p> <p><b>AO2</b> – Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.</p> <p><b>AO1</b> – Very limited relevant knowledge and understanding of place(s) and environments.</p> <p><b>AO1</b> – Isolated knowledge and understanding of key concepts and processes.</p> <p><b>AO1</b> – Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies.</p>
<b>0</b>	<b>0</b>	No creditable content.

### Indicative Content

Content will depend on the tropical storm(s) chosen.

If student does not refer to an example of a tropical storm marks will be limited to Level 2.

This question requires an evaluative discussion of the response or responses to a named tropical storm and identify whether or not the response was influenced by the hazard perception in the area studied. Students should evaluate the statement by using the example of a tropical storm. Students should discern the importance of the areas hazard perception and the unique factors influencing the hazard perception.

If student does not refer to tropical storms marks will be limited to Level 1.

### **AO1**

- Hazard perception is controlled by people's cultural and socio-economic circumstances which will influence risk management of tropical storms.
- There is no one set response to a natural hazard and these are determined by governments and individuals.
- Knowledge of the different types of hazard perception such as fatalism and adaptation.
- The relationship between hazard perception and hazard incidence, frequency and experience.
- Knowledge of the Park model and hazard management cycle.
- Success of responses to tropical storms depend on incidence, magnitude and distribution of a hazard alongside frequency, magnitude and vulnerability.
- Level of development of an area will influence how well hazards can be prepared for and responded to (eg may lack wealth and technology).
- The causes and factors increasing the risk and impact of tropical storms and their link/relationship to risk management.
- Some comparison of use of management strategies including prediction technology.
- Primary and secondary impacts of tropical storms and their link/relationship to risk management.
- Short and long-term responses to tropical storms and their link/relationship to risk management.
- Place knowledge of the impacts of human response evidenced by two recent tropical storms in contrasting areas of the world – **students should use at least one of these in their response.**

### **AO2**

- Analysis and explanation of the interactions between causes, magnitude and distribution of tropical storms.
- Evaluation of how risk management can reduce the impacts of tropical storms.
- Evaluation of specific risk management strategies that were used to reduce the impacts of one or more recent tropical storms in contrasting areas of the world.
- Relative comparison between the hazard perception and its cultural determinants in the contrasting areas of the world.
- There may be some relative comparison between the specific responses if student refers to two tropical storms – some students may make some comparisons between responses even if one tropical storm is referred to.
- Evaluation of the role of hazard perception in shaping the responses to one or more tropical storms – such as in the case of Hurricane Florence, the hazard perception for a few coastal dwellers was that of fatalism and the residents remained in the area affected; whereas the culture for the majority was to heed warnings and advice from the government and move away.
- Evaluation of how successful the response was for one or more tropical storms.

- Evaluation of other factors – political, cultural, economic that may have also influenced the success of the responses – such as in the case of Hurricane Florence, where many poorer residents did not heed the evacuation as they wanted to protect their properties from looting.
- Analysis of whether hazard perception does shape responses or not using the examples studied to justify this.
- Comparison between the hazard perception and responses.
- Evaluation and explanation of successfulness of the response(s) to the tropical storm(s) in relation to whether hazard perception had a role in the response and success.

**Section B – Hot Desert Systems and Landscapes**

**Total for this section: 40 marks**

Question	Part	Marking guidance	Total marks
05	1	<p><b>Which of the following describes weathering in hot desert environments?</b></p> <p>Key – C: Mechanical action caused by the expansion and contraction of rock surfaces is the dominant process.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
05	2	<p><b>The areas most at risk from desertification are found in:</b></p> <p>Key – D: semi-arid regions, on the margins of existing deserts.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
05	3	<p><b>‘Transported fluvial sediment that is washed out through adjoining wadis, forming continuous areas of lowland sediment.’</b></p> <p><b>This statement describes the development of which of the following desert features?</b></p> <p>Key – A: Bahadas</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
05	4	<p><b>Which of the following are <u>all</u> human causes of desertification?</b></p> <p>Key – C: Overcultivation; population increase; the collection of fuelwood.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
05	5	<p><b>Which of the following explains how continentality causes aridity?</b></p> <p>Key – B: Aridity is higher within the interior of continents as there is little influence from airstreams over oceans. As air moves inland, it loses moisture and so there is less precipitation.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
06		<p><b>Figure 2a</b> shows an area around the mouth of the Salado River in the Atacama Desert, Chile, before flooding in March 2015.</p> <p><b>Figure 2b</b> shows the same area after flooding in March 2015.</p> <p><b>Analyse the data shown in Figure 2a and Figure 2b.</b></p>	<p><b>6</b></p> <p><b>AO3=6</b></p>

Level	Marks	Descriptor
2	4 – 6	<b>AO3</b> – Clear selection of evidence from the satellite images provided and appropriate comparison of evidence. Making appropriate use of specific distribution to support the analysis.
1	1 – 3	<b>AO3</b> – Some basic selection of evidence from the satellite images provided. Isolated or basic ideas.
0	0	No creditable content.

### Indicative Content

There is a variety of ways of approaching this unseen material. Students should analyse the two images to analyse the extent and scale of the flooding.

### **AO3**

- Flood flow direction was sporadic, but flowed westwards.
- Figure 2a shows a distinctly dry channel, whereas in Figure 2b it is much clearer to see a more distinct river channel.
- Flood intensive enough to damage large section of Highway 5.
- Flood limits do not encroach too much onto populated areas of the town.
- The flooding over-flowed the Salado's river channel – the widest part of the channel in the east near the settlement is at most 50 m wide – the flood limits were at least 180 m.
- Deposition of sediment changed and some homes became covered with sediments from the flood.
- In the east, near the settlement, the flood limits were contained by Highway 5 – there is approximately 20 m overspill.
- In the west the flood limits broke through Highway 5 and destroyed the highway in parts – 500 m and 300 m destroyed when following the highway from east to south west.
- Flood depths ranged from 0.52 to 4.8 m across the affected areas.
- Areas with the highest flood depths were areas in the east where the flood was semi-contained by Highway 5.
- Flood depths were generally lower at the margins of the flood extent (such as by the south-west most point of Highway 5) – with the exception of areas to the east of the image.
- Generally flood depths lessened from east to west where the flood limits were wider as the Salado flows to its mouth.
- There are two anomalous data points with flood depths of 1–1.5 m and 1.5–2 m in the east – the other flood depths around this area are three or more times bigger.

Question	Part	Marking guidance	Total marks
07		<p><b>Evaluate the role of water in creating desert landforms.</b></p> <p><b>AO1</b> – Knowledge and understanding of fluvial processes in hot desert environments. Knowledge and understanding of processes and landforms in hot desert environments.</p> <p><b>AO2</b> – Application of knowledge and understanding of the specific processes involved in shaping landscapes. Evaluation of how sources of water influence landscape shaping processes. Students may apply their ideas to areas they have studied.</p>	<p><b>9</b></p> <p><b>AO1=4</b> <b>AO2=5</b></p>

Level	Marks	Descriptor
3	7 – 9	<p><b>AO1</b> – Demonstrates detailed knowledge and understanding of the fluvial processes and landforms in hot desert environments. Detailed ideas on the links between characteristics, processes and landforms.</p> <p><b>AO2</b> – Applies knowledge and understanding to the novel situation, offering detailed analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are thorough and relevant.</p>
2	4 – 6	<p><b>AO1</b> – Demonstrates knowledge and understanding of fluvial processes and landforms in hot desert environments. Clear ideas on the links between characteristics, processes and landforms.</p> <p><b>AO2</b> – Applies knowledge and understanding to the novel situation, offering clear analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are evident and relevant.</p>
1	1 – 3	<p><b>AO1</b> – Demonstrates basic knowledge and understanding of fluvial processes and landforms in hot desert environments. Basic ideas on the links between characteristics, processes and landforms.</p> <p><b>AO2</b> – Applies limited knowledge and understanding to the novel situation, offering some basic analysis and evaluation, drawn from the context provided. Connections and relationships between different aspects of study are basic and of limited relevance.</p>
0	0	No creditable content.



Indicative Content

This question requires an evaluation of the link between water in hot deserts and the landforms in hot deserts. Students can look at any desert landform and the associated landforms. There should be some discussion and evaluation in relation to desert landforms.

**AO1**

- Hot desert environments have high levels of sunshine and long sunlight durations.
- Hot desert environments have low levels of precipitation, high potential evapotranspiration rates and water deficit.
- As a result of high PET there may be thunderstorms – which can lead to episodic flooding.
- Episodic flooding and rainfall events lead to fluvial processes creating fluvial landscapes.
- Hot desert environments are classified as semi-arid, arid and hyper arid and have aridity indices of 0.2–<0.5; 0.05–<0.2 and <0.05 respectively.
- Water sources in deserts can be external to the hot desert environment and create exogenous rivers.
- Ephemeral streams and sheet flooding can occur during times of rainfall.
- In hot desert environments, such as the Atacama, temperature inversions may create rolling fog.
- Landforms such as wadis form from fluvial erosional processes.
- Some landforms in hot deserts may be classed as relic features from times of higher rainfall.
- Landforms in deserts are often the result of multiple interacting processes.

**AO2**

- A clear explanation of the influence that water has on the processes shaping landscapes
  - eg limited rainfall such reduced rates of chemical weathering and disintegration of rocks
  - eg thunder storms and periods of intense rainfall creating sheet and flash flooding – often not restricted to river channels.
- A clear explanation of the links between weathering, erosion, transportation and deposition.
- Hot desert landscape features should be linked and associated with specific processes and landscapes – there should be reference and evaluation of the importance of climatic characteristics
  - eg Wadis are river channels formed when sheet flooding runs into gullies. This often gathers in channels formed by ephemeral streams. Hydraulic action and abrasion further erode the channel to create a valley, which is left dry when the rainfall evaporates or flows away. Alluvial fans are found where sediments from flash and sheet flooding are deposited when the water flows away or evaporates.
- Critical evaluation of whether water is important in shaping desert landscapes.
- Other factors could be discussed (such as changes over geological time-scale, geology, wind, weathering)
  - eg some landscapes are relict and show how previous climates may have been important to creating the landscapes, such as the Grand Canyon – this was formed when there was significantly more rain to create the long term fluvial action required to erode a canyon (along with tectonic uplift).
- An evaluation of the role of water in creating specific landforms or named landscapes
  - eg sand dune landscapes, such as the Dumont Dunes in the Mojave Desert, are distinctly created by wind deposition. The sediments transported by wind can be fluvial or aeolian in nature, but the deposition is mainly aeolian.
- The scale and geographical location of the landscape and specific landforms could be considered and evaluated against the importance of water.

Question	Part	Marking guidance	Total marks
08		<p><b>‘Current <u>and</u> future distributions of hot desert environments are shaped by natural causes, such as atmospheric high pressure, and not by human activity.’</b></p> <p><b>To what extent do you agree with this statement?</b></p> <p><b>AO1</b> – Knowledge and understanding of current and future distributions of hot desert environments. Knowledge and understanding of causes of aridity. Knowledge and understanding of desertification.</p> <p><b>AO2</b> – Application of knowledge and understanding to analyse the causes of current and future distributions of hot desert environments.</p>	<p><b>20</b></p> <p><b>AO1=10</b> <b>AO2=10</b></p>

Level	Marks	Descriptor
4	16 – 20	<p><b>AO2</b> – Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question.</p> <p><b>AO2</b> – Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout.</p> <p><b>AO2</b> – Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.</p> <p><b>AO1</b> – Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout.</p> <p><b>AO1</b> – Full and accurate knowledge and understanding of key concepts and processes throughout.</p> <p><b>AO1</b> – Detailed awareness of scale and temporal change which is well integrated where appropriate.</p>
3	11 – 15	<p><b>AO2</b> – Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question.</p> <p><b>AO2</b> – Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding.</p> <p><b>AO2</b> – Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.</p> <p><b>AO1</b> – Generally clear and relevant knowledge and understanding of place(s) and environments.</p> <p><b>AO1</b> – Generally clear and accurate knowledge and understanding of key concepts and processes.</p>

		<b>AO1</b> – Generally clear awareness of scale and temporal change which is integrated where appropriate.
<b>2</b>	<b>6 – 10</b>	<p><b>AO2</b> – Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question.</p> <p><b>AO2</b> – Some partially-relevant analysis and evaluation in the application of knowledge and understanding.</p> <p><b>AO2</b> – Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.</p> <p><b>AO1</b> – Some relevant knowledge and understanding of place(s) and environments which is partially relevant.</p> <p><b>AO1</b> – Some knowledge and understanding of key concepts, processes and interactions and change.</p> <p><b>AO1</b> – Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies.</p>
<b>1</b>	<b>1 – 5</b>	<p><b>AO2</b> – Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question.</p> <p><b>AO2</b> – Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence.</p> <p><b>AO2</b> – Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.</p> <p><b>AO1</b> – Very limited relevant knowledge and understanding of place(s) and environments.</p> <p><b>AO1</b> – Isolated knowledge and understanding of key concepts and processes.</p> <p><b>AO1</b> – Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies.</p>
<b>0</b>	<b>0</b>	No creditable content.

### Indicative Content

This question requires a review of the current locations of hot deserts and their margins and an evaluation of whether the distribution will alter. Students should examine whether the natural causes of their distribution will be impacted by human activity associated with desertification.

#### **AO1**

- Knowledge of current distributions of hot desert environments and their margins – found close to the tropics, margins are around the edges of deserts, in continental interiors and/or on the leeward side of mountain ranges.
- Knowledge of the changing extent and distribution of deserts.
- Knowledge of the specific aridity causing processes of continentality, atmospheric high pressure, cold ocean currents and relief (rain shadow deserts).
- Knowledge of desertification – its causes and influence on the extent of deserts – margins of deserts become more desertified.
- The interactions between aridity processes and arid landscapes.
- The interactions between human processes and arid landscapes.
- Knowledge of climate change and its influence on the risk of desertification.
- Knowledge of the changing extent and distribution of hot deserts over the last 10 000 years.

#### **AO2**

- Analysis of the role that the processes of continentality, atmospheric high pressure, cold ocean currents and relief have on creating aridity and the current distribution of hot desert environments.
- Analysis of how climate change may influence the future distribution and extent of hot desert environments.
- Analysis of how climate change influenced the historical extent of hot desert environments.
- Evaluation of the specific aridity causing processes and the scale of their influence in shaping the current and future distributions of deserts.
- Evaluation of the climate change and the scale of its influence in shaping the current and future distributions of deserts.
- Evaluation of the importance of human activity and the scale of its influence in shaping the current and future distributions of deserts.
- Comparison and analysis of the different factors shaping the current and future distributions of hot desert environments.
- Examples used to analyse distribution of hot desert environments.
- Case study of desertification at a local scale to illustrate the changing extent of hot desert margins.
- A conclusion of which factor most influences the distribution of hot desert environments currently.
- A conclusion of which factor most influences the distribution of hot desert environments in the future.
- Some students may find they have two separate conclusions based upon the two elements of the question. That current distributions and future distributions have different causes.
- Conclusion could either agree or disagree with the statement, but any conclusion is valid as long as it is supported.

**Assessment Objective grid**

	AO1	AO2	AO3	Total
<b>Section A</b>				
01.1	1			1
01.2	1			1
01.3	1			1
01.4	1			1
01.5	1			1
02			6	6
03	4	5		9
04	10	10		20
<b>Section B</b>				
05.1	1			1
05.2	1			1
05.3	1			1
05.4	1			1
05.5	1			1
06			6	6
07	4	5		9
08	10	10		20
Unit total	38	30	12	80