



Cambridge  
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**GEOGRAPHY**

**9696/31**

Paper 3 Advanced Physical Geography Options

**October/November 2018**

MARK SCHEME

Maximum Mark: 60

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**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.

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This document consists of **18** printed pages.

### 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 descriptors 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.

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)     | <p><b>Fig. 1.1 shows granite landforms in a tropical environment.</b></p> <p><b>Describe the landforms shown in Fig. 1.1.</b></p> <p>Candidates should interpret the figure to identify the key features.</p> <p>Features from the photograph that could be described:</p> <ul style="list-style-type: none"> <li>the two pinnacles (tors) with vertical joints wide apart</li> <li>sub-rectangular but rounded corestones getting smaller towards the top of the features</li> <li>differentially jointed nature of the rock</li> <li>few horizontal joints (pseudo-bedding planes)</li> <li>the depression between the tors filled with weathered material</li> <li>the dominance of vertical joints might also be mentioned</li> </ul> <p>Look for four accurate points for the 4 marks.</p> | <b>4</b> |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Marks    |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1(b)     | <p><b>Briefly explain how the landforms described in (a) might have developed.</b></p> <p>The emphasis is on 'briefly' and the focus of the explanation should be on the nature of the rock (granite) and the operation of weathering processes in tropical environments. The main explanation will be in terms of deep chemical weathering (mostly hydrolysis of the feldspar minerals) influenced by the joint spacing followed by stripping of the weathered material to expose the basal surface of weathering (weathering front) and tors. Physical weathering processes are relevant when the feature is exposed at the surface (e.g. unloading, insolation weathering, salt crystallisation) which may lead to granular or block disintegration.</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><br/>Response addresses the question fully and is well-focused on the weathering of granite in a tropical environment. 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><br/>Response is partial in addressing the question and focus is not maintained and may be lacking some aspects of granite weathering. Response develops on a largely secure basis 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><br/>Response comprises a few points that address the question simply or in part 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><br/>No creditable response.</p> | <b>6</b> |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Marks |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2        | <p><b>For <u>one</u> tropical ecosystem, assess the role of physical factors in limiting the development of climax vegetation.</b></p> <p>Candidates are free to develop their own approaches to the question and responses will vary depending on the chosen ecosystem. The main part of the question concerns why the vegetation never reaches the climax stage (subclimax) because of physical arresting factors, such as soils, rock type, climate, relief or topography. As the question asks for an assessment, other factors, such as human activity leading to a plagioclimax should be discussed. The effect of fire could be either a physical or human factor.</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><br/>Response addresses the question fully and is well-focused. Knowledge of the chosen ecosystem is accurate and detailed with a good understanding of the nature of the climax vegetation and why this climax might not be achieved in some areas. 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><br/>Response develops on a largely secure base of knowledge and understanding of the vegetation of the chosen ecosystem, but there will be a more limited range of physical factors inhibiting the development of climax vegetation. 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><br/>Response demonstrates some knowledge and understanding of the topic but addresses the question in a partial way. Knowledge of the range of relevant physical factors will be 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><b>Level 1</b> <span style="float: right;"><b>1–5</b></span><br/>Response makes a few general points about the vegetation of the chosen ecosystem. 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><br/>No creditable response.</p> | 20    |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Marks |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 3        | <p><b>Evaluate problems of sustainable management of areas within <u>either</u> the tropical rainforest ecosystem <u>or</u> the savanna ecosystem.</b></p> <p>Candidates are free to develop their own approaches to the question and responses will vary depending on the chosen ecosystem. Whichever ecosystem and examples are chosen, responses that assess sustainable management and support their argument with relevant examples will be rewarded.</p> <p>The problems relate to the nature of the climate, vegetation and soils in the chosen ecosystem. Once the natural vegetation is removed, nutrient cycling is interrupted and changed, the soil loses its fertility and perhaps soil erosion becomes more pronounced. The key to a good answer is the ability to evaluate the relative significance of the factors discussed. In savanna ecosystems it might be the climatic characteristics, whereas in tropical rainforest ecosystems it might be the infertility of the soil. Human factors can be relevant.</p> <p>Award marks based on the quality of explanation and breadth of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span><br/>Response demonstrates a clear understanding of a range of problems of sustainable management of the chosen ecosystem. 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><br/>Responses are likely to consider several factors that influence sustainable management of the chosen ecosystem. 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><br/>Some knowledge of the problems of sustainable management of the chosen ecosystem is shown. Understanding of the topic is partial and may be inaccurate. Response is mainly descriptive in approach and contains a brief or thinly supported evaluation. Response 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><br/>Response makes a few general points about the chosen tropical ecosystem 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><br/>No creditable response.</p> | 20    |

**Coastal environments**

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

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Marks    |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 4(a)     | <p><b>Fig. 4.1 shows coastline change in Long Bay, South Carolina, USA, 1996–2000.</b></p> <p><b>Describe the rates of change shown in Fig. 4.1 from North Island to Waites Island.</b></p> <p>The following points are relevant:</p> <ul style="list-style-type: none"> <li>along most of the coastline there is interspersing of erosion and deposition</li> <li>there are areas where erosion seems to be dominant such as adjacent to North Island and Waites Island</li> <li>in the centre of the bay there is mainly deposition</li> <li>the pattern at the western end (North Island) is more variable than other areas of the coastline</li> <li>there are two areas within Long Bay where there is no change/no data</li> <li>identification of high rates of erosion or deposition with appropriate locations</li> </ul> <p>Four relevant points for 4 marks.</p> | <b>4</b> |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Marks    |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 4(b)     | <p><b>Suggest <u>two</u> reasons for the rates of coastline change described in (a).</b></p> <p>Some of the factors that could be discussed are:</p> <ul style="list-style-type: none"> <li>wave type (destructive/constructive)</li> <li>wave energy (high/low)</li> <li>direction of wave approach</li> <li>offshore gradient (gentle/steep)</li> <li>availability of sediment</li> <li>offshore currents</li> <li>amount and types of coastal management</li> </ul> <p>Credit any reasonable suggestion (both natural factors and human management) based on an understanding of coastal processes. There is no necessity for knowledge of this specific coast.</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><br/> Response addresses two reasons fully and is well-focused on the coastal processes and factors that affect rates of erosion and deposition. 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><br/> Response addresses two reasons but may be unbalanced. Response develops on a largely secure basis 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><br/> Response comprises a few basic points that address the question simply or in part. 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><br/> No creditable response.</p> | <b>6</b> |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Marks |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 5        | <p><b>To what extent is the formation of cliff profiles the result of marine erosion?</b></p> <p>Candidates are free to develop their own approach to the question. The focus of this question is the formation of the cliff profile. There needs to be an accurate discussion of the nature of relevant marine processes such as abrasion, hydraulic action, cavitation, etc. Other relevant factors in cliff profile development could include rock type and structure, weathering, mass movement, changes in sea level and coastal management. There needs to be a sound evaluation of the various factors that lead to the formation of cliff profiles.</p> <p>Award marks based on the quality of explanation and breadth of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span><br/>Response has an effective and secure evaluation of the relative importance of marine processes in the formation of cliff profiles. 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><br/>Response is broadly evaluative in character, comprising some explanatory or narrative content and an assessment of the relative role of marine processes in the formation of cliff profiles. 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><br/>Response recognises the importance of marine processes in the formation of cliff profiles but with limited discussion of any other relevant factors. Response is mainly descriptive in approach and contains a brief or thinly supported evaluation. Response 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><br/>Response is mainly descriptive, 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><br/>No creditable response.</p> | 20    |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Marks |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 6        | <p><b>Describe the problems of sustainably managing a stretch or stretches of coastline and evaluate the attempted solutions.</b></p> <p>The syllabus requires a case study, so candidates are free to choose their own example of a stretch of coastline. The detail will depend on the stretch of coastline chosen. Whichever stretch or stretches of coastline are chosen, the focus should be on the recognition and description of the problems with an evaluation of solutions to the problems described. The problems should be site specific but there will need to be a secure generic understanding of coastal processes and management techniques.</p> <p>Award marks based on the quality of explanation and breadth of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span><br/> Response identifies and describes a range of problems and effectively evaluates solutions to these problems employed on the chosen stretch(es) of coastline. An effective and sustained evaluation with a sound conclusion. Response is well-founded in detailed exemplar knowledge and strong conceptual understanding of the question.</p> <p><b>Level 3</b> <span style="float: right;"><b>11–15</b></span><br/> Response identifies some problems of sustainability on the chosen stretch(es) of coastline. 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><br/> Response shows some knowledge of the problems of the chosen stretch(es) of coastline but understanding of the topic is limited and may be inaccurate. Response is mainly descriptive in approach and contains a brief or thinly supported evaluation. Response without the use of specific 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><br/> Response shows basic knowledge of a specific stretch(es) of coastline and the discussion may be mostly generic. A descriptive response comprising a few simple points. 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><br/> No creditable response.</p> | 20    |

**Hazardous environments**

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

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Marks    |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 7(a)     | <p><b>Fig. 7.1 shows the tracks of selected hurricanes in the Atlantic Ocean in 2014.</b></p> <p><b>Describe the tracks of the hurricanes shown in Fig. 7.1.</b></p> <p>There are only 4 marks available so only a brief description is needed, but it does need to be a general synthesis rather than describing each track in detail.</p> <p>The general points are:</p> <ul style="list-style-type: none"> <li>most start in the centre or western areas of the North Atlantic/between 5°N and 20°N</li> <li>all move in a curved path/towards land and back out to sea</li> <li>the majority move clockwise/from north westward to north eastward</li> <li>most end between latitudes 25 degrees and 42 degrees north</li> <li>hurricanes 4 and 8 are anomalies, both in direction and length of tracks</li> <li>some reference to longitude for start and finish</li> </ul> <p>Four points for 4 marks.</p> | <b>4</b> |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Marks    |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 7(b)     | <p><b>Outline possible reasons for the source and direction of movement of the hurricanes shown in Fig. 7.1.</b></p> <p>Knowledge and understanding of the factors needed for the formation of tropical cyclones is essential to be able to provide a good explanation.</p> <p>Explanation will focus on:</p> <ul style="list-style-type: none"> <li>warm ocean temperatures of about 26°C providing energy</li> <li>warm ocean temperatures to depth of 60 metres</li> <li>this provides conditions for rapid uplift of warm humid air</li> <li>release of latent heat to increase rate of air uplift</li> <li>lack of wind shearing</li> <li>general movement to the NW and then NE as a result of the Coriolis effect</li> <li>hurricanes dissipate on making landfall or on passing over colder water due to a loss of energy</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><br/> Response addresses a range of reasons for the source and direction of movement of the hurricanes. 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><br/> Response addresses some reasons for the source and direction of movement of the hurricanes. 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><br/> Response comprises a few points which address the question simply or in part. 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><br/> No creditable response.</p> | <b>6</b> |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Marks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 8        | <p><b>‘Prediction is the most effective way of reducing the impacts of volcanic eruptions on lives and property.’</b></p> <p><b>How far do you agree with this view?</b></p> <p>Evaluation needs to be based on a detailed knowledge of the nature of volcanic eruptions and the processes and materials involved.</p> <p>There needs to be a thorough knowledge of predictive techniques such as:</p> <ul style="list-style-type: none"> <li>remote sensing by satellite sensors detecting deformation of the ground surface</li> <li>temperature changes caused by heating of the ground before an eruption</li> <li>gravimeters detecting underground movement of the magma chamber</li> <li>geochemical changes</li> <li>increasing temperature of thermal waters such as hot springs with increased levels of certain gases</li> </ul> <p>Ways of reducing the impact of volcanic eruptions need to be discussed and assessed. These could include:</p> <ul style="list-style-type: none"> <li>evacuation (but this will be largely based on the accuracy of prediction)</li> <li>emergency services and personal survival kits</li> <li>building design</li> <li>hazard mapping</li> <li>possible modification of the eruption such as lava diversions, bombing of lava, spraying lava with water</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 4</b> <span style="float: right;"><b>16–20</b></span><br/> Response is well-founded in a thorough and detailed assessment of the prediction of volcanic eruptions and effective ways of reducing their impacts. Response is well-focused and addresses all elements of the question. An effective and sustained evaluation with a sound conclusion. Response is well-founded in detailed exemplar knowledge and strong conceptual understanding of the question.</p> <p><b>Level 3</b> <span style="float: right;"><b>11–15</b></span><br/> Response assesses the prediction of volcanic eruptions and effective ways of reducing their impacts but may be somewhat partial. Response is broadly evaluative in character, comprising some explanatory or narrative content and an assessment. 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><br/> Response shows some knowledge of the nature of volcanic eruptions and ways of reducing their impacts, but understanding of the topic is limited and may be inaccurate. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) will not get above the middle of Level 2 (8 marks).</p> | 20    |

| Question | Answer                                                                                                                                                                                                                                                                                                                           | Marks |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 8        | <p><b>Level 1</b> <span style="float: right;"><b>1–5</b></span><br/> Response is mainly descriptive, 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><br/> No creditable response.</p> |       |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Marks |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 9        | <p><b>For the hazardous environment you have studied, assess the view that sustainable management is impossible.</b></p> <p>Candidates are free to develop their own approaches to the question and responses will vary depending on the hazardous environment chosen.</p> <p>Issues that could be discussed are:</p> <ul style="list-style-type: none"> <li>the nature of the chosen hazardous environment</li> <li>why there is need for management</li> <li>different approaches to sustainable management</li> <li>why sustainable management might be impossible</li> </ul> <p>Examples of possible management strategies could include:</p> <ul style="list-style-type: none"> <li>prediction of the scale and intensity of the hazards present</li> <li>hazard mapping</li> <li>preparedness and monitoring</li> <li>perception of the risk</li> </ul> <p>These could be used to address the problems of sustainable management based on a good understanding of the concept.</p> <p>Award marks based on the quality of explanation and breadth of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span><br/> Response is effective and there is secure evaluation in which the whole of the response is structured as an assessment. 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><br/> Response may lack some detail in terms of the evaluation as to why the sustainable management of a hazardous environment is impossible. Response is broadly evaluative in character, comprising some explanatory or narrative content and an assessment. 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><br/> Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Some knowledge of the hazardous environment is shown but understanding of the topic is limited and may be inaccurate. Responses without the use of example(s) 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><br/> Response is mainly descriptive, 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><br/> No creditable response.</p> | 20    |

## 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)    | <p><b>Fig. 10.1 is a photograph which shows sand dunes in a hot arid environment.</b></p> <p><b>With the aid of a labelled diagram, describe the sand dunes shown in Fig. 10.1.</b></p> <p>The diagram does not have to perfectly match the photograph.</p> <p>The following features could be identified:</p> <ul style="list-style-type: none"> <li>they are clearly crescentic dunes formed in a series of parallel groups</li> <li>the flat surfaces should be noted as well as the ripples on the flattish top surfaces</li> <li>the superimposition of one crescent on another</li> </ul> <p>Full marks can be awarded for a well-annotated diagram.</p> <p>2 marks for the diagram and 2 for the description.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4     |
| 10(b)    | <p><b>Suggest how the sand dunes described in (a) have developed.</b></p> <p>Suggestions could be based on:</p> <ul style="list-style-type: none"> <li>processes of aeolian transport and deposition</li> <li>relationships between wind speed and sand particle size</li> <li>sand availability</li> <li>variability or constancy of wind strength and direction</li> <li>initial obstruction to begin the development</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><br/> Response is a detailed explanation of the processes involved in the development of the sand dunes shown. 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><br/> Response is a partial explanation of the processes involved in the development of the sand dunes shown. Response develops on a largely secure basis 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><br/> Response comprises a few points that address the question simply or in part. 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><br/> No creditable response.</p> | 6     |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Marks |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 11       | <p><b>With the aid of examples, assess the extent to which ocean currents are the cause of aridity.</b></p> <p>The needs to be a detailed discussion of the main causes of aridity, which are:</p> <ul style="list-style-type: none"> <li>continentiality</li> <li>high pressure caused by the descending falling limbs of the Hadley Cell</li> <li>rain shadow effect</li> <li>cold offshore ocean currents</li> <li>human activity which reduces evapotranspiration</li> </ul> <p>Thus, ocean currents are only one possible cause and need to be assessed in comparison with the other possible causes. It is very difficult to produce an effective answer without the use of specific examples. Thus, examples should form a prominent part of the answer.</p> <p>Award marks based on the quality of explanation and breadth of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span><br/>Response comprises a thorough assessment of the extent to which ocean currents are the cause of aridity in comparison to other relevant factors. 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><br/>Response comprises some assessment of the extent to which ocean currents are the cause of aridity in comparison to other relevant 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> <p><b>Level 2</b> <span style="float: right;"><b>6–10</b></span><br/>Response comprises a partial assessment of the extent to which ocean currents are the cause of aridity in comparison to other relevant factors. Response is mainly descriptive in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) 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><br/>Response is mainly descriptive, 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><br/>No creditable response.</p> | 20    |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Marks |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 12       | <p><b>‘Desertification is caused by human factors.’</b></p> <p><b>How far do you agree with this view?</b></p> <p>There needs to be a precise definition of desertification as this will determine the factors discussed in the answer.</p> <p>There needs to be a balanced account of the natural processes, such as:<br/> changing climatic characteristics<br/> nature and fragility of the vegetation and soils</p> <p>There also needs to be an account of the role of human factors (human activity) such as:<br/> overgrazing<br/> deforestation<br/> over irrigation<br/> over cropping<br/> human-induced climatic change</p> <p>The key to a good answer is the evaluation of the statement.</p> <p>Award marks based on the quality of explanation and breadth of the response using the marking levels below.</p> <p><b>Level 4</b> <span style="float: right;"><b>16–20</b></span><br/> Response comprises a thorough assessment of the view that desertification is caused by human factors. 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><br/> Response comprises some assessment of the view that desertification is caused by human 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 with the use of example(s).</p> <p><b>Level 2</b> <span style="float: right;"><b>6–10</b></span><br/> Response comprises a partial assessment of the view that desertification is caused by human factors. 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><br/> Response makes a few general points about desertification. A descriptive response comprising a few simple points. Knowledge is basic and understanding may be poor and lacking relevance to the question set.</p> <p><b>Level 0</b> <span style="float: right;"><b>0</b></span><br/> No creditable response.</p> | 20    |