CAMBRIDGE
International Education

# Cambridge International AS & A Level

**GEOGRAPHY** **9696/33**

Paper 3 Advanced Physical Geography Options **May/June 2025**

MARK SCHEME

Maximum Mark: 60

**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.



 

## Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

 

## Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

## Annotations

| Annotation | Meaning | Use |
|---|---|---|
|  | Correct point | Point-marked questions only: Resource-based questions part (a) |
|  | Level 4 | Levels-marked questions only: Essay questions |
|  | Level 3 | Levels-marked questions only: Resource-based questions part (b), and Essay questions |
|  | Level 2 | Levels-marked questions only: Resource-based questions part (b), and Essay questions |
|  | Level 1 | Levels-marked questions only: Resource-based questions part (b), and Essay questions |
|  | Level 0 – No creditable response | Levels-marked questions only: Resource-based questions part (b), and Essay questions |
| Highlighter | Creditworthy part of an extended response | Levels-marked questions only: Resource-based questions part (b), and Essay questions |
| Off-page comment | Short statement to justify the level given for an essay, using wording from the mark scheme | Levels-marked questions only: Essay questions |
|  | Evaluative point | Levels-marked questions only: Essay questions |
|  | Omission or further development/ detail needed to gain credit | All questions |

| Annotation | Meaning | Use |
|---|---|---|
|  | Unclear or validity is doubted | All questions |
| DEV | Developed point | All questions |
| EG | Appropriate example or case study given | All questions |
| IRRL | Irrelevant | All questions |
| NAQ | Material that does not answer the question | All questions |
|  | Highlighting a significant part of an extended response – to be used with another annotation e.g. IRRL or EVAL | Levels-marked questions only: Resource-based questions part (b), and Essay questions |
| SEEN | 1. Diagram or essay plan has been seen but no specific credit given<br><br>2. Additional page has been checked | 1. Any diagrams or essay plans<br><br>2. All blank pages in the provided generic answer booklet and/or extension answer booklet(s). |
| R | Rubric error | Optional questions only (place at start of question not being credited): Whole paper |

Examiners must consider the following guidance when marking the essay questions:

Candidates are free to develop their own approach to the question and responses will vary depending on the example(s) chosen. Whichever approach is chosen, essays which address the question and support their argument with relevant examples will be credited. The direction of the response and evaluation made will depend on the approach chosen, and any evaluation is therefore valid if argued and based on evidence.

 

Answer questions from **two** different options.

**Tropical environments**

If answering this option, answer Question 1 and **either** Question 2 **or** Question 3.

| Question | Answer | Marks |
|---|---|---|
| 1(a) | **Fig. 1.1 is a photograph which shows vegetation in a seasonally humid tropical (savanna) ecosystem in Botswana, Africa.**<br><br>**Describe <u>four</u> characteristics of the vegetation shown in Fig. 1.1.**<br><br>Characteristics include:<br>• extensive coverage of the ground with shrubs/low bushes<br>• light green shrubs/bushes<br>• occasional, scattered trees in foreground<br>• one (dominant) tree has a bulbous/thick trunk…<br>• …dry/peeling bark…<br>• …many small bare branches/very few leaves<br>• whilst other trees have 'umbrella' canopies/crown-like<br>• more dense trees in background<br>• dark green trees<br>• most tress in background have similar heights<br>• possible flowers on bush to bottom right of photo<br><br>**1 mark** for each descriptive point. **Maximum 3 marks** if only describing the main (baobab) tree. | **4** |

| Question | Answer | Marks |
|---|---|---|
| 1(b) | **Explain how the seasonally humid tropical climate has influenced the characteristics of the vegetation shown in Fig. 1.1.**<br><br>Influences of the climate on the vegetation include:<br>• seasonally humid tropical climate involves two distinct seasons – dry and wet. Candidates may make reference to the ITCZ<br>• the growing season is limited by the lack of rain in the dry season and so productivity and vegetation density is low<br>• vegetation tends to be xerophytic and able to survive the frequent droughts of the dry season<br>• shrubs/bushes dominate because the dry season limits the presence of trees, requiring more water<br>• trees that can survive include those such as baobab, which store water in their bulbous trunk during the wet season for use in the dry season. Baobab is deciduous – drops leaves for dry season to reduce water loss<br>• some trees have long and/or widespread tap roots to find water when the water table is low<br>• the acacia has a flattened crown so that sunlight, and hence high temperatures, are reduced around the roots, lowering evaporation rates. Acacia is also evergreen, small leaves with few stomata to reduce water loss<br>• the dry conditions and occasional lightning storms can lead to fire, and so the vegetation is typically pyrophytic – thick bark, seeds that germinate with heat<br>• thick bark helps insulate trees during hot/dry season, helping them to preserve water<br>• grasses remain dormant in dry winter but survive as seeds/roots<br>• grasses have low water and low nutrient requirements<br><br>Award marks based on the quality of explanation and breadth of the response using the marking levels below.<br><br>**Maximum Level 2** if answer is purely generic about adaptations with no specific reference to Fig. 1.1<br><br>**Level 3 (5–6)**<br>Response clearly explains how the seasonally humid tropical climate has influenced the characteristics of the vegetation shown in Fig. 1.1. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 2 (3–4)**<br>Response explains how the seasonally humid tropical climate has influenced the characteristics of the vegetation shown in Fig. 1.1. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 1(b) | **Level 1 (1–2)**<br>Response describes how the seasonally humid tropical climate has influenced the characteristics of the vegetation shown in Fig. 1.1. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.<br><br>**Level 0 (0)**<br>No creditable response. | |

 

| Question | Answer | Marks |
|---|---|---|
| 2 | **'The characteristics of the humid tropical climate are mainly caused by the intertropical convergence zone (ITCZ).'**<br><br>**How far do you agree with this statement?**<br><br>The role of the ITCZ:<br>• the ITCZ lies close to the equator and moves seasonally, lagging slightly behind the position of the overhead sun<br>• air streams converge at the ITCZ from north and south of the equator (low-pressure zone and development of Hadley cells, trade winds)<br>• the air rises convectively which leads to cooling, condensation and cloud formation resulting in heavy convectional rainfall<br>• locations close to the equator are directly under the ITCZ twice a year, and close to it for the rest of the year, meaning rainfall is fairly evenly distributed through the year with no dry season<br>• humidity and cloudiness both linked to low pressure and rainfall produced by the ITCZ (although ultimately is caused by high insolation)<br><br>Other factors:<br>• air masses – the direction of approach of an air mass determines its temperature, and whether it tracks over land or sea will influence the moisture content of the air<br>• sub-tropical high pressure – often develops over land masses in winter, and stable, sinking air moves outwards, including towards the tropics. In the summer they tend to develop over the cooler oceans and moister air will move towards the tropics<br>• monsoons – this relates to the point above, with high pressure in the winter creating drier conditions and lower pressure in the spring causing monsoon rains<br>• ocean currents – warm ocean currents move warm, moist air above to the edge of the tropics whilst cold ocean currents do the opposite making maritime areas in the tropics cooler and drier<br>• wind – wind from the sea tends to be warmer in winter and cooler in the summer than the corresponding wind from the land<br>• ENSO – El Niño/La Niña might be mentioned in respect of regional short-term variations to humid tropical climates<br>• altitude – areas with higher altitude may have cooler temperatures but potentially more precipitation due to orographic uplift<br>• vegetation – high density of vegetation means levels of evapotranspiration are very high and so can influence precipitation in humid tropical regions<br><br>Candidates may argue that the ITCZ is the key factor, with other factors causing local and regional variations.<br><br>Award marks based on the quality of the response using the marking levels below. | **20** |

| Question | Answer | Marks |
|---|---|---|
| 2 | **Level 4 (16–20)**<br>Response thoroughly discusses the extent to which the characteristics of the humid tropical climate are mainly caused by the intertropical convergence zone (ITCZ). An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 3 (11–15)**<br>Response discusses the extent to which the characteristics of the humid tropical climate are mainly caused by the intertropical convergence zone (ITCZ). Response is broadly evaluative in character, comprising some explanatory or narrative content and a conclusion. Response develops on a largely secure base of knowledge and understanding with the use of example(s).<br><br>**Level 2 (6–10)**<br>Response demonstrates some knowledge and understanding of the extent to which the characteristics of the humid tropical climate are mainly caused by the intertropical convergence zone (ITCZ). Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks).<br><br>**Level 1 (1–5)**<br>Response makes a few general points about the causes of the characteristics of the humid tropical climate. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.<br><br>**Level 0 (0)**<br>No creditable response. | |

 

| Question | Answer | Marks |
|---|---|---|
| 3 | **Assess the relative importance of the factors influencing tropical soil formation.**<br><br>Influencing factors include:<br>• climate – rainfall (length of wet/dry seasons as well as quantity), temperature<br>• vegetation – type, density<br>• organisms – micro-organisms, insects, burrowing animals<br>• relief – altitude, gradient, aspect<br>• parent material – bedrock and superficial deposits, affects mineral composition and texture<br>• time – the medium through which the other factors operate; soil formation is a slow process<br>• fire – releasing nutrients from vegetation<br>• human influence – use of heavy machinery, agricultural practices (overgrazing, monocultures, fertilisers, irrigation, etc.), fire. Changes the characteristics of soil more than having an influence on formation.<br><br>Tropical soils include:<br>• oxisols/latosols<br>• tropical red earths<br>• tropical brown earths<br><br>Soil forming processes include:<br>• lateritization<br>• humification<br>• leaching/illuviation<br>• weathering – rates/types<br><br>Candidates may consider the importance of these factors at different scales (local to widespread) and/or over time.<br><br>Award marks based on the quality of the response using the marking levels below.<br><br>**Level 4 (16–20)**<br>Response thoroughly discusses the relative importance of the factors influencing tropical soil formation. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 3 (11–15)**<br>Response discusses the relative importance of the factors influencing tropical soil formation. Response is broadly evaluative in character, comprising some explanatory or narrative content and a conclusion. Response develops on a largely secure base of knowledge and understanding with the use of example(s). | **20** |

| Question | Answer | Marks |
|---|---|---|
| 3 | **Level 2 (6–10)**<br>Response demonstrates some knowledge and understanding of the relative importance of the factors influencing tropical soil formation. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks).<br><br>**Level 1 (1–5)**<br>Response makes a few general points about factors influencing tropical soil formation. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.<br><br>**Level 0 (0)**<br>No creditable response. | |

**Coastal environments**

If answering this option, answer Question 4 and **either** Question 5 **or** Question 6.

| Question | Answer | Marks |
|---|---|---|
| 4(a) | **Fig. 4.1 shows beach volume changes along the coastline in Netarts Bay, Oregon, USA, 1997–99.**<br><br>**Describe the pattern of beach volume changes shown in Fig. 4.1.**<br><br>Pattern includes:<br>• overall, downwards trend in volume changes with distance along the coast<br>• starts at +1000 $m^3$ and finishes at –1000 $m^3$<br>• significant variations/fluctuations along the coastline …<br>• highest increase has a greater magnitude than the highest decrease<br>• highest increase of 4000 $m^3$ at 3600 m along and highest decrease of –1800 $m^3$ at 3200 m along (range of 5800 $m^3$)<br>• virtually all positive changes until 2500 m along …<br>• … with the exception of a small negative change at 1400 m along the coastline<br>• much more negative change after 2500 m along …<br>• … but more variable change in that stretch of coastline<br>• more positive than negative changes<br>• more stable/less variation after 4000 m along<br><br>**1 mark** for each descriptive point. **Reserve 1 mark** for use of data. | **4** |

| Question | Answer | Marks |
|---|---|---|
| 4(b) | **Suggest <u>two</u> reasons for the pattern shown in Fig. 4.1.**<br><br>Reasons could include:<br>• exposure to higher energy, more erosive waves in some places resulting in volume loss<br>• dominance of lower energy waves leading to deposition in more sheltered areas (bays potentially) resulting in volume gain<br>• influence of longshore drift, removing sediment from areas with volume loss and transporting it to areas with volume gain<br>• human activity – role of groynes trapping sediment in places causing volume gain; beach nourishment/recharge in areas of volume gain; sediment removal in areas of loss; role of artificial offshore bars/reefs<br>• nature of sediment – sand or shingle may influence change due to weight of sediment<br>• wave refraction – changes in depth of water may alter the direction and strength of waves leading to more erosion or deposition<br>• increasing sediment supply from offshore bars, rivers, sand dunes, etc.<br><br>Award marks based on the quality of explanation and breadth of the response using the marking levels below.<br><br>**Level 3 (5–6)**<br>Response clearly explains <u>two</u> reasons for the pattern shown in Fig. 4.1. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 2 (3–4)**<br>Response explains <u>two</u> reasons or clearly explains <u>one</u> reason for the pattern shown in Fig. 4.1. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.<br><br>**Level 1 (1–2)**<br>Response explains <u>one or two</u> reasons for the pattern shown in Fig. 4.1. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.<br><br>**Level 0 (0)**<br>No creditable response. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 5 | **To what extent are erosional landforms influenced by sub-aerial processes in coastal environments?**<br><br>Erosional landforms include:<br>• cliffs and wave cut platforms<br>• caves, arches, stacks and stumps<br>• bays and headlands<br><br>Sub-aerial processes include:<br>• weathering – mechanical, chemical and biological<br>• mass movements – creeps, slides, flows and falls<br><br>Other factors include:<br>• marine erosion – hydraulic action, cavitation, corrasion, abrasion, solution<br>• geology – rock type and structure<br>• wave energy – direction and fetch<br>• human factors – engineering such as groynes inhibits longshore drift, reducing the size of beaches in front of cliffs<br>• sea level rise<br><br>Candidates may well argue that erosional processes are largely responsible for the formation of the landforms, but that sub-aerial processes contribute and modify subsequently.<br><br>Award marks based on the quality of the response using the marking levels below.<br><br>**Level 4 (16–20)**<br>Response thoroughly discusses the extent to which erosional landforms are influenced by sub-aerial processes in coastal environments. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 3 (11–15)**<br>Response discusses the extent to which erosional landforms are influenced by sub-aerial processes in coastal environments. Response is broadly evaluative in character, comprising some explanatory or narrative content and a conclusion. Response develops on a largely secure base of knowledge and understanding with the use of example(s).<br><br>**Level 2 (6–10)**<br>Response demonstrates some knowledge and understanding of the extent to which erosional landforms are influenced by sub-aerial processes in coastal environments. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks). | **20** |

 

| Question | Answer | Marks |
|---|---|---|
| 5 | **Level 1 (1–5)**<br>Response makes a few general points about the influence of sub-aerial processes on erosional landforms. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.<br><br>**Level 0 (0)**<br>No creditable response. | |

| Question | Answer | Marks |
|---|---|---|
| 6 | **Discuss the extent to which pollution can be regarded as the greatest threat to coral reefs.**<br><br>Threats to coral reefs should focus on what affects the preferred conditions for coral growth and include:<br>• pollution – from oil spills, industrial waste, sedimentation, nitrate run-off, phosphates in treated sewage, ocean plastics<br>• global warming – sea temperature, ocean acidity, bleaching<br>• sea-level rise – causing submergence and change in habitat but only if the coral is already under stress<br>• physical damage from humans – fishing, snorkelling, leisure boats<br>• natural factors – storms, tsunamis, volcanoes<br>• invasive species<br><br>A different approach could be that climate change is a result of atmospheric pollution and therefore a 'pollution' threat to coral reefs.<br>Some candidates may regard acidification from increased $CO_2$ absorption as a form of pollution, which is acceptable.<br><br>Candidates may approach this question in terms of scale of threats (global vs local) or the manageability of the threats and the success of strategies to manage threats. Some may also make reference to the level of development.<br><br>Award marks based on the quality of the response using the marking levels below.<br><br>**Level 4 (16–20)**<br>Response thoroughly discusses the extent to which pollution can be regarded as the greatest threat to coral reefs. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 3 (11–15)**<br>Response discusses the extent to which pollution can be regarded as the greatest threat to coral reefs. Response is broadly evaluative in character, comprising some explanatory or narrative content and a conclusion. Response develops on a largely secure base of knowledge and understanding with the use of example(s).<br><br>**Level 2 (6–10)**<br>Response demonstrates some knowledge and understanding of the extent to which pollution can be regarded as the greatest threat to coral reefs. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks). | **20** |

 

| Question | Answer | Marks |
|---|---|---|
| 6 | **Level 1 (1–5)**<br>Response makes a few general points about threats to coral reefs. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.<br><br>**Level 0 (0)**<br>No creditable response. | |

**Hazardous environments**

If answering this option, answer Question 7 and **either** Question 8 **or** Question 9.

| Question | Answer | Marks |
|---|---|---|
| 7(a) | **Fig. 7.1 shows the Typhoon Haiyan storm surge, San Pedro Bay, Philippines, 2013.**<br><br>**Describe the variations in the height of the storm surge shown in Fig. 7.1.**<br><br>Variations include:<br>• increasing height to the N/NW/into the bay OR decreasing height to the S/SE/out of the bay<br>• minimum of 0 m to SE, maximum of 8 m at head of the bay (between Tacloban city and Basey)<br>• height decreases slightly into the river estuary, dropping to 6/7 m in the narrow channel in the far north<br>• rate of height change increases with distance NW/into the bay (and the increase is more significant towards the NW)<br>• waves generally higher on the West than the East of San Pedro Bay<br><br>**1 mark** for each descriptive point. Use of data for **maximum marks**. | **3** |

| Question | Answer | Marks |
|---|---|---|
| 7(b) | **Suggest reasons for the variations you described in (a).**<br><br>Reasons could include:<br>• height increases with increasing wind speed as winds blow over a greater distance of open sea<br>• height increases as surge steepens due to friction from sea floor in shallowing water – maybe shallower on the Western side as storm surge is higher there<br>• height increases due to funnelling effect of the narrowing bay – waves are squeezed upwards as the bay narrows<br>• height increases as pressure falls during the movement of a developing low-pressure system, allow water to rise up<br>• height decreases in river estuary due to shelter from wind strength<br><br>Award marks based on the quality of explanation and breadth of the response using the marking levels below.<br><br>**Level 3 (6–7)**<br>Response clearly explains two or more reasons for the variations in the height of the storm surge described in (a). Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 2 (3–5)**<br>Response explains two reasons or clearly explains one reason (max. 4) for the variations in the height of the storm surge described in (a). Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.<br><br>**Level 1 (1–2)**<br>Response explains one or two reasons for the variations in the height of the storm surge described in (a). Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.<br><br>**Level 0 (0)**<br>No creditable response. | **7** |

| Question | Answer | Marks |
|---|---|---|
| 8 | **'Soil liquefaction is the most significant hazard resulting from earthquakes.'**<br><br>**How far do you agree with this view?**<br><br>Earthquake hazards include:<br>• soil liquefaction – ground shaking separates water and sediment causing buildings to collapse, but only in loose sediments<br>• ground shaking – even without liquefaction, building foundations can fracture and cause collapse, so widespread hazard<br>• ground deformation – movement and change of shape of the ground can be destructive if occurring under buildings or infrastructure<br>• landslides – ground shaking can decrease frictional forms of slopes leading to landslides or other mass movements, but only on slopes<br>• tsunami – displacement of the sea floor in an earthquake can trigger a tsunami, but only affecting coastal areas<br><br>Candidates may consider how significance is quantified; loss of life, number made homeless, number of injuries, monetary cost. Significance will vary depending upon the nature of the ground material in a locality.<br><br>Manageability of hazards is relevant and there may be comments on how level of development affects this.<br><br>Award marks based on the quality of the response using the marking levels below.<br><br>**Level 4 (16–20)**<br>Response thoroughly discusses the extent to which soil liquefaction is the most significant hazard resulting from earthquakes. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 3 (11–15)**<br>Response discusses the extent to which soil liquefaction is the most significant hazard resulting from earthquakes. Response is broadly evaluative in character, comprising some explanatory or narrative content and a conclusion. Response develops on a largely secure base of knowledge and understanding with the use of example(s).<br><br>**Level 2 (6–10)**<br>Response demonstrates some knowledge and understanding of the extent to which soil liquefaction is the most significant hazard resulting from earthquakes. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks). | **20** |

 

| Question | Answer | Marks |
|---|---|---|
| 8 | **Level 1 (1–5)**<br>Response makes a few general points about hazards resulting from earthquakes. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.<br><br>**Level 0 (0)**<br>No creditable response. | |

| Question | Answer | Marks |
|---|---|---|
| 9 | **Assess the effectiveness of different ways of managing hazards resulting from atmospheric disturbances.**<br><br>Hazards from large-scale atmospheric disturbances (cyclones, hurricanes, typhoons) include:<br>• storm surges<br>• coastal flooding<br>• intense rainfall (leading to severe river floods and mass movement)<br>• high winds<br><br>Hazards from small-scale atmospheric disturbances (tornadoes) include:<br>• intense precipitation (rain leading to flash flooding and hail)<br>• high winds<br>• pressure imbalances<br>• lightning<br><br>Ways of managing hazards include:<br>• weather forecasting, prediction and monitoring<br>• building regulation and land use zoning<br>• emergency planning, including evacuation drills, shelters and emergency service provision<br>• education<br>• flood channels, embankments, sea walls<br><br>Candidates should focus on the management of the hazards themselves, rather than the disturbance in general. They could distinguish between the management of large-scale atmospheric disturbances and small-scale atmospheric disturbances. They may consider how effectiveness can be quantified; accuracy of predictions (large-scale are easier to predict/monitor than small-scale), lives saved, cost-benefit. They may argue that effectiveness depends on the level of economic development of the location and/or effectiveness of governance.<br><br>Award marks based on the quality of the response using the marking levels below.<br><br>**Level 4 (16–20)**<br>Response thoroughly discusses the effectiveness of different ways of managing hazards resulting from atmospheric disturbances. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response. | **20** |

 

| Question | Answer | Marks |
|---|---|---|
| 9 | **Level 3 (11–15)**<br>Response discusses the effectiveness of different ways of managing hazards resulting from atmospheric disturbances. Response is broadly evaluative in character, comprising some explanatory or narrative content and a conclusion. Response develops on a largely secure base of knowledge and understanding with the use of example(s).<br><br>**Level 2 (6–10)**<br>Response demonstrates some knowledge and understanding of the effectiveness of different ways of managing hazards resulting from atmospheric disturbances. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks).<br><br>**Level 1 (1–5)**<br>Response makes a few general points about different ways of managing hazards resulting from atmospheric disturbances. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.<br><br>**Level 0 (0)**<br>No creditable response. | |

 

**Hot arid and semi-arid environments**

If answering this option, answer Question 10 and **either** Question 11 **or** Question 12.

| Question | Answer | Marks |
|---|---|---|
| 10(a) | **Fig. 10.1 is a climate graph for Lajamanu, Northern Territory, Australia.**<br><br>**Describe the climate of Lajamanu shown in Fig. 10.1.**<br><br>Features of the climate include:<br>• low temperature range of 12°C<br>• maximum temperature 32°C in November/minimum temperature 20°C in June/July<br>• low annual precipitation, approximately 530–550 mm in total<br>• seasonal pattern of precipitation with dry season in cooler months April–October, wetter in hotter months November–March<br>• maximum precipitation just over 150 mm in February/minimum precipitation 0 mm in August/high variation in precipitation<br>• when precipitation is high temperature is high<br><br>**1 mark** for each descriptive point. Use of data as evidence and reference to both temperature and precipitation for **maximum marks**. | **4** |

| Question | Answer | Marks |
|---|---|---|
| 10(b) | **Suggest <u>two</u> reasons for the climate you described in <u>(a)</u>.**<br><br>Reasons could include:<br>• low latitude (18°33'S), so relatively high angle sun and intense solar heating throughout the year, leading to relatively high temperatures all year around<br>• movement of the ITCZ does cause some variation in temperatures at different times of year<br>• highest rainfall in warmest months due to convectional uplift causing clouds and rain linked to passage of ITCZ<br>• relatively low altitude (315 m above sea level), so potentially some impact of orographic uplift on precipitation total (possible rain shadow effect)<br>• long distance from the sea (400 km), so lack of maritime influence on humidity; dry air/winds likely to be commonly occurring<br><br>Award marks based on the quality of explanation and breadth of the response using the marking levels below.<br><br>**Level 3 (5–6)**<br>Response clearly explains <u>two</u> reasons for the climate described in <u>(a)</u>. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 2 (3–4)**<br>Response explains <u>two</u> reasons or clearly explains <u>one</u> reason for the climate described in <u>(a)</u>. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.<br><br>**Level 1 (1–2)**<br>Response explains <u>one or two</u> reasons for the climate described in <u>(a)</u>. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.<br><br>**Level 0 (0)**<br>No creditable response. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 11 | **Assess the influence of water action on the formation of landforms in hot arid and semi-arid environments.**<br><br>Landforms strongly influenced by water action include:<br>• wadis and arroyos<br>• alluvial fans and bahadas<br>• playas and salt lakes<br><br>Landforms also influenced by water include:<br>• pediments and piedmont zone<br>• inselbergs/buttes/mesas<br><br>Landforms barely influenced by water include:<br>• sand dunes<br>• wind sculptured rocks (yardang, zeugen)<br><br>Candidates should consider the role of previous pluvial period influences, the impact of thunderstorms/flash floods as well as a range of weathering processes involving water. Some may comment on the differing influence of water action between hot arid and semi-arid environments.<br><br>Other influences on the formation of landforms include erosion/transport/deposition by wind, as well as other weathering processes such as insolation weathering.<br><br>Award marks based on the quality of the response using the marking levels below.<br><br>**Level 4 (16–20)**<br>Response thoroughly discusses the influence of water action on the formation of landforms in hot arid and semi-arid environments. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 3 (11–15)**<br>Response discusses the influence of water action on the formation of landforms in hot arid and semi-arid environments. Response is broadly evaluative in character, comprising some explanatory or narrative content and a conclusion. Response develops on a largely secure base of knowledge and understanding with the use of example(s).<br><br>**Level 2 (6–10)**<br>Response demonstrates some knowledge and understanding of the influence of water action on the formation of landforms in hot arid and semi-arid environments. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks). | **20** |

 

| Question | Answer | Marks |
|---|---|---|
| 11 | **Level 1 (1–5)**<br>Response makes a few general points about the influence of water action on the formation of landforms in hot arid and semi-arid environments. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.<br><br>**Level 0 (0)**<br>No creditable response. | |

| Question | Answer | Marks |
|---|---|---|
| 12 | **Using a case study of either a hot arid environment or a semi-arid environment, evaluate solutions to the problems of sustainable management.**<br><br>Problems of sustainable management include:<br>• lack of rainfall/drought<br>• climate change – less reliable rainfall, higher temperatures and more evaporation<br>• desertification and soil degradation<br>• deforestation as a result of …<br>• population growth pressures<br>• poor agricultural practices – overgrazing/overcultivation<br>• fuelwood collection<br><br>Solutions to the problems include:<br>• nomadic pastoralism and paddocking<br>• crop rotation to prevent further degradation or loss of soil<br>• sustainable irrigation – stone lines, water spreading weirs<br>• drought-resistant crops<br>• using alternative water sources e.g. desalination of sea water, deep wells for fossil water<br>• windbreaks, afforestation (Great Green Wall)<br>• ecotourism<br>• large-scale catchment management schemes (dams)<br><br>Solutions may be attempted or possible. Candidates may comment on differences between natural and human-induced problems. Solutions should be directly linked to the problems they are trying to solve.<br><br>Criteria for evaluating success should be established and this might include reference to different stakeholders, over different time periods, the extent to which the problems have been solved/removed. Reference might be made to economic, social, and environmental elements of sustainability.<br><br>Award marks based on the quality of the response using the marking levels below.<br><br>**Level 4 (16–20)**<br>Response thoroughly discusses solutions to the problems of sustainable management for a case study of either a hot arid environment or a semi-arid environment. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.<br><br>**Level 3 (11–15)**<br>Response discusses solutions to the problems of sustainable management for a case study of either a hot arid environment or a semi-arid environment. Response is broadly evaluative in character, comprising some explanatory or narrative content and a conclusion. Response develops on a largely secure base of knowledge and understanding with the use of example(s). | **20** |

| Question | Answer | Marks |
|---|---|---|
| 12 | **Level 2 (6–10)**<br>Response demonstrates some knowledge and understanding of solutions to the problems of sustainable management for a case study of either a hot arid environment or a semi-arid environment. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks).<br><br>**Level 1 (1–5)**<br>Response makes a few general points about solutions to the problems of sustainable management in arid environments. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.<br><br>**Level 0 (0)**<br>No creditable response. | |