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CAMBRIDGE
International Education

Cambridge International AS & A Level

GEOGRAPHY **9696/32**

Paper 3 Advanced Physical Geography Options **May/June 2026**

MARK SCHEME

Maximum Mark: 60

Published

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

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General marking principles

All examiners must apply these marking principles when marking candidate responses.

1	Examiners must award marks for each response in line with: • the specific **content** defined in the mark scheme • the specific **skills** defined in the mark scheme or in the level descriptions • the **standard of response** required as exemplified by the standardisation scripts.
2	Examiners must award **whole marks** (not half marks, or other fractions).
3	Examiners must award marks **positively**. This means that: • marks are not deducted for errors or omissions • marks are awarded for correct/valid answers as defined in the mark scheme and also for **other valid answers** which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate • the quality of spelling, punctuation and grammar are judged **only** when the mark scheme indicates that these features are **specifically assessed** in the question. However, the meaning of all responses must be unambiguous.
4	Examiners must **consistently** apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly.
5	Examiners must use the **full range of marks** defined in the mark scheme, unless limited by the quality of the candidate responses seen.
6	Examiners must award marks according to the mark scheme and **must not** award marks with grade thresholds or grade descriptions in mind.

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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)
L4	Level 4	Levels-marked questions only: Essay questions
L3	Level 3	Levels-marked questions only: Resource-based questions part (b), and Essay questions
L2	Level 2	Levels-marked questions only: Resource-based questions part (b), and Essay questions
L1	Level 1	Levels-marked questions only: Resource-based questions part (b), and Essay questions
0	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
EVAL	Evaluative point	Levels-marked questions only: Essay questions
^	Omission or further development/ detail needed to gain credit	All questions

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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 2. Additional page has been checked	1. Any diagrams or essay plans 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.

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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)	**Figure 1.1 is a climate graph for Medan, Indonesia. Figure 1.2 is a climate graph for Tidele, Senegal.** **Describe the main differences between the climates shown in Figure 1.1 and Figure 1.2.** Both temperature and precipitation differences should be described. Candidates should make differences explicit. Main differences include: • Overall, Medan has a more consistent pattern of climate, whereas Tidele has more seasonal variation • Temperature: Medan has a very consistent pattern of temperature of 25–26 °C (a range of 1 °C) in each month, whereas Tidele's is just a little more variable, ranging from 26–28 °C (a range of 2 °C) • Temperature both are high but max. 26 °C (Medan) vs 28 °C (Tidele) • Precipitation: Medan has a much higher annual total; 3225 mm compared to Tidele's 1180 mm (Note: allow some tolerance – c.3000/c.1200) • Average monthly precipitation is higher in Medan – approx. 250 mm vs 100 mm • Medan's precipitation is quite high throughout the year, ranging from 150 mm in February to 400 mm in October, whereas Tidele has more significant seasonal variations with almost no precipitation from November/December–May and a much wetter season from June–October/November, with a peak of 400 mm in August • Max precipitation is the same in both but in different months **1 mark** for each descriptive point. **Max. 3 marks** without the use of numerical data. Reference to both temperature and precipitation for **maximum marks**.	**4**

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Question	Answer	Marks
1(b)	**Suggest reasons for the differences in the precipitation you described in 1(a).** Key reasons might include: • Medan has a lower latitude/closer to the equator and therefore seasonal differences are small. The overheard sun is at a high angle for all of the year, giving intense solar heating and consistently high temperatures. This leads to convectional uplift and significant rainfall throughout the year • Tidele is at a higher latitude, and so the angle of the sun varies more. It is at its highest angle during the middle of the year, producing convectional uplift and significant rainfall at this time due to the influence of the ITCZ. It is at a lower angle at the end of the year and into the new year, meaning less intense heating and a reduction in uplift and precipitation. During this period it is under the influence of the descending limb of the Hadley cell, so experiences high pressure, clear skies and no precipitation. • A reversal of wind direction could play a very significant role in the seasonal differences. Being closer to the equator, Medan would be less influenced by the movement of the ITCZ and changing wind direction. The command word is 'suggest', so any potentially valid reasons should be credited. Other than latitude, which has been given, specific locational knowledge is not a requirement. Altitude is similar in both cases (i.e. low) and so is unlikely to have much, if any, influence. Credit should be given to well-drawn diagrams that add to the explanations. Award marks based on the quality of explanation and breadth of the response using the marking levels below. **Level 3 (5–6)** Response clearly explains reasons for the differences in the precipitation described in 1(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. **Level 2 (3–4)** Response explains reasons for the differences in the precipitation described in 1(a). Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response suggests reason(s) for the differences in the precipitation described in 1(a). Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely. **Level 0 (0)** No creditable response.	**6**

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Question	Answer	Marks
2	**To what extent is the formation of characteristic limestone landforms of tropical environments influenced by weathering processes?** The focus of the answer should be on the formation of the landforms. Characteristic landforms are: • Cockpit karst, cone karst, and tower karst, often developed in this sequence Candidates may also discuss: • Caverns, stalactites and stalagmites • Solution hollows, collapsed caverns and blue holes Influences on formation include: • Limestone geology – joint/bedding plane size and spacing, chemical characteristics • Solution/carbonation weathering processes • Other weathering processes – biological weathering, salt crystal growth in coastal areas (e.g. Thailand) • Vertical fluvial erosion at the base of cones • Tectonic uplift • Cavern collapse • Slope retreat • Time – development of one karst landscape to another depends on timescales Candidates may argue that the geology (e.g. variations in jointing) is an essential requirement, and that solution/carbonation weathering is the key process involved (hot wet climate increases rate – karst areas in temperate zones do not develop in quite the same way). Other influences are present, but their roles are less significant. These could include human influence (industrial output leading to the creation of acid rain, possible influence of climate change in the future).	**20**

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Question	Answer	Marks
2	Award marks based on the quality of the response using the marking levels below. **Level 4 (16–20)** Response thoroughly discusses the extent to which the formation of characteristic limestone landforms of tropical environments is influenced by weathering processes. 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. **Level 3 (11–15)** Response discusses the extent to which the formation of characteristic limestone landforms of tropical environments is influenced by weathering processes. 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). **Level 2 (6–10)** Response demonstrates some knowledge and understanding of the extent to which the formation of characteristic limestone landforms of tropical environments is influenced by weathering processes. 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). **Level 1 (1–5)** Response makes a few general points about characteristic limestone landforms and/or influences on their formation. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set. **Level 0 (0)** No creditable response.	**20**

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Question	Answer	Marks
3	**'The development of plant communities in tropical ecosystems is largely the result of human activity.'** **How far do you agree with this statement?** Responses should be focused on the development of plant communities, with clear links established to the influencing factors. Both rainforest and savanna ecosystems should be considered. Development of plant communities includes: • Seres/seral stages • Primary and secondary succession • Climax, subclimax and plagioclimax communities Influencing factors include: • Climate – temperature and precipitation • Soil (edaphic – physical and chemical properties of the ground itself) • Relief – altitude, gradient, aspect • Human activity – including agriculture, population pressures, climate change, deforestation and associated soil leaching/erosion • Natural hazards – including fire, lava flows Candidates may argue that climate is the most important factor overall, but that human activity is increasingly influential, particularly through anthropogenic climate change. Candidates may also discuss different scales – climate being the dominant factor at the global scale, but at the local scale, relief, soil, groundwater levels and humans can have considerable influence. Answers with only one tropical ecosystem (humid or seasonally humid) can be given credit up to the **top of Level 3**.	**20**

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Question	Answer	Marks
3	Award marks based on the quality of the response using the marking levels below. **Level 4 (16–20)** Response thoroughly discusses the extent to which the development of plant communities in tropical ecosystems is largely the result of human activity. 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. **Level 3 (11–15)** Response discusses the extent to which the development of plant communities in tropical ecosystems is largely the result of human activity. 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). **Level 2 (6–10)** Response demonstrates some knowledge and understanding of the extent to which the development of plant communities in tropical ecosystems is largely the result of human activity. 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). **Level 1 (1–5)** Response makes a few general points about the development of plant communities in tropical ecosystems and/or influencing factors. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set. **Level 0 (0)** No creditable response.	**20**

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Coastal environments

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

Question	Answer	Marks
4(a)	**Figure 4.1 shows the frequency of wave direction and wave height at Marina di Pisa, Italy, May 2008–May 2009.** **Describe the variations in the frequency of wave direction <u>and</u> wave height shown in Figure 4.1.** The main variations in wave direction are: • Wave direction ranged from W, through S, to E/very variable • The most frequent wave direction was WSW/SW, occurring about 30% of the time/mostly concentrated between W and SW (over 10%) • W waves occurred about 18% of the time • Waves from the S, SE and E had a low frequency <10% • Waves did not come from N or NE / no waves approach from directions between NNW and NE The main variations in wave height are: • Wave height varied from less than 1.0 m to 3.0 m and above • Only two directions (W–WSW and WSW–SW) showing more than two categories • The most frequent wave height was less than 1.0 m (with ~70% of waves from all directions) • The highest waves (3.0 m and above) only came from WSW–SW/only 2% of the time • Waves 2.0–2.9 m came from only two directions W–WSW and WSW–SW • The higher the wave height, the less frequent the waves • Areas with higher frequency usually have a greater height Both wave direction and wave height are required. **Max. 3 marks** if only one of these. **1 mark** for each descriptive point. **Max. 3 marks** without the use of data.	**4**

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Question	Answer	Marks
4(b)	**Explain how <u>wave direction</u> influences marine processes.** Marine processes include: • Erosion • Transportation • Deposition Influences of <u>wave direction</u> include: • Waves approaching perpendicular to the coast are likely to be refracted around headlands causing a concentration of energy, and hence erosion, on the sides of the headland with dissipation of energy and deposition in bays producing swash-aligned beaches • Waves approaching the coast at an oblique angle are likely to result in longshore drift and the transportation of sediment along the shore by swash and backwash. When wave direction changes this can alter the appearance of features such as hooks on spits. • Links between wave direction and wave height in relation to fetch and processes are also relevant – this can therefore also have an influence on wave type (high vs low energy) which in turn influences marine processes. Responses should make explicit links between the wave direction and the marine processes that result. Award marks based on the quality of explanation and breadth of the response using the marking levels below. **Level 3 (5–6)** Response clearly explains how <u>wave direction</u> influences at least two marine processes. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response. **Level 2 (3–4)** Response explains how <u>wave direction</u> influences at least one marine process. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response is largely descriptive of how <u>wave direction</u> influences at least one marine process. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely. **Level 0 (0)** No creditable response.	**6**

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Question	Answer	Marks
5	**Assess the relative importance of the conditions required for coral growth.** Responses should refer explicitly to how the conditions influence coral growth. Conditions include: • Temperature >20 °C required; 23–25 °C optimum • Depth of water <25 m • Salinity >32 psu • Good supply of light for photosynthesis • Clear water – for both light and to prevent clogging up of feeding structures and cleansing systems • Strong wave action to oxygenate water and remove sediment • No lengthy exposure to air, so typically below mean low tide level • Composition of seabed – solid rather the soft shifting sands Candidates may argue that one or other factor is most important, but this will need strong supporting evidence. The factors all have an influence and overall, it is the combination that is the key. Candidates may consider variations between scales – sea temperature and sunlight more generally, but others may be a deciding factor more locally. Award marks based on the quality of the response using the marking levels below. **Level 4 (16–20)** Response thoroughly discusses the relative importance of the conditions required for coral growth. 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. **Level 3 (11–15)** Response discusses the relative importance of the conditions required for coral growth. 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). **Level 2 (6–10)** Response demonstrates some knowledge and understanding of the relative importance of the conditions required for coral growth. 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). **Level 1 (1–5)** Response makes a few general points about the condition(s) required for coral growth. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set. **Level 0 (0)** No creditable response.	**20**

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Question	Answer	Marks
6	**'The problems of sustainably managing a stretch or stretches of coastline cannot be solved.'** **Using a case study, how far do you agree with this statement?** Responses should provide explicit links between the problems, which should be the focus of the answer, and the strategies used in their management. Whether they can be solved or not could be judged in terms of their success in meeting social, economic and environmental needs in a balanced way and their longevity. It may be appreciated that different stakeholders/interest groups may have contrasting views on solutions. The response needs to be based on place-specific detail and not a largely generic answer. Responses without clear case study/place-specific detail – **Max. 8 marks** (middle of Level 2). Problems include: • Rising sea level • More frequent storms/flooding • Increased rates of erosion • Pressure from tourism • Pollution (terrestrial and marine) • Energy generation • Ports/shipping/fishing • Increased residential development Solutions include: • Coastal protection – hard and soft engineering • Planning policy • Land use zoning • Zoning of marine areas • Marine protection zones • Restrictions on fishing • Limitation on tourism numbers • Legislation on pollution Effectiveness of solutions may be judged by cost-benefit analysis, with consideration of social, economic and environmental costs and benefits and their longevity.	**20**

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Question	Answer	Marks
6	Award marks based on the quality of the response using the marking levels below. **Level 4 (16–20)** Response thoroughly discusses the extent to which the problems of sustainably managing a stretch or stretches of coastline cannot be solved using a case study. 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. **Level 3 (11–15)** Response discusses the extent to which the problems of sustainably managing a stretch or stretches of coastline cannot be solved using a case study. 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). **Level 2 (6–10)** Response demonstrates some knowledge and understanding of the extent to which the problems of sustainably managing a stretch or stretches of coastline cannot be solved using a case study. 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). **Level 1 (1–5)** Response makes a few general points about problems and/or solutions of sustainably managing coasts. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set. **Level 0 (0)** No creditable response.	**20**

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Hazardous environments

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

Question	Answer	Marks
7(a)	**Figure 7.1 shows changes in the factor of safety on a slope.** **Describe the pattern of changes in the factor of safety shown in Figure 7.1.** The main features of the pattern include: • Overall, there was a general decrease in the factor of safety / from 2.9 to 1.05 • The higher the factor of safety the more stable the slope is • The factor of safety is above equilibrium (1.0) for most of the time except near the end where there are two small dips below 1.0 • Minimum value is 0.85/maximum value is 2.9 • The pattern of decrease was irregular and there were some very significant fluctuations • Steady decrease from 2.9 to 2.6 with one large drop to 2.1 during this time • But this was immediately followed by a rapid increase back up to 2.7 • Then the big(gest) drop down from 2.6 to 1.7 followed by another fairly steady decrease to 1.25 • During this decrease, however, there are couple of reductions in the factor of safety, one of which goes down to 1.0 • The slope then becomes unstable with variation just above and below 1.0. **1 mark** for each descriptive point. **Max. 3 marks** without the use of data.	**4**

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Question	Answer	Marks
7(b)	**Explain <u>two</u> hazards resulting from slope instability.** The hazards resulting from slope instability are the mass movement processes including: • Linear slides • Rotational slides (slumps) • Flows • Heaves • Creeps • Rock falls • Avalanches These processes can cause a risk to human activity, with both lives and property potentially impacted upon. There should be some mention of this in the answer as the question is about hazards. Answers without mention of impact on human activity will be limited to **Level 2**. The nature of the hazard will vary with the volume of material and type of process, with those with higher speed, such as slides, and/or higher water content, such as flows, likely to be more hazardous. Award marks based on the quality of explanation and breadth of the response using the marking levels below. **Level 3 (5–6)** Response clearly explains <u>two</u> hazards resulting from slope instability. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response. **Level 2 (3–4)** Response explains <u>two</u> hazards, or clearly explains <u>one</u> hazard, resulting from slope instability. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response is largely descriptive of <u>one or two</u> hazards resulting from slope instability. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely. **Level 0 (0)** No creditable response.	**6**

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Question	Answer	Marks
8	**'Lava flows are the most significant hazard resulting from volcanoes.'** **How far do you agree with this statement?** Hazards resulting from volcanoes include: • Lava flows – both basaltic and acidic • Ballistics – including ash, tephra, volcanic bombs • Pyroclastic flows – including nuées ardentes • Gases and acid rain • Lahars (volcanic mudflows) • Volcanic landslides • Jökulhlaups (glacial lake outbursts) • Tsunamis Significance may be considered in terms of frequency, magnitude, areal extent, longevity, scale of impact on lives and property, and manageability of the hazard. Level of development of a location may also be a factor. Candidates may argue that the significance of the hazard depends upon the type of volcano and therefore eruption, the surrounding environment and the preparedness/response of the people. Award marks based on the quality of the response using the marking levels below. **Level 4 (16–20)** Response thoroughly discusses the extent to which lava flows are the most significant hazard resulting from volcanoes. 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. **Level 3 (11–15)** Response discusses the extent to which lava flows are the most significant hazard resulting from volcanoes. 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). **Level 2 (6–10)** Response demonstrates some knowledge and understanding of the extent to which lava flows are the most significant hazard resulting from volcanoes. 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). **Level 1 (1–5)** Response makes a few general points about hazards resulting from volcanoes. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set. **Level 0 (0)** No creditable response.	**20**

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Question	Answer	Marks
9	**To what extent are the primary impacts of atmospheric disturbances more significant than the secondary impacts?** Atmospheric disturbances produce a range of impacts on people and property. Impacts from large-scale atmospheric disturbances (cyclones, hurricanes, typhoons) and small-scale atmospheric disturbances (tornadoes) have similarities but also differences. The impacts will vary depending on the type of hazard involved. Comparison could be in terms of variation associated with specific atmospheric disturbances or between different types of atmospheric disturbance. There may be different interpretations of primary impacts vs secondary impacts. Primary impacts include: • Physical damage to property from strong winds, including possible collapse • Injury or death to people in buildings that are damaged or collapse • Property damage by flood waters • Death by drowning from flooding, from rivers and storm surges • Property engulfed by mass movement • Injury or death by submergence in mass movement material Secondary impacts include: • Homelessness due to damage or collapse of home • Pressure on medical services treating those injured • Illness/disease resulting from homelessness or contamination of water supply • Food shortages caused by storm surges damaging crops, killing livestock and/or salinisation of soil in the long term • Disruption to transport and other infrastructure making rescue efforts more difficult • Rebuilding costs Significance of impacts may be judged in terms of numbers of people affected, financial costs, longevity, areal extent, frequency and magnitude of the hazard. Manageability and level of development may also be factors determining the significance of the impacts. Answers with only one type of atmospheric disturbance (hurricane or tornado) can be given credit up to the **top of Level 3**.	**20**

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Question	Answer	Marks
9	Award marks based on the quality of the response using the marking levels below. **Level 4 (16–20)** Response thoroughly discusses the extent to which the primary impacts of atmospheric disturbances are more significant than the secondary impacts. 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. **Level 3 (11–15)** Response discusses the extent to which the primary impacts of atmospheric disturbances are more significant than the secondary impacts. 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). **Level 2 (6–10)** Response demonstrates some knowledge and understanding of the extent to which the primary impacts of atmospheric disturbances are more significant than the secondary impacts. 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). **Level 1 (1–5)** Response makes a few general points about the impacts of atmospheric disturbances but may not explicitly distinguish between primary and secondary. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set. **Level 0 (0)** No creditable response.	**20**

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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)	**Figure 10.1 is a photograph which shows a semi-arid environment in Texas, USA.** **Describe the main features of the vegetation shown in Figure 10.1.** Main features include: • Overall, scattered/sparse/low density of vegetation (with much bare ground between) • Vegetation appears denser in the background/near the top of the hill • Vegetation consists mainly of small shrubs and bushes, such as in the foreground • Some taller species, such is in the centre of the photograph • Large, (prickly pear) cactus in the right foreground, with large / flat / spiky leaves • Species variety looks quite limited with a number of plants having a similar appearance • Plants are mostly green/some plants are a light green colour such as left middle ground • A few scattered plants are grey in colour • Leaves on many plants appear to be small, including left foreground **1 mark** for each descriptive point. Explicit location on the photograph for **maximum marks**.	**4**

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Question	Answer	Marks
10(b)	**Suggest reasons for the features of the vegetation you described in 10(a).** The key influence overall will be the semi-arid climate, with low precipitation and high temperatures limiting available water supply. This would lead to slow growth and explain the low height. This may also be influenced by the damaging effects of strong winds in an open environment. The sparsity of cover is also a function of a lack of water, with each plant likely to have an extensive root system to gather water from a wide area around its main stem. The taller species may have adapted better by storing water in their fleshy tissues allowing growth to occur even in the drier season. The pale green/grey colour of some plants will reflect solar radiation to help prevent overheating. The low height and small size of leaves also means a low surface area to reduce evapotranspiration losses. Features are also influenced by the soil characteristics, which are also very restrictive. Soils are thin, dry, sometimes saline and so overall quite infertile, supporting few species and limiting growth. Natural fires may occur, including from lightning strikes, which can damage or kill plants, again restricting growth. Credit features described in 10(a), even if not included in the 10(a) mark scheme. Award marks based on the quality of explanation and breadth of the response using the marking levels below. **Level 3 (5–6)** Response clearly explains reasons for the features of the vegetation described in 10(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. **Level 2 (3–4)** Response explains reasons for the features of the vegetation described in 10(a). Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response suggests reason(s) for the vegetation described in 10(a) but not explicitly linked to the features. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely. **Level 0 (0)** No creditable response.	**6**

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Question	Answer	Marks
11	**'The global distributions of hot arid and semi-arid environments are largely determined by latitude.'** **How far do you agree with this statement?** Factors influencing the distributions include: • Pressure and wind systems • Cold ocean currents • Rain shadow effect • Continentality Responses should make explicit links between the factors and the distributions, not just as 'causes of aridity'. Candidates may argue that the key factor is the pressure and wind systems, with hot arid areas largely being distributed around 30°N/S under the descending limb of the Hadley Cell. Many semi-arid areas tend to lie on the poleward side of hot arid areas, with slightly lower temperatures and more, seasonal, precipitation. Some lie between the savanna and the hot arid areas, also with some seasonal precipitation. Other factors beyond latitude tend to be more spatially limited and whilst significant in specific geographical areas, may enhance rather than create the conditions required. Answers mentioning just hot arid or semi-arid can be given credit up to the **top of Level 3**. Award marks based on the quality of the response using the marking levels below. **Level 4 (16–20)** Response thoroughly discusses the extent to which the global distributions of hot arid and semi-arid environments are largely determined by latitude. 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. **Level 3 (11–15)** Response discusses the extent to which the global distributions of hot arid and semi-arid environments are largely determined by latitude. 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). **Level 2 (6–10)** Response demonstrates some knowledge and understanding of the extent to which the global distributions of hot arid and semi-arid environments are largely determined by latitude. 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**

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GradeMax

Question	Answer	Marks
11	**Level 1 (1–5)** Response makes a few general points about the global distributions of hot arid and/or 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. **Level 0 (0)** No creditable response.	

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GradeMax

Question	Answer	Marks
12	**To what extent are the landforms of hot arid and semi-arid environments the result of erosion rather than deposition?** Landforms of erosion include: • Wind sculptured rocks – yardangs, zeugens, pedestals • Wadis, arroyos • Inselbergs, Mesas, buttes, spires • Pediments • Ventifacts • Deflation hollows Landforms of deposition include: • Sand dunes • Alluvial fans and bahadas • Playas Candidates are likely to argue that both sets of processes are of similar importance, and that they can also act in combination, such as in the formation of pediments. Inselbergs are influenced by erosion, although the role of weathering is more significant. Some may also distinguish between aeolian (wind) and fluvial (water) processes, although that is not the key focus of the question. Better answers may identify that for deposition to take place; there must have been some erosion first. Award marks based on the quality of the response using the marking levels below. **Level 4 (16–20)** Response thoroughly discusses the extent to which the landforms of hot arid and semi-arid environments are the result of erosion rather than deposition. 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. **Level 3 (11–15)** Response discusses the extent to which the landforms of hot arid and semi-arid environments are the result of erosion rather than deposition. 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). **Level 2 (6–10)** Response demonstrates some knowledge and understanding of the extent to which the landforms of hot arid and semi-arid environments are the result of erosion rather than deposition. 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**

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GradeMax

Question	Answer	Marks
12	**Level 1 (1–5)** Response makes a few general points about landforms of 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. **Level 0 (0)** No creditable response.	

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