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**GEOGRAPHY**

**9696/03**

Paper 3 Advanced Physical Geography Options

**For Examination from 2018**

SPECIMEN MARK SCHEME

**1 hour 30 minutes**

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**MAXIMUM MARK: 60**

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This document consists of **22** printed pages.

**Tropical environments**

Question	Answer	Marks
1(a)	<p><b>With the aid of a labelled diagram, describe the landforms shown in Photograph A.</b></p> <p>Candidates should interpret the photograph to identify the key features and use these observations to produce a realistic diagram.</p> <p>Features from the photograph may include:</p> <ul style="list-style-type: none"> <li>• towers: steep sided, tall, isolated from each other, partially vegetated</li> <li>• hollows: forming between towers either broad alluvial plain (with or without river) or narrow between towers</li> <li>• overall shape: steep, rounded, uneven</li> <li>• appropriate scale: may show river or houses seen in Photograph A.</li> </ul> <p><b>1 mark</b> for each labelled feature with detail on diagram.</p>	<b>4</b>

Question	Answer	Marks
1(b)	<p><b>Explain the roles of rock type and rock structure in the development of the landforms you described in (a).</b></p> <p>The focus of this explanation should be the rock type and rock structure. Credit a standard explanation of development as long as it is linked to the rock type and structure.</p> <p>Explanation may include:</p> <ul style="list-style-type: none"> <li>• chemical composition of limestone</li> <li>• jointed structure allowing the initial surface topography to develop</li> <li>• weathering processes (mostly chemical but also physical) accentuate 'hollows' and the towers are gradually formed.</li> </ul> <p>Credit reference to climate (temperature and precipitation characteristics) in explaining the nature of the weathering i.e. carbonation.</p> <p>Credit other valid factors and explanations as long as rock type and rock structure are mentioned.</p> <p>Award marks based on the quality of explanation and breadth of the response using the marking levels below.</p> <p><b>Level 3</b> <span style="float: right;"><b>5–6</b></span> Response addresses both rock type and structure and is balanced between the two. Good explanation of the processes and the role of rock type and rock structure. Response is well-founded in detailed knowledge and strong conceptual understanding of the topic. Any examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 2</b> <span style="float: right;"><b>3–4</b></span> Response addresses both rock type and structure in a limited manner or may address either rock type or rock structure only. May be lacking coverage of both the nature of the rock and the operation of the weathering processes. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.</p> <p><b>Level 1</b> <span style="float: right;"><b>1–2</b></span> Response comprises one or more points which address either rock type or rock structure in outline. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.</p> <p><b>Level 0</b> <span style="float: right;"><b>0</b></span> No creditable response.</p>	<b>6</b>

Question	Answer	Marks
2	<p><b>‘Sustainable management in tropical environments is difficult.’</b></p> <p><b>For <u>either</u> the rainforest ecosystem <u>or</u> the savanna ecosystem, how far do you agree?</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the ecosystem chosen. Whichever ecosystem and examples are chosen, essays which assess sustainable management and support their argument with relevant examples will be credited. There may be detailed consideration of one or more management strategies or a broadly conceived response.</p> <p>Issues that could be discussed are:</p> <ul style="list-style-type: none"> <li>• the nature of the chosen ecosystem</li> <li>• why there is a need for sustainable management</li> <li>• different approaches to sustainable management.</li> </ul> <p>Examples of sustainable management could be:</p> <ul style="list-style-type: none"> <li>• local crafts and local economy</li> <li>• breeding programmes for crops and animals that are more sustainable</li> <li>• ecotourism</li> <li>• sustainable methods of timber exploitation</li> <li>• planning controls and land use zoning such as the creation of National Parks and Nature Reserves</li> <li>• reduction in the harmful use of the chosen ecosystem.</li> </ul> <p>Credit other valid factors and explanations.</p> <p>There must be some attempt at evaluating the success or otherwise of the strategies examined and there should be a good understanding of the concept of sustainable management.</p> <p>Credit use of different examples to assess the success of different approaches to management.</p> <p>Contextual understanding of the different viewpoints and stakeholders and the possibility of different outcomes in different places should be credited.</p> <p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span></p> <p>Response thoroughly discusses the relative success of initiatives for sustainable management in their chosen ecosystem. Demonstrates a well founded understanding of the concept of sustainability. At the top of the level, responses may demonstrate strong contextual understanding of one or more specific initiatives for sustainable management. An effective and sustained evaluation with a sound conclusion. Response is well-founded in detailed exemplar knowledge and strong conceptual understanding of the topic.</p>	20

Question	Answer	Marks
2	<p><b>Level 3</b> <span style="float: right;"><b>11–15</b></span> Response discusses one or more initiatives for sustainable management with well integrated examples to support the discussion. Responses are likely to consider several factors that influence sustainability. 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).</p> <p><b>Level 2</b> <span style="float: right;"><b>6–10</b></span> Response demonstrates some knowledge and understanding of the difficulty of managing tropical ecosystems, but may not consider many factors or sustainable approaches. 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).</p> <p><b>Level 1</b> <span style="float: right;"><b>1–5</b></span> Response makes a few general points about tropical environments without the necessary focus on sustainable management. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.</p> <p><b>Level 0</b> <span style="float: right;"><b>0</b></span> No creditable response.</p>	

Question	Answer	Marks
3	<p><b>For <u>one</u> tropical ecosystem, describe the nature of the vegetation and assess how far factors other than climate have influenced the nature of the vegetation.</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the ecosystem chosen. Whichever ecosystem is chosen, essays which assess the nature of vegetation and the role of relevant factors will be credited.</p> <p>For tropical rainforest the key characteristics of vegetation are:</p> <ul style="list-style-type: none"> <li>• evergreen deciduous forest</li> <li>• the structure of the forest, i.e. ground layer, shrub layer, canopy layer and emergents with some knowledge of vertical height of the layers</li> <li>• characteristics such as epiphytes, drip tips to leaves, buttress roots, limited ground flora.</li> </ul> <p>For savanna ecosystems the key characteristics of vegetation are:</p> <ul style="list-style-type: none"> <li>• a range from open forest to open parkland, tall grass and shrubs</li> <li>• tall, open canopies of drought-resistant, fire-resistant or browse-resistant trees e.g. acacias and baobabs.</li> </ul> <p>For both ecosystems the characteristics should be discussed with reference to the nature of the vegetation. Climatic climax, plagioclimax and sub-climax are relevant to the discussion.</p> <p>The relationships with climate are very clear with respect to tropical rainforest ecosystems and vegetation is clearly related to high rainfall and temperature. The role of other factors, such as human activity, is more limited but there may be reference to sub-climax with reference to soils, topography etc. and plagioclimax related to human activities such as slash and burn and shifting cultivation producing secondary vegetation.</p> <p>The factors affecting savanna vegetation are more varied and possibly more complicated. However, the role of climate is clear but the vegetation is also a response to fire (natural and human-induced), animal grazing and human activities.</p> <p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span> Response thoroughly discusses the nature of the vegetation (structure and characteristics) and assesses the role of climatic characteristics and other factors. At the top of the level, responses may demonstrate strong contextual understanding of the ecosystem discussed. An effective and sustained evaluation with a sound conclusion. Response is well-founded in detailed exemplar knowledge and strong conceptual understanding of the topic.</p> <p><b>Level 3</b> <span style="float: right;"><b>11–15</b></span> Response discusses the nature of the vegetation and the influence of climate but with a limited assessment of the role of other factors. 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).</p>	20

Question	Answer	Marks
3	<p><b>Level 2</b> Response demonstrates some knowledge of tropical vegetation but discussion of vegetation structure may be limited and discussion of factors which influence vegetation may be undeveloped. 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).</p> <p><b>Level 1</b> Response makes a few general points about tropical vegetation without the necessary focus on the role of climate and other factors. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.</p> <p><b>Level 0</b> No creditable response.</p>	<p><b>6–10</b></p> <p><b>1–5</b></p> <p><b>0</b></p>

**Coastal environments**

Question	Answer	Marks
4(a)	<p data-bbox="304 300 863 336"><b>Describe the changes shown in Fig. 1B.</b></p> <p data-bbox="304 371 1203 436">Candidates should interpret Fig. 1B to identify the changes that have occurred.</p> <p data-bbox="304 474 608 510">The main changes are:</p> <ul data-bbox="304 510 783 716" style="list-style-type: none"><li data-bbox="304 510 699 546">• no input from cliff erosion</li><li data-bbox="304 546 703 582">• no input of river sediment</li><li data-bbox="304 582 619 618">• addition of groynes</li><li data-bbox="304 618 676 654">• construction of sea wall</li><li data-bbox="304 654 783 689">• reduced input from offshore bar</li><li data-bbox="304 689 751 725">• sand dunes starting to erode.</li></ul> <p data-bbox="304 752 667 788"><b>1 mark</b> for each valid point.</p>	<b>4</b>



Question	Answer	Marks
4(b)	<p><b>Explain how the changes you have identified in (a) have affected the operation of the sediment cell shown in Fig. 1A.</b></p> <p>Candidates require an understanding of the nature of a sediment cell and how it operates as a coastal system.</p> <p>The following could be identified:</p> <ul style="list-style-type: none"> <li>• reduction in input of river sediment will make the marine erosive processes more active and may lead to erosion of the coast in a downdrift direction</li> <li>• the groyne will help to build up the beach and protect the town but may lead to erosion in the sediment starved areas downdrift especially the spit</li> <li>• the sea wall will protect the town but will also starve downdrift areas of sediment</li> <li>• there is reduction of input from offshore bars which will also make the marine erosional processes more active and beaches may be depleted.</li> </ul> <p>Award marks based on the quality of explanation and breadth of the response using the marking levels below.</p> <p><b>Level 3</b> <span style="float: right;"><b>5–6</b></span> Response applies knowledge and understanding of the operation of sediment cells and convincingly explains both the major processes at work and the affect they have on the sediment cell. Response is well-founded in detailed knowledge and strong conceptual understanding of the topic. Any examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 2</b> <span style="float: right;"><b>3–4</b></span> Response offers one or more explanations for the changes to the sediment cell but explanation of processes and discussion of the repercussions may be unbalanced or limited. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.</p> <p><b>Level 1</b> <span style="float: right;"><b>1–2</b></span> Response is broadly about sediment cells but changes are not clearly identified and explanations are insecure. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.</p> <p><b>Level 0</b> <span style="float: right;"><b>0</b></span> No creditable response.</p>	<b>6</b>

Question	Answer	Marks
5	<p><b>Assess the relative importance of marine erosion and sub-aerial processes in shaping the landforms of rocky coastlines.</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the examples chosen. Whichever approach is chosen, essays which address both marine erosion and sub-aerial processes and support their argument with relevant examples will be credited. There may be detailed consideration of one or more landforms or a broadly conceived response covering several in less detail.</p> <p>There must be some attempt at evaluating the relative contribution of marine erosion and sub-aerial processes.</p> <p>Landforms which may be discussed include:</p> <ul style="list-style-type: none"> <li>• cliffs</li> <li>• wave cut platforms</li> <li>• caves, stacks, stumps, arches</li> <li>• headland and bays.</li> </ul> <p>These can easily be illustrated by diagrams, with some indication of scale.</p> <p>The factors that shape these landforms are:</p> <ul style="list-style-type: none"> <li>• marine processes – (hydraulic action, abrasion, quarrying, cavitation etc.)</li> <li>• sub-aerial weathering and processes</li> <li>• mass movement processes</li> <li>• rock type and structure as well as wave energy and direction.</li> </ul> <p>Candidates should attempt to make linkages between the landforms, the processes and the geology. Credit other valid factors and explanations.</p> <p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span> Response thoroughly discusses a range of landforms and assesses the role of marine erosion and sub-aerial processes and other factors such as geology. Responses demonstrate strong understanding of the processes discussed. An effective and sustained evaluation with a sound conclusion. Response is well-founded in detailed exemplar knowledge and strong conceptual understanding of the topic.</p> <p><b>Level 3</b> <span style="float: right;"><b>11–15</b></span> Response discusses a range of landforms and the role of marine erosion and sub-aerial processes in their development. Discussion of the processes may be unbalanced towards one or the other and discussion of the role of other factors will be limited. 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).</p>	20

Question	Answer	Marks
5	<p><b>Level 2</b> Response demonstrates some knowledge of a limited range of landforms. Discussion of processes may be limited and likely heavily weighted towards marine erosion. 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).</p> <p><b>Level 1</b> Response makes a few general points about coastal landforms without the necessary focus on the role of marine erosion and sub-aerial processes. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.</p> <p><b>Level 0</b> No creditable response.</p>	<p><b>6–10</b></p> <p><b>1–5</b></p> <p><b>0</b></p>

Question	Answer	Marks
6	<p><b>With the aid of one or more examples, assess the extent to which soft engineering approaches have more advantages than hard engineering approaches when managing a coastline sustainably.</b></p> <p>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 assess the management strategies and support their argument with relevant examples will be credited. There may be detailed consideration of one or more examples or a broadly conceived response.</p> <p>Examples of management strategies and evaluation of the effect they had on the coast may be established case studies from studied managed coastlines or local examples.</p> <p>Expect discussion of the advantages and disadvantages of a range of both soft and hard engineering approaches:</p> <ul style="list-style-type: none"> <li>• soft engineering approaches: beach nourishment, sand dune stabilisation through replanting and managed retreat</li> <li>• hard engineering approaches: groynes, sea walls, revetments, rock armour, gabions.</li> </ul> <p>Discussion should focus on the potential for sustainably managing the coast and may include:</p> <ul style="list-style-type: none"> <li>• cost</li> <li>• duration/longevity of management strategy</li> <li>• success in managing the coastal habitat</li> <li>• effects on land use or other environments further down coast.</li> </ul> <p>Candidates may also mention factors such as the visual impact on the environment as an advantage or disadvantage.</p> <p>Credit use of different examples to assess whether soft or hard engineering options are most sustainable.</p>	<b>20</b>

Question	Answer	Marks
6	<p>Contextual understanding of the different viewpoints and stakeholders and the possibility of different outcomes in different places should be credited.</p> <p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span>  Response thoroughly discusses a range of different engineering and management strategies with a secure understanding of the concept of sustainability and analysis of advantages in the context of coastal management. At the top of the level, responses may demonstrate strong contextual understanding of one or more specific initiatives for sustainably managing coastlines. An effective and sustained evaluation with a sound conclusion. Response is well-founded in detailed exemplar knowledge and strong conceptual understanding of the topic.</p> <p><b>Level 3</b> <span style="float: right;"><b>11–15</b></span>  Response discusses both soft and hard engineering strategies but may focus on one at the expense of the other making comparison difficult. The criteria used for sustainability and advantages may be more limited and less secure. 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).</p> <p><b>Level 2</b> <span style="float: right;"><b>6–10</b></span>  Response demonstrates some knowledge and understanding of coastal management strategies but understanding of the difference between soft and hard engineering may not be secure or may focus on one exclusively. Links to sustainability may be limited, lack development and may not be identified clearly. 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).</p> <p><b>Level 1</b> <span style="float: right;"><b>1–5</b></span>  Response makes a few general points about coastal management without the necessary focus on sustainability or comparison between soft and hard engineering techniques. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.</p> <p><b>Level 0</b> <span style="float: right;"><b>0</b></span>  No creditable response.</p>	

**Hazardous environments**

Question	Answer	Marks
7(a)	<p><b>Compare the relationship between vertical drop and horizontal travel distance of the volcanic hazards shown in Fig. 2.</b></p> <p>Candidates should interpret Fig. 2 to compare the relationships between the vertical drop and distance travelled for both pyroclastic flows and volcanic landslides.</p> <p>Candidates may identify that:</p> <ul style="list-style-type: none"> <li>• Volcanic landslides travel the least distance [mostly between 10 and 30 km] and have the closest correlation between distance travelled and vertical drop</li> <li>• Pyroclastic flows have the greatest range [2 km to 70 km] and do not show a close correlation with vertical drop.</li> </ul> <p>Up to <b>2 marks</b> for a description of each hazard including a comparative statement for vertical drop <b>and</b> horizontal distance travelled. <b>1 mark</b> for a simple descriptive point.</p>	<b>4</b>

Question	Answer	Marks
7(b)	<p><b>Outline how the information shown in Fig. 2 can be used to predict the potential impacts of the <u>two</u> hazards on lives and property.</b></p> <p>Candidates should make reference to types of information available in Fig. 2 when discussing prediction of risks.</p> <p>Discussion may include:</p> <ul style="list-style-type: none"> <li>• both hazards travel a long way thus hazard zonation will need to take this into account</li> <li>• the height of the volcano increases the distance travelled of landslides and may have an effect on the other processes</li> <li>• hazard zones for pyroclastic flows are hard to predict as they may travel either short or long distances and are not necessarily linked to vertical height</li> <li>• the threat from both hazards will depend on the topography and run-out distance.</li> </ul> <p>Credit other reasonable points. <b>Max. 2 marks</b> for a description of the types of process and hazards with no reference to the value of the information in Fig. 2.</p> <p>Award marks based on the quality of explanation and breadth of the response using the marking levels below.</p> <p><b>Level 3</b> <span style="float: right;"><b>5–6</b></span> Response applies knowledge and understanding of these hazards and explains the usefulness of this information for predicting risk. Response is well-founded in detailed knowledge and strong conceptual understanding of the topic. Any examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 2</b> <span style="float: right;"><b>3–4</b></span> Response discusses these hazards, possibly in an unbalanced way, making some explanatory links to predicting risk. Reference to the types of evidence provided by Fig. 2 may be limited and unclear. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.</p> <p><b>Level 1</b> <span style="float: right;"><b>1–2</b></span> Response consists of one or more descriptive statements about Fig. 2 or the hazards with little or no explanation of risk prediction. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.</p> <p><b>Level 0</b> <span style="float: right;"><b>0</b></span> No creditable response.</p>	<b>6</b>

Question	Answer	Marks
8	<p><b>‘Hazard mapping is the most effective way of reducing the impact of earthquakes on lives and property.’</b></p> <p><b>How far do you agree with this view?</b></p> <p>Candidates are free to develop their own approach to the question. Whichever approach is chosen, essays which discuss hazard mapping and the efficacy of prediction and support their argument with relevant examples will be credited.</p> <p>Discussion of hazard mapping may include:</p> <ul style="list-style-type: none"> <li>• fault areas can be monitored using seismographs and tilt meters but these cannot be used as a predictive measure</li> <li>• frequency of past earthquakes can be used to calculate the possibility of future occurrence</li> <li>• seismic gap theory can be used to prepare hazard maps.</li> </ul> <p>There should be some evaluation of the extent to which hazard mapping provides useful predictions:</p> <ul style="list-style-type: none"> <li>• generally prediction has proved problematic and unsuccessful</li> <li>• does not provide precise location, timing or strength</li> <li>• generally gives little warning.</li> </ul> <p>In evaluating the effectiveness of predicting earthquakes candidates may discuss other measures which can reduce impact on lives and property:</p> <ul style="list-style-type: none"> <li>• earthquake resilient buildings</li> <li>• emergency cut off systems</li> <li>• tsunami warning systems</li> <li>• drills and emergency supplies.</li> </ul> <p>Credit reference to other methods of prediction including precursor events e.g. a release of radon gas, variations in water levels, fore shocks and even animal behaviour. These should not be the focus of the argument.</p> <p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span> Response thoroughly discusses both the nature of hazard mapping and its limitations with regard to mitigating the impact of earthquakes. Response considers other methods of predicting earthquakes and whether prediction is the most effective way of reducing the impact on lives and property. An effective and sustained evaluation with a sound conclusion. Response is well-founded in detailed exemplar knowledge and strong conceptual understanding of the topic.</p> <p><b>Level 3</b> <span style="float: right;"><b>11–15</b></span> Response discusses the nature and limitations of hazard mapping, maybe developing one more than the other. Discussion of other methods of prediction or mitigation may be underdeveloped. 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).</p>	20

Question	Answer	Marks
8	<p><b>Level 2</b> <span style="float: right;"><b>6–10</b></span> Response demonstrates some knowledge and understanding of the hazards associated with earthquakes and of hazard mapping but discussion of what can be achieved by hazard mapping and other strategies may be limited or lack development. 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).</p> <p><b>Level 1</b> <span style="float: right;"><b>1–5</b></span> Response makes a few general points about earthquakes without the necessary focus on hazard mapping or mitigation of impact on lives and property. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.</p> <p><b>Level 0</b> <span style="float: right;"><b>0</b></span> No creditable response.</p>	

Question	Answer	Marks
9	<p><b>Assess the extent to which the hazardous effects of tornadoes are different from those of tropical cyclones.</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the examples chosen. Whichever approach is chosen, essays which address the hazardous effects and support their argument with relevant examples will be credited. There may be detailed consideration of one or more examples or a broadly conceived response covering several in less detail.</p> <p>There should be some comparative comment on the differences between the hazardous effects which may include the nature of the hazards, the type and extent of damage, a discussion of scale and any secondary hazards.</p> <p>Hazardous effects of a tornado are:</p> <ul style="list-style-type: none"> <li>• limited in areal extent</li> <li>• rotating winds and intense low pressure</li> <li>• the winds destroy buildings, uproot trees, hurl lethal missiles into the air and the walls of buildings buckle</li> <li>• as the winds blast over the roof they cause lower pressure above the roofs allowing the winds to carry them away</li> <li>• lower pressure outside a structure can cause it to explode</li> <li>• additional hazards may include an intense hailstorm and lightning.</li> </ul> <p>Hazardous effects of a tropical cyclone:</p> <ul style="list-style-type: none"> <li>• threats occur over larger areas and are not restricted to wind speed</li> <li>• storm surges and intense rainfall leading to river floods and landslides</li> <li>• secondary hazards such as water pollution, disease and crop destruction.</li> </ul> <p>Credit other valid factors and explanations. Credit use of different examples to assess the relative hazardous effects.</p>	<b>20</b>



Question	Answer	Marks
9	<p data-bbox="304 237 1294 300">Award marks based on the quality of the response using the marking levels below.</p> <p data-bbox="304 338 1326 367"><b>Level 4</b> <span style="float: right;"><b>16–20</b></span></p> <p data-bbox="304 376 1310 577">Response thoroughly discusses a wide range of primary and secondary hazards associated with tornadoes and tropical cyclones in a comparative way. Response demonstrates knowledge of specific examples. An effective and sustained evaluation with a sound conclusion. Response is well-founded in detailed exemplar knowledge and strong conceptual understanding of the topic.</p> <p data-bbox="304 616 1326 645"><b>Level 3</b> <span style="float: right;"><b>11–15</b></span></p> <p data-bbox="304 654 1294 855">Response discusses hazards associated with both tornados and tropical cyclones but may not discuss secondary hazards in depth and may not explicitly recognise the difference in scale. 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).</p> <p data-bbox="304 893 1326 922"><b>Level 2</b> <span style="float: right;"><b>6–10</b></span></p> <p data-bbox="304 931 1294 1133">Response demonstrates some knowledge and understanding of primary hazards associated with the phenomena but discussion may be unbalanced and comparison limited. 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).</p> <p data-bbox="304 1171 1326 1200"><b>Level 1</b> <span style="float: right;"><b>1–5</b></span></p> <p data-bbox="304 1209 1310 1339">Response makes a few general points about tornadoes and/or tropical cyclones without the necessary focus on comparison of hazards. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.</p> <p data-bbox="304 1377 1326 1406"><b>Level 0</b> <span style="float: right;"><b>0</b></span></p> <p data-bbox="304 1415 619 1444">No creditable response.</p>	

**Hot arid and semi-arid environments**

Question	Answer	Marks
10(a)	<p><b>Describe the distribution of areas with high risk of desertification shown in Fig. 3.</b></p> <p>Candidates should consider the global pattern.</p> <p>Candidates may describe:</p> <ul style="list-style-type: none"> <li>• most at risk areas surround existing deserts</li> <li>• great expansion of area in western USA and Australia</li> <li>• small areas in NE South America and Europe (Spain) not associated with present deserts</li> <li>• much of the Middle East at risk</li> <li>• Sahara desert expanding both north and south.</li> </ul> <p>Credit other valid points. <b>1 mark</b> for each point.</p>	<b>4</b>

Question	Answer	Marks
10(b)	<p><b>Outline possible reasons for the distribution of areas with a high risk of desertification that you have described in (a).</b></p> <p>The discussion might vary depending on the examples chosen.</p> <p>Suggestions may include:</p> <ul style="list-style-type: none"> <li>• lack of rainfall due to sub-tropical high pressure; the descending limb of the Hadley cell, continentality, cold ocean currents, rain shadow effects</li> <li>• changes/variability in climate</li> <li>• biophysical systems, reduction of vegetation and fragile soils</li> <li>• human activity, growth of population, farming, removal of water.</li> </ul> <p>These at risk regions are prone to difficult and uncertain climates. The stress to biophysical systems could also be part of the explanation such as lack of vegetation and fragile soils.</p> <p>Award marks based on the quality of explanation and breadth of the response using the marking levels below.</p> <p><b>Level 3</b> <span style="float: right;"><b>5–6</b></span> Response applies knowledge and understanding of both human use and natural factors leading to desertification and develops two or more plausible reasons for the distribution identified in <b>(a)</b>. Response is well-founded in detailed knowledge and strong conceptual understanding of the topic. Any examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 2</b> <span style="float: right;"><b>3–4</b></span> Response offers some reasons for the distribution of desertification but explanation may focus on one group of factors. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.</p> <p><b>Level 1</b> <span style="float: right;"><b>1–2</b></span> Response describes desertification with one or more reasons for it in a broad way. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.</p> <p><b>Level 0</b> <span style="float: right;"><b>0</b></span> No creditable response.</p>	<b>6</b>

Question	Answer	Marks
11	<p><b>Evaluate the importance of the role of Pleistocene pluvials in the development of desert landforms.</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the approach chosen. Whichever examples are chosen, essays which assess the factors with a reasoned argument will be credited.</p> <p>Landforms and features that might be used to assess the role of Pleistocene pluvials are:</p> <ul style="list-style-type: none"> <li>• extensive dry valley systems</li> <li>• vast sand seas</li> <li>• former shorelines of Lake Chad</li> <li>• botanical remains of savanna woodland and steppe grassland</li> <li>• signs of former human occupation</li> <li>• fossil groundwater</li> <li>• remains of animals characteristic of savanna grassland</li> </ul> <p>Credit other evidence.</p> <p>Landforms and features that might be used as part of the assessment are:</p> <ul style="list-style-type: none"> <li>• wadis and integrated valley systems are unlikely to have formed under present conditions</li> <li>• piedmont zone landforms show evidence of having been formed by intense water action</li> <li>• dunes are probably the reworking of vast sand seas, a result of alluvial deposition in a wetter climate.</li> </ul> <p>There also needs to be an assessment of landforms forming under present climatic conditions. This analysis needs to be assessed with reference to landforms that might have been developed or modified by processes currently operating in hot desert environments.</p> <p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span> Response thoroughly discusses the evidence for Pleistocene pluvials and relates this evidence to relevant landforms including landforms which are unrelated or only partially related to the pluvials. An effective and sustained evaluation with a sound conclusion. Response is well-founded in detailed exemplar knowledge and strong conceptual understanding of the topic.</p> <p><b>Level 3</b> <span style="float: right;"><b>11–15</b></span> Response discusses the evidence for pluvials but discussion of related landforms may demonstrate some confusion over which may have been created during these pluvials. 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).</p>	<b>20</b>

Question	Answer	Marks
11	<p><b>Level 2</b> Response demonstrates some knowledge and understanding of the formation of desert landforms but evidence for pluvials may not be identified clearly or linked to relevant landforms. 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).</p> <p><b>Level 1</b> Response makes a few general points about desert landforms without the necessary focus on evidence for environmental change. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.</p> <p><b>Level 0</b> No creditable response.</p>	<p><b>6–10</b></p> <p><b>1–5</b></p> <p><b>0</b></p>

Question	Answer	Marks
12	<p><b>‘Humans can effectively manage arid environments.’</b></p> <p><b>How far do you agree?</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the examples chosen. Whichever approach is chosen, essays which address the extent to which humans can sustainably manage arid environments and support their argument with relevant examples will be credited. There may be detailed consideration of one or more examples or a broadly conceived response drawing on several examples to illustrate the factors involved.</p> <p>Candidates may discuss the following initiatives used to manage arid environments:</p> <ul style="list-style-type: none"> <li>• nomadic pastoralism and paddocking</li> <li>• crop rotation to prevent further degradation or loss of soil</li> <li>• sustainable irrigation</li> <li>• using alternate water sources e.g. desalination of sea water, deep wells for fossil water</li> <li>• ecotourism</li> </ul> <p>Initiatives should be based on specific examples and not generalisations, improbable or unfeasible schemes.</p> <p>The focus of the evaluation should be on how effective these initiatives have been in sustainably managing arid environments.</p> <p>Candidates may also discuss natural factors which cannot be managed but this should not be the focus of the argument.</p> <p>Natural factors affecting the management of arid environments may include:</p> <ul style="list-style-type: none"> <li>• vulnerability of margins to (small scale) changes in climate</li> <li>• drought leading to loss of vegetation</li> <li>• erosion particularly by wind (the dust bowl effect)</li> <li>• effects of sudden excessive rainfall.</li> </ul>	<b>20</b>

Question	Answer	Marks
12	<p>Contextual understanding of the different viewpoints and stakeholders and the possibility of different outcomes in different places should be credited.</p> <p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span>  Response thoroughly discusses the relative success of initiatives for management with a secure understanding and analysis of what might constitute ‘effective management’ in the context of arid environments. At the top of the level, responses may demonstrate strong contextual understanding of one or more specific initiatives in 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.</p> <p><b>Level 3</b> <span style="float: right;"><b>11–15</b></span>  Response discusses one or more initiatives for management of arid areas with well integrated examples to support the discussion. Responses are likely to consider several factors that influence success of initiatives and discuss the statement with some consideration of what ‘effectively’ means. 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).</p> <p><b>Level 2</b> <span style="float: right;"><b>6–10</b></span>  Response demonstrates some knowledge and understanding of management strategies in arid environments, but may not consider many factors or discuss the statement. 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).</p> <p><b>Level 1</b> <span style="float: right;"><b>1–5</b></span>  Response makes a few general points about arid environments without the necessary focus on management. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lack relevance to the question set.</p> <p><b>Level 0</b> <span style="float: right;"><b>0</b></span>  No creditable response.</p>	