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# INTERNATIONAL AS GEOGRAPHY GG01A

Paper 1A Physical Geography 1 Hot Desert Systems and Landscapes

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Mark scheme

June 2023

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

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

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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 how deep-sea trenches are formed?</b></p> <p>Key – D: Subduction of the denser tectonic plate at a destructive margin leads to the bending of that plate at the point of collision.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
01	2	<p><b>‘Following the 2018 wildfires in California, local officials voted on forest management laws. Residents then protested about being automatically enrolled onto emergency wildfire notification systems.’</b></p> <p><b>The statement above outlines which impact of the hazard?</b></p> <p>Key – D: Secondary political</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
01	3	<p><b>Which of the following is an example of preparedness to reduce the impact of a tropical storm?</b></p> <p>Key – A: Computer-based models to identify, track and communicate about the potential of the tropical storm.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
01	4	<p><b>Which of the following would be most likely to result in many casualties from falling debris during an earthquake?</b></p> <p>Key – D: A shallow focus earthquake in a densely populated area with many high-rise buildings.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
01	5	<p><b>‘Following the volcanic eruption of Mount Semeru, government agencies evacuated areas at risk of mudflows and distributed surgical masks to reduce ash inhalation.’</b></p> <p><b>The statement above describes which stage of the hazard management cycle for this volcanic eruption?</b></p> <p>Key – D: Response</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
02		<p><b>Figure 1</b> shows the impacts of Tropical Cyclone Seroja (2021) in Timor-Leste and part of Indonesia.</p> <p><b>Analyse the information shown in Figure 1.</b></p>	<p><b>6</b></p> <p><b>A03=6</b></p>

Level	Marks	Descriptor
2	4–6	<b>A03</b> – Clear selection and analysis of the evidence that has been provided linked to tropical storm and rainfall to the warnings and impacts.
1	1–3	<b>A03</b> – Some basic selection and analysis of the evidence that has been provided linked to the tropical storm, rainfall, warnings and impacts.
0	0	No creditable content.

### Indicative Content

There are a variety of ways of approaching this unseen material. Students must select the relevant information from the map and look at patterns and relationships between the path and rainfall associated with the tropical storm and the warnings issued/impacts. Students should look at the figure and see anomalies and links between the information.

### **A03**

- The tropical storm remains at 63–93 km/h throughout its path – it does circle the Indonesian island with Rote Ndao (on the 4th April at 65 km/h) which received three weather warnings including strong wind watch.
- The Indonesian islands of Timor and Rote both have a storm surge of <1 m – the storm did make landfall on the 4th April near the town on Kupang – there was a flood advisory in this area.
- Areas with 500% of normal rainfall tend to fall within 150 km of the tropical storms track – some exceptions include Wetar to the north and Flores to the north-west.
- Timor-Leste receives significantly less rain than areas in Indonesia – with the exception of West Sumba.
- The weather warnings do not differ with proximity to the tropical storms track – areas 300 km or more away such as Bima and Manggarai receive the same three warnings as Rote which is less than 20 km from the storm's track.
- The impacts are significantly greater in Indonesia.

Question	Part	Marking guidance	Total marks
03		<p><b>Evaluate the success of the human responses to a recent seismic event that you have studied.</b></p> <p><b>AO1</b> – Knowledge and understanding of responses to seismic hazards, evidenced by a recent event.</p> <p><b>AO2</b> – Application of knowledge and understanding to evaluate the response to the seismic event.</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 responses to seismic events.</p> <p><b>AO2</b> – Applies detailed 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 responses to seismic events.</p> <p><b>AO2</b> – Applies clear 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 responses to seismic events.</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

There are a variety of ways of approaching this question. The response will depend on the seismic event studied. If a non-seismic event is chosen such as a tropical storm then the response will be limited to no higher than level 2.

Candidates should review the responses to the event and whether the responses mitigated any issues.

### **AO1**

- Nature, forms and potential impacts of hazards.
- Understanding that response is part of the hazard management cycle and the Park model of human response to hazards.
- Hazard perception and its economic and cultural determinants; characteristic human responses.
- Knowledge of the nature of seismicity and forms of seismic hazard.
- Understanding the impacts and responses to seismic hazards/the chosen seismic event:
  - impacts can be primary, secondary or long term
  - primary impacts are a direct result of the seismic activity such as immediate deaths, landslides, ground shaking
  - secondary impacts are direct consequences such as fires from gas pipes being broken, spread of communicable disease in camps, disorder and rioting
  - long-term impacts include economic losses from not being able to rebuild and resume work and trauma for those impacted.
- Knowledge of short and long-term responses to seismic events/the chosen seismic event.
- Understanding that other factors influence impacts and response to the chosen seismic event such as:
  - magnitude of the earthquake
  - locational geography
  - level of development, education, societal norms
  - previous experience and history of seismic events.
- Human response to hazards varies by event and even within an event – hazards disrupt life and this deterioration is explained using the Park model.
- Understanding of the range of responses and factors influencing these eg political instability in Haiti following the assassination of their president had potential to impact the value of aid in responding to the 2021 earthquake.
- Knowledge and understanding of the impacts and human responses to seismic hazards as evidenced by a recent seismic event.

### **AO2**

- Linking preparation and experience of seismic events to the response:
  - structural preparations such as buildings with oil dampers and swaying central columns may be found in places like Japan, whereby the residents are experienced at being prepared and therefore the responses to seismic events are helped by mitigation
  - large-scale preparations such as education on evacuation procedures and earthquake drills are experienced across the country which helped reduce the impacts of the Chiba 2021 and Fukushima 2022 earthquakes.
- Analysis of how different responses influence the impacts of seismic hazards.
- Analysis of how other factors may influence impacts and responses.
- The relative importance of different elements of response to seismic hazards.
- Example of a recent seismic event to evaluate the success of the response:
  - eg Haiti 2021 earthquake response was hindered due to the political conditions in the country at the time and the previous response to the 2011 earthquake. The rebuilding from the 2011 earthquake was patchy, and despite plans to make structures sounder for seismic events (and cyclones) funding, expertise and leadership meant that some areas were not structurally sound – this was



compounded by the COVID-19 pandemic. The assassination of their President meant the response was uncoordinated and still resulted in over 2000 casualties. The earthquake also occurred during the pandemic

- whilst the Japanese Chiba 2021 and Fukushima 2022 earthquakes had a good response as people were prepared and prior mitigation reduced the need for emergency aid, there were still some weaknesses in the response – elderly people struggled to complete earthquake drills and many homes were prone to flooding from liquefaction.
- Discussion and evidence provided to evaluate whether response to the recent seismic event (or other factors) were successful.

Question	Part	Marking guidance	Total marks
04		<p><b>‘Multi-hazardous environments present greater risks to the economy than to the environment.’</b></p> <p><b>Evaluate this statement with reference to a case study of a multi-hazardous environment that you have studied.</b></p> <p><b>AO1</b> – Knowledge of nature and the social, economic and environmental risks presented. Knowledge of how human qualities and human responses contribute to its continuing human occupation.</p> <p><b>AO2</b> – Application of knowledge and understanding to evaluate whether the economic risks of multi-hazardous environments are bigger than environmental.</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> <p><b>AO1</b> – Generally clear awareness of scale and temporal change which is integrated where appropriate.</p>

2	6–10	<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>
1	1–5	<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>
0	0	No creditable content.

### Indicative Content

Content will depend on the multi-hazardous environment chosen and the associated hazards.

Candidates should look at the value of the impacts the hazards play on the economy and environment and make a judgement.

If a student does not refer to an example of a multi-hazardous environment the response will be limited to no higher than level 2.

### **AO1**

- Nature, forms and potential impacts of natural hazards: seismic, volcanic, storm hazards and wildfires.
- Hazard perception and its determinants may shape the response to and therefore impacts of different hazards eg communities in Japan operate risk sharing and adjustment, therefore the economic and environmental impacts of the hazard may be minimised.
- Impacts of natural hazards can be primary, secondary, economic, environmental, political and social – there may be some overlap and connection between these categories.
- Short and long-term responses, including mitigation and preparation influence hazard impact. Risk management is designed to reduce the impacts of the different hazards experienced.
- Preparedness, adaptation and mitigation are common responses to hazards.
- There is no one set response to a natural hazard and these are determined by governments and individuals.
- Other factors such as the level of development of an area will influence how well hazards can be prepared for and managed (eg may lack wealth and technology).
- Multi-hazardous environments contain two or more different hazards from different hazard groups such as hydrological, geophysical and atmospheric. Different hazards interact with each other and may exacerbate impacts – such as significant periods of tropical storms and associated wet weather making slopes of volcanic and seismic regions more prone to landslides, avalanches and liquefaction.
- Some comparison of different impacts:
  - eg the Californian coast has experienced recent wildfires and is prone to earthquakes. The earthquakes are relatively common – but often low intensity swarms. These have potential to create large economic impacts on built-up areas, whereas wildfires had significant economic cost to home-owners and environmental impacts of forest and habitat loss.
- Place knowledge of the multi-hazard environment and the relative impacts of hazards experienced there.
- Knowledge of economic and environmental risks – including risks to the built environment.

### **AO2**

- Analysis and explanation of the interactions between nature and underlying causes of hazards within a multi-hazardous environment and the impacts.
- Analysis and explanation of the interactions between hazard experience, perception and response within a multi-hazardous environment and the impacts.
- Analysis of different hazards within the multi-hazardous environment and their impacts on the environment and economy – evaluation of these and judgement of which is greater.
- Evaluation of how hazards experienced within a multi-hazardous environment impact the human qualities and responses.
- Evaluation of how human qualities and responses to hazards within a multi-hazardous environment contribute to its continued human occupation.
- Relative comparison between economic impacts and environmental impacts.
- Relative contrasts between the economic and environmental impacts in terms of cost, recovery, scale and the influence on society.

- Analysis of whether economic costs of hazards experienced in a multi-hazardous environment are greater than the environmental impacts:
  - the Californian coast has experienced wildfires between 2018 and 2022. These wildfires have had economic costs to many wealthy individuals including celebrities Caitlyn Jenner and actor Orlando Bloom. The Paradise Wildfires of 2018 impacted 27 000 homes of middle to low-income people – many of whom lived in trailers on the Sierra Hills. The economic losses were significant. Whilst the celebrities were able to publicise on social media their homes were repaired and well insured. Those in trailers worth significantly less felt the economic impact on them more so
  - the wildfire destroyed 153 336 acres of forest and many areas reliant on forestry and agriculture. Whilst this had an impact on the economy the environment was stunted and will not recover within a human lifetime – the economy was, for the best part, able to bounce back. Trees do not quickly grow back and cannot even grow because of soil destruction and erosion caused by fire. Suddenly, invasive and animal-unfriendly weeds and unmanageable grasses spout up and begin to outnumber native brush and plants, hurrying further erosion and even leading to more fires
  - fauna including wolves, mountain lions, rodents, rabbits, small birds and other indigenous animals which relied on California's native vegetation experienced trouble finding enough food to live
  - whilst California is prone to earthquakes, these are often low intensity swarms. These have potential to create large economic impacts on built-up areas, but perhaps less impact on natural environments due to the nature of the coastline – major cities are found on fault lines.

## 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 are <u>all</u> ways that plants can adapt to the hot desert climate?</b></p> <p>Key – A: Ability to become dormant, storing water in fleshy stems <b>and</b> growing low to the ground.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
05	2	<p><b>Which of the following are <u>all</u> processes of transportation in hot desert environments?</b></p> <p>Key – C: Surface creep, saltation <b>and</b> suspension</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
05	3	<p><b>‘Rock fragments scattered across a large surface of desert, formed when wind blows away finer sand particles and leaves behind larger rocks.’</b></p> <p><b>The description above refers to the appearance and formation of which desert landform?</b></p> <p>Key – B: Desert pavement</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
05	4	<p><b>Which of the following explains the role of relief in causing aridity in hot deserts?</b></p> <p>Key – B: Moist air is forced over hills and mountains. This creates rainfall on the windward side of slopes. The air which descends on the leeward side becomes warmer and drier.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
05	5	<p><b>Which of the following describes the process of exfoliation?</b></p> <p>Key – A: Continued heating and cooling of the outer layers of rock causes them to expand and contract and break away.</p>	<p>1</p> <p>AO1=1</p>

Question	Part	Marking guidance	Total marks
06		<p><b>Figure 2</b> shows the relationship between soil characteristics and soil erosion for a range of sample sites in southern Iran.</p> <p><b>Analyse the different rates of soil erosion in Figure 2.</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 graphs provided and appropriate comparison between soil erosion rates and soil composition. Making appropriate use of specific relationships between soil composition and soil erosion rates to support the analysis.
1	1–3	<b>AO3</b> – Some basic selection of evidence from the graphs provided. Isolated or basic ideas.
0	0	No creditable content.

### Indicative Content

There are a variety of ways of approaching this unseen material. Students should analyse the rates of soil erosion and soil composition. Students should make links between soil moisture, and whether the soil is sand or clay, as well as varied rates of erosion. Students should identify patterns and anomalies, using data to refer to these.

### **AO3**

- There is a positive correlation between the percentage of sand in a soil and the rate of erosion – the greater the percentage of sand, the greater the erosion.
- The data does group once the proportion of sand is above 50%. Sand of 50% generally experiences between 2 and 3 grams per m<sup>2</sup>/s but – this doesn't always increase with increased sand content and the results become more variable.
- Some of the highest and most significant rates of erosion with percentage of sand of over 70% – up to 15 grams per m<sup>2</sup>/s.
- Much more clustering in the sand graph compared to the others, at 20–40%.
- At 60% sand there is a wide range of soil erosion rates from as low as 1 grams per m<sup>2</sup>/s to 8 grams per m<sup>2</sup>/s. The range is much narrower with lower sand percentage such as at 20% – there is a range of 1 grams per m<sup>2</sup>/s.
- Both the percentage of clay and soil moisture follow a negative correlation – the higher the percentage of clay the lower the rate of soil erosion, the higher the soil moisture the lower rate of soil erosion.
- The greatest amount of soil erosion on the clay is 11 grams per m<sup>2</sup>/s in a soil with 9% clay. Similarly, 11 grams per m<sup>2</sup>/s is the highest rate of soil erosion on Graph C – related to approximately 0.2% moisture content.
- The greatest amount of soil erosion is experienced within Graph A – a rate of 17 grams per m<sup>2</sup>/s in a soil composed of 82% sand. This is not the highest percentage of sand in a soil sample – which is fractionally higher at 84%.
- Within the soil moisture content graph all soil samples with more than 2% soil moisture experience minimal soil erosion of 2 grams per m<sup>2</sup>/s or less.

Question	Part	Marking guidance	Total marks
07		<p><b>Assess the importance of sheet and flash flooding in the formation of wadis.</b></p> <p><b>AO1</b> – Knowledge and understanding of arid landscape development. Knowledge and understanding of distinctively arid geomorphological processes, the role of wind and water.</p> <p><b>AO2</b> – Application of knowledge and understanding of how fluvial processes shape landforms. Students may apply their ideas to different landforms.</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 sheet and flash flooding processes. Detailed ideas on the links between water and landforms.</p> <p><b>AO2</b> – Applies detailed 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 sheet and flash flooding processes. Clear ideas on the links between water and landforms.</p> <p><b>AO2</b> – Applies clear 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 sheet and flash flooding processes. Basic ideas on the links between water 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 understanding of the role of water processes in deserts and understanding of the climatic characteristics of deserts. The role of water should be assessed against the formation of wadis.

#### **AO1**

- Desert landscapes and landforms are created by desert systems which interact.
- Deserts experience distinctive climatic characteristics:
  - high levels of insolation
  - low levels of cloud cover
  - large diurnal temperature range
  - strong winds including frequent sandstorms
  - thunderstorms and episodic rainfall.
- Water action is important in shaping desert landscapes.
- Sources of water in deserts include:
  - exogenous, ephemeral and endoreic rivers
  - episodic flooding.
- Knowledge of sheet flooding: sheet flooding occurs on plateau landscapes. Water from sheet flooding forms rivulets and gullies.
- Knowledge of flash flooding: flash flooding occurs in river valleys such as canyons and wadis. Flash flooding has high erosional power to create and deepen river channels.
- Water erodes the landscape by hydraulic action, abrasion, corrasion and solution. These eroded particles are transported by traction, saltation, suspension and solution and are deposited.
- Wadis are landforms resultant from water action – there may be references to others including:
  - alluvial fans, pediments, canyons, playas, inselbergs, mesas, buttes and spires.
- Wadis are dry river valleys created initially from a plateau landscape.
- Weathering of surfaces provides substrates for fluvial erosion.
- Knowledge and understanding of the interaction of processes within desert systems.
- Understanding of the relationship between process, time, landforms, and landscapes.

#### **AO2**

- A clear explanation of the influence that flash and sheet flooding have had on wadis:
  - eg wadis are predominantly formed by flash flooding. Wadis form a distinct channel gorged out by streams (generally ephemeral) and canyons are much deeper, formed by a more continuous stream, often from an exogenous river. In the case of wadis short spells of intense rainfall creates a sheet flood running over a plateau surface. This in turn creates rills and a gully, which over time and with sufficient flow during flood events create distinctive channels, forming a wadi.
- A clear explanation of the links between the landscape and the processes creating the landscape.
- Critical evaluation of whether sheet and flash flooding are responsible for the formation of wadis – whether that be in large or in part.
- Explanation of the link between flash and sheet flooding, wadis and interconnected landforms within desert environments.
- Critical evaluation:
  - eg Landforms such as wadis are dominated by the influence of sheet and flash flooding, whereas others may have very little connection to fluvial processes.
- Other factors could be discussed (such as wind, soil, climate, weathering) and their role in the formation of wadis.
- An evaluation of whether sheet and flash flooding are important in forming wadis. There may be some examples used to justify this.

Question	Part	Marking guidance	Total marks
08		<p><b>‘The human causes of desertification make attempts to mitigate against it more difficult.’</b></p> <p><b>Assess the extent to which you agree with this statement.</b></p> <p><b>Use <u>at least one</u> case study of a landscape impacted by desertification to support your answer.</b></p> <p><b>AO1</b> – Knowledge and understanding the causes of and responses to desertification. Knowledge and understanding of a case study of a landscape where desertification has occurred.</p> <p><b>AO2</b> – Application of knowledge and understanding to analyse the influence of human causes to the relative success of desertification responses.</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

### **AO1**

- Knowledge of current distributions of hot desert environments and their margins.
- Knowledge of the climatic characteristics of hot desert environments.
- Knowledge and understanding of the changing extent and distribution of hot deserts and the causes of desertification.
- Desertification is the degradation of land and soil, whereby land that was once marginalised becomes exposed, eroded and unproductive:
  - climate change and population growth are some of the major causes of desertification leading to over-farming and unsustainable land use techniques
  - eg increased sheep farming in the Baida region of Jordan has reduced land and soil quality.
- Desertification is dominantly caused by human processes:
  - climate variation linked with human-induced global warming has increased global temperatures and influenced rainfall patterns
  - humans depend on the land for their survival and are prone to utilise it for agriculture  
Overcultivation, overirrigation and overgrazing are the result of population increase putting strain and pressures on marginal land
  - fuelwood use in places like Zinder Niger are responsible for increased soil erosion as the ground is less protected once vegetation is removed.
- Knowledge of impacts of desertification.
- Knowledge and understanding of the interaction of processes threatening areas subject to desertification eg soil erosion reducing the ability of farm land to maintain water, increased irrigation makes the land more saline, and this reduces the soil's ability to bind together, which makes the soil looser and more prone to erosion.
- Knowledge of alternative possible futures for local populations including responses to reduce and reverse desertification:
  - eg Less productive soils increase migration and put pressure on other areas – such as the rural depopulation of the Baida region in Jordan
  - eg less productive soils encourage some to implement conservation strategies such as drip irrigation and zero tillage farming.
- Knowledge of implication of desertification for sustainable development.

### **AO2**

- A clear explanation of the influence that desertification has on the case study:
  - eg reduced soil quality has led to over farming techniques movement in Zinder, Niger whereby populations have increased irrigation of land and made it more saline.
- Knowledge and understanding of the interaction of processes threatening areas subject to desertification eg soil erosion reducing the ability of farm land to maintain water, increased irrigation makes the land more saline, and this reduces the soil's ability to bind together, which makes the soil looser and more prone to erosion.
- A clear explanation of the links between the causes of and responses to desertification.
- Responses to desertification should be clearly linked to the human causes and underlying issues creating the desertification within the case study:
  - eg in the Baida region of Jordan one major influence on the rate of desertification was overgrazing of sheep since the Gulf War. The Tal Rimah Rangeland Restoration Project was initiated to ask herders to reduce sheep grazing; bunds were built to reduce water loss; drought tolerant vegetation was planted. The aim of the project was to support populations to survive and thrive in this region and reduce population loss. The project ensured farmers were able to make a living from their land and increased the biodiversity of the region. This was successful as the area was not overpopulated and the landscape did not feel the strain due to the need to feed a growing

population, therefore was moderately successful in reducing sheep numbers. The landscape improved and desertification was reversed

- eg conversely in Zinder, Niger a growing population reliant on wood to fuel heating and cooking was the major cause of soil and land degradation. One strategy was the introduction of solar ovens which have reduced the need for fuelwood collection for these populations. This has maintained greater land cover and forest and reduced the erosion of the fragile soil underneath, but the growing population and their culture of eating only cooked food has hampered the impact of the project. Despite efforts not all families have access to solar ovens and the destruction of vegetated areas still continues to a large extent.
- An evaluation of the human responses to desertification and whether the human causes help or hinder their success in reducing and reversing desertification.
- A conclusion of the influence of human causes in shaping the successfulness of the responses to desertification.

**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