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**GEOGRAPHY**

**9696/31**

Paper 3 Advanced Physical Geography Options

**May/June 2019**

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 **21** 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 a winter dry monsoon and Fig. 1.2 shows a summer wet monsoon.</b></p> <p><b>Describe the differences in the position of the ITCZ and the pattern of winds between Fig. 1.1 and Fig. 1.2.</b></p> <p>Candidates should interpret Fig. 1.1 and Fig. 1.2 to identify the differences in the position of the ITCZ and the pattern of winds.</p> <p>Differences from Fig. 1.1 and Fig. 1.2 may include:</p> <p>For the ITCZ:</p> <ul style="list-style-type: none"> <li>• more uniform west-east pattern in winter north of the Tropic of Capricorn</li> <li>• predominantly over the ocean in winter and over the land in summer</li> <li>• in summer north of the Tropic of Cancer over the Indian sub-continent</li> <li>• conspicuous bulge to the north over China towards Japan</li> </ul> <p>For the pattern of winds:</p> <ul style="list-style-type: none"> <li>• reversal of winds from winter to summer (1) with the north-east winds changing to south westerlies (1) which move towards the Tropic of Cancer (1)</li> <li>• winds to the north of the Tropic of Cancer in summer are generally westerlies</li> </ul> <p>Mark 2/2, 3/1, 1/3 depending on the balance.</p>	4

Question	Answer	Marks
1(b)	<p><b>Explain the role of the ITCZ in the monsoons shown in Fig. 1.1 and Fig. 1.2.</b></p> <p>The ITCZ is the zone of intense heating caused by the position of the overhead sun. This moves north in the northern hemisphere summer and south in the northern hemisphere winter. In the northern summer this drags the south westerly winds across India and Southeast Asia. The ITCZ brings with it intense uplift of air leading to high rainfall amounts during the summer wet monsoon. The bulge over China is caused by the Himalayan Range restricting the movement of the ITCZ north of India. The southerly movement of the ITCZ in the northern winter allows north easterly dry winds to blow from the Central Asia high pressure system towards the low pressure areas over the Indian Ocean.</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 (5–6)</b> Response addresses role of the ITCZ in the monsoons and is balanced with a thorough explanation of changing wind directions using appropriate terminology and understanding of the ITCZ. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 2 (3–4)</b> Response offers some explanation of the role of the ITCZ in the monsoons but in a limited manner. Explanation may be unbalanced between position of the ITCZ and the direction of the winds and understanding of the role of the ITCZ may be inaccurate. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.</p> <p><b>Level 1 (1–2)</b> Response comprises one or two descriptive points about the role of the ITCZ in the monsoons but explanation may be insecure. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.</p> <p><b>Level 0 (0)</b> No creditable response.</p>	<b>6</b>

Question	Answer	Marks
2	<p><b>Describe <u>one</u> type of tropical karst landscape. Assess the relative importance of water, rock structure and vegetation in its formation.</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the example(s) chosen. Whichever approach is chosen, essays which assess the karst landscape and the role of water, rock structure and vegetation in its formation will be credited. There may be detailed consideration of one or more examples, or a broadly conceived response, drawing on several examples to show the factors involved.</p> <p>The three types of tropical karst are cone karst, tower karst and cockpit karst. Cockpit karst and cone karst are very similar and will be treated together. Tower karst is very different in its features and its formation.</p> <p>Cockpit karst and cone karst (mostly confined to islands in the Caribbean, especially Jamaica):</p> <ul style="list-style-type: none"> <li>• deep depressions with slightly concave floors filled with soil</li> <li>• smooth, steep sides rise at an angle of 30–40 degrees to form the convex sides of the residual hills</li> <li>• many have sinkholes on the bottom as they have formed above the water table</li> <li>• formed by dissection of the former landscape by intense carbonation aided by closely spaced joints and bedding planes in the limestone</li> <li>• humic acids from abundant vegetation aid the process</li> </ul> <p>Tower karst (concentrated in Southeast Asia):</p> <ul style="list-style-type: none"> <li>• similar early processes to those involved in cockpit karst formation but the cockpits are lowered to the water table and are permanently moist</li> <li>• the tower bases dissolve away, undercutting the sides which steepens them</li> <li>• this results in vertical overhangs and cliffs in bare rock with slopes ranging from 60 to 90 degrees</li> <li>• towers can reach 150 metres above the level plain</li> </ul> <p>Thus, the mode of formation of both main types is similar in the early stages but tower karst has gone a stage further. Uplift of an original surface may be relevant in the formation of cockpit karst.</p> <p>If both types are answered, mark both and credit the best answer.</p>	20

Question	Answer	Marks
2	<p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4 (16–20)</b> Response thoroughly describes the specific characteristics of <b>one</b> type of tropical karst. Response makes clear links between the nature and formation of the karst type chosen and the importance of water, rock structure and vegetation. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 3 (11–15)</b> Response describes the characteristics of the chosen tropical karst landscape and makes some links with water, rock structure and 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 (6–10)</b> Response demonstrates some knowledge of the characteristics of the chosen karst landscape but shows a lack of understanding of the links with water, rock structure and vegetation. 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 (1–5)</b> Response makes a few general points about the chosen tropical karst landscape but is lacking in assessment of the role of water, rock structure and vegetation. 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 (0)</b> No creditable response.</p>	

Question	Answer	Marks
3	<p><b>Describe the characteristics of the vegetation in <u>one</u> tropical ecosystem. Assess the extent to which human activities affect the climax vegetation.</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the example(s) chosen. Whichever approach is chosen, essays which assess the extent to which human activities affect the climax vegetation of the chosen ecosystem will be credited. There may be detailed consideration of one or more examples or a broadly conceived response, drawing on several examples to show the factors involved.</p> <p>In the case of the TRF, the main characteristics of the climax vegetation are:</p> <ul style="list-style-type: none"> <li>• dense vegetation with tall emergent, a uniform main canopy layer, under canopy, and shrub layer level</li> </ul> <p>The main effect of human activity is deforestation caused by:</p> <ul style="list-style-type: none"> <li>• traditional slash and burn activities where vegetation is cut down to allow farming activities. Clearing involving removal of shrubs and small trees, and burning is important to produce ash, the source of fertility. Crops are harvested and after a number of years, soil fertility declines as land is exposed to leaching and nutrients exhausted.</li> <li>• lumber and agriculture industries have a very adverse effect due to soil fertility being only good enough to grow crops for a few years after it has been cleared. Farmers clear more and more forest each year to satisfy the needs of consumers.</li> <li>• in mining, large areas of forest are cleared and roads are built to access the mines. Chemicals may leach and flow into river courses.</li> </ul> <p>This upsets the balance between vegetation and climatic characteristics.</p> <p>The main characteristics of seasonally humid tropical ecosystems (savanna) depend on location as there is a gradation (ecocline) away from the TRF from wooded savanna to grass savanna in the drier parts.</p> <p>In the savanna, climax vegetation is prevented from developing because of deforestation, grazing and the growth of agriculture, with increased use of fertilisers and irrigation. Monoculture severely depletes soil nutrients leading to degradation preventing the return of climax vegetation. Overgrazing causes the removal of vegetation at water holes, while prevention of fires causes bush encroachment.</p>	20

Question	Answer	Marks
3	<p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4 (16–20)</b> Response thoroughly discusses the climax vegetation of the chosen ecosystem. Response makes clear links between climax vegetation and human activities. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 3 (11–15)</b> Response discusses the climax vegetation of the chosen ecosystem in a meaningful way. 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 (6–10)</b> Response demonstrates some knowledge and understanding of the climax vegetation of the chosen ecosystem. 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 (1–5)</b> Response makes a few general points about the climax vegetation of the chosen environment and the effect of human activities. 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 (0)</b> No creditable response.</p>	



**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 is a photograph which shows some coastal landforms.</b></p> <p><b>Describe the landforms shown in Fig. 4.1.</b></p> <p>Candidates should identify the landforms shown in Fig. 4.1 and then describe the characteristics of those landforms. A well annotated diagram could earn full credit.</p> <p>The landforms shown in the photograph are:</p> <ul style="list-style-type: none"> <li>• vertical cliffs</li> <li>• two main arches, one larger than the other</li> <li>• offshore islands, one of which could be identified as a stump</li> <li>• flat topped surface to the cliffs and headland</li> <li>• headland and inlet</li> <li>• cliff fall</li> </ul> <p>Three relevant landforms with description for 3 marks.</p>	<b>3</b>
4(b)	<p><b>Explain the development of the landforms described in (a).</b></p> <p>Explanation will be based on the processes of marine erosion leading to headlands, bays, caves, arches and stacks. There should be a discussion of both processes and the nature of the rock and its structure. Sub-aerial processes, such as rock falls, are also 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 3 (6–7)</b> Response applies knowledge and understanding of marine processes and other factors to explain the formation of the landforms described in (a). Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 2 (3–5)</b> Response offers some explanation for the landforms but may be unbalanced between the landforms described. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.</p> <p><b>Level 1 (1–2)</b> Response is broadly about the landforms but explanation is unclear. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.</p> <p><b>Level 0 (0)</b> No creditable response.</p>	<b>7</b>

Question	Answer	Marks
5	<p><b>Assess the role of longshore drift in the formation of depositional landforms in coastal environments.</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the example(s) chosen. Whichever approach is chosen, essays which assess the role of longshore drift in the formation of depositional landforms will be credited. There may be detailed consideration of one or more examples or a broadly conceived response, drawing on several examples to show the factors involved.</p> <p>The main landforms related to longshore drift are drift-aligned beaches, spits, tombolos and possibly some offshore bars and barrier beaches. The question also requires discussion of depositional landforms where longshore drift plays less of a role, if any, such as swash-aligned beaches, most offshore bars and sand dunes and salt marshes, although it could be suggested that many salt marshes form in the sheltered water behind spits.</p> <p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4 (16–20)</b> Response thoroughly assesses the role of longshore drift in the formation of a range of coastal depositional landforms. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 3 (11–15)</b> Response assesses the role of longshore drift in the formation of coastal depositional landforms. 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 (6–10)</b> Response demonstrates some knowledge and understanding of the role of longshore drift in the formation of coastal depositional landforms. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks).</p> <p><b>Level 1 (1–5)</b> Response makes a few general points about the role of longshore drift in the formation of coastal depositional landforms. 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 (0)</b> No creditable response.</p>	20

Question	Answer	Marks
6	<p><b>‘Soft engineering is less expensive and more sustainable than hard engineering in coastal management.’ With the aid of one or more case studies, how far do you agree with this view?</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the example(s) chosen. Whichever approach is chosen, essays which assess soft and hard engineering techniques will be credited. There may be detailed consideration of one or more examples or a broadly conceived response, drawing on several examples to show the factors involved.</p> <p>An assessment of their expense and sustainability is expected. There needs to be the use of a case study or case studies. A range of soft engineering approaches could include: beach replenishment, planting of vegetation, especially on sand dunes, managed retreat, cliff drainage, cliff re-grading, planning controls, doing nothing. A range of hard engineering approaches could include: groynes, sea walls, revetments, rock armour, gabions.</p> <p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4 (16–20)</b> Response thoroughly discusses a range of both soft and hard engineering techniques, assessing their expense and sustainability. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 3 (11–15)</b> Response discusses the different approaches to soft and hard engineering and makes some links with expense and sustainability. Response is broadly evaluative in character, comprising some explanatory or narrative content and a conclusion. Response develops on a largely secure base of knowledge and understanding with the use of example(s).</p> <p><b>Level 2 (6–10)</b> Response demonstrates some knowledge and understanding of a limited range of both soft and hard engineering approaches. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks).</p> <p><b>Level 1 (1–5)</b> Response makes a few general points about soft and hard engineering approaches. 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 (0)</b> 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 earthquake activity in the area of Christchurch, New Zealand, 2010–12.</b></p> <p><b>Describe the pattern of earthquake activity shown in Fig. 7.1.</b></p> <p>Candidates should interpret Fig. 7.1 to describe the main pattern of earthquake activity.</p> <p>Candidates may identify:</p> <ul style="list-style-type: none"> <li>• most intense earthquake in the west</li> <li>• the Mw earthquakes of 6.3, 6.0 and 5.9 concentrated just to the east of Christchurch</li> <li>• aftershocks on 04/09/2010 in a line west of Christchurch clearly related to the 04/09/2010 earthquake probably associated with the Greendale fault</li> <li>• other aftershocks concentrated to the south and east of Christchurch</li> <li>• isolated aftershocks of low magnitude more widely scattered</li> <li>• age pattern is acceptable</li> </ul> <p>1 mark for each clear and unambiguous point including use of data.</p>	<b>4</b>

Question	Answer	Marks
7(b)	<p><b>Suggest reasons for the great amount of earthquake activity in the area shown in Fig. 7.1.</b></p> <p>Candidates should refer to the information provided in Fig. 7.1 in suggesting reasons. No knowledge of New Zealand or Christchurch is expected but generic points might be valid. However, the bulk of the answer should relate to detail provided in Fig. 7.1 such as movement along the major fault lines such as the Greendale fault. Offshoots from this major fault (sub-surface fault rupture) are also relevant.</p> <p>Suggestions may include:</p> <ul style="list-style-type: none"> <li>• the Greendale fault</li> <li>• several active faults are present</li> <li>• sub-surface fault rupture offshore to the north-east</li> </ul> <p>This information needs to be used in combination with an understanding of the causes of earthquakes.</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 (5–6)</b> Response clearly uses the information in Fig. 7.1 to suggest reasons for the earthquake activity. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 2 (3–4)</b> Response offers some suggestions to account for the earthquake activity but with limited use of Fig. 7.1. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.</p> <p><b>Level 1 (1–2)</b> Response suggests some reasons for the earthquake activity but explanation is insecure. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.</p> <p><b>Level 0 (0)</b> No creditable response.</p>	<b>6</b>

Question	Answer	Marks
8	<p><b>‘Risk from large scale atmospheric disturbances can be completely removed by effective preparation of people and property.’</b></p> <p><b>How far do you agree with this view?</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the example(s) chosen. Whichever approach is chosen, essays which assess the risks from large scale atmospheric disturbances will be credited. There may be detailed consideration of one or more examples or a broadly conceived response, drawing on several examples to show the factors involved.</p> <p>Impacts which may be discussed include:</p> <p>Large scale atmospheric disturbances are tropical cyclones, hurricanes and typhoons. The hazards associated with them are storm surges, coastal flooding, intense rainfall and high winds. The risks are associated with these hazards but will also be conditioned by the local topography, geology for mass movement caused by the intense rainfall, and flooding if there are major rivers. These risks need assessing with respect to preparation of people and property. This will include any coastal defences, building design for high winds and river defences for flooding. Prediction and monitoring are also relevant. The most probable assessment is that the risks cannot be completely removed but that they can be reduced.</p>	20

Question	Answer	Marks
8	<p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4 (16–20)</b> Response thoroughly discusses a range of risks associated with large scale atmospheric disturbances. Response makes clear how preparation of people and property may reduce these risks. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 3 (11–15)</b> Response discusses one or more risks from large scale atmospheric disturbances. Response is broadly evaluative in character, comprising some explanatory or narrative content and a conclusion. Response develops on a largely secure base of knowledge and understanding with the use of example(s).</p> <p><b>Level 2 (6–10)</b> Response demonstrates some knowledge and understanding of a limited range of risks from large scale atmospheric disturbances. Response is mainly descriptive or explanatory in approach and contains a brief or thinly supported evaluation. Responses without the use of example(s) to support the response will not get above the middle of Level 2 (8 marks).</p> <p><b>Level 1 (1–5)</b> Response makes a few general points about the risks from large scale atmospheric disturbances but without a focus on how these risks may be reduced. 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 (0)</b> No creditable response.</p>	

Question	Answer	Marks
9	<p><b>Assess the extent to which prediction, hazard mapping and preparedness can reduce the impacts of mass movements on lives and property.</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the example(s) chosen. Whichever approach is chosen, essays which assess how prediction, hazard mapping and preparedness can reduce the impacts of mass movement will be credited. There may be detailed consideration of one or more examples or a broadly conceived response, drawing on several examples to show the factors involved.</p> <p>There needs to be specific reference to a variety of mass movements. Prediction of mass movement is difficult but an understanding of the nature of the mass movements chosen for discussion and the nature of the most susceptible rocks and soils will enable some prediction to be made. Thus mudflows, which require an input of water and specific earthquake materials, might be related to intense rainfall. This also forms the basis of much hazard mapping. Preparedness could be related to planning controls in association with the hazard mapping and preventative techniques.</p> <p>Effectiveness of these techniques should focus on reduction of impacts on lives and property. Impacts on lives and property include residential, commercial, public buildings, and infrastructure such as transportation, water, energy, and communication systems which may be damaged or destroyed.</p>	20



Question	Answer	Marks
9	<p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4 (16–20)</b> Response thoroughly discusses how prediction, hazard mapping and preparedness can reduce impacts of mass movements on lives and property. Response makes clear links between these and level of impact. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 3 (11–15)</b> Response discusses one or more aspects of prediction, hazard mapping and preparedness and makes some links with reducing the impacts of mass movements on lives and property. 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 (6–10)</b> Response demonstrates some knowledge and understanding of prediction, hazard mapping and preparedness techniques but the links with reducing the impacts of mass movements on lives and property are not developed. 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 (1–5)</b> Response makes a few general points about the impacts of mass movements on lives and property but with a limited discussion of prediction, hazard mapping and preparedness. 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 (0)</b> No creditable response.</p>	

**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 landforms in Death Valley, USA.</b></p> <p><b>With the use of a diagram, describe the landforms shown in Fig. 10.1.</b></p> <p>Candidates should interpret Fig. 10.1 to identify the key features and use these observations to produce a realistic diagram.</p> <p>Features from Fig. 10.1 may include:</p> <ul style="list-style-type: none"> <li>• large alluvial fan with a variety of anastomosing channels extending into the salt lake</li> <li>• channel (wadi) emerging from the mountains</li> <li>• gullies on the hillsides</li> <li>• clear evidence of a salt lake</li> <li>• smaller alluvial fan to the left of the main fan</li> <li>• possibility of a delta to the left of the main fan</li> </ul> <p>There may be other features that could be considered.</p> <p>1 mark for a diagram identifying a minimum of two landforms and 3 marks for an accurate description of the landforms.</p>	<b>4</b>
10(b)	<p><b>Explain the role of water in the formation of <u>two</u> of the landforms described in (a).</b></p> <p>The detail will depend on which landforms are chosen. However, for most of the landforms water action has been crucial.</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 (5–6)</b> Response clearly explains the formation of the chosen landforms. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 2 (3–4)</b> Response offers some explanation of the chosen landforms but may be limited in some respect, probably in the understanding of the processes involved. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development.</p> <p><b>Level 1 (1–2)</b> Response provides an explanation which is unclear and insecure with little mention of the processes involved. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely.</p> <p><b>Level 0 (0)</b> No creditable response.</p>	<b>6</b>

Question	Answer	Marks
11	<p><b>Assess the relative influence of factors leading to the salinisation of soils in hot arid and semi-arid environments.</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the example(s) chosen. Whichever approach is chosen, essays which assess a range of factors will be credited. There may be detailed consideration of one or more examples or a broadly conceived response, drawing on several examples to show the factors involved.</p> <p>There needs to be a description of the nature of soil salinisation.</p> <p>The main saline soils are solonetz and solonchaks. Solonetz are sodium rich soils with a conspicuous natric (sodic) layer. Solonchaks are pale grey soils with a high concentration of soluble minerals with a fluffy surface layer. Candidates may discuss the following factors involved in salinisation.</p> <p>Natural factors include:</p> <ul style="list-style-type: none"> <li>• lack of rainfall and high temperatures resulting in potential evaporation exceeding rainfall amounts</li> <li>• this brings soluble salts up into the soil from the water table</li> <li>• the poor structure of the soils, lacking in humus, is also an important factor</li> </ul> <p>Human factors include:</p> <ul style="list-style-type: none"> <li>• over irrigation which brings the water table near the surface</li> <li>• irrigating with water rich in salts; this includes from inland lakes and from coastal areas</li> </ul> <p>The focus of the assessment should be on the relative influence of these factors. Soil salinisation is a natural process which can be increased by human activity.</p>	<b>20</b>

Question	Answer	Marks
11	<p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4 (16–20)</b> Response thoroughly discusses the nature of soil salinisation and how it occurs. Response demonstrates a thorough understanding of the factors, both natural and human, which lead to salinisation. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 3 (11–15)</b> Response discusses the nature of soil salinisation and how it occurs, and makes some links to natural and 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 and understanding with the use of example(s).</p> <p><b>Level 2 (6–10)</b> Response demonstrates some knowledge and understanding of a limited range of factors causing soil salinisation. 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 (1–5)</b> Response makes a few general points about soil salinisation but without a clear focus on the factors causing it. 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 (0)</b> No creditable response.</p>	

Question	Answer	Marks
12	<p><b>With the aid of a case study from <u>either</u> a hot arid <u>or</u> semi-arid environment, assess the effectiveness of solutions to the problems of sustainable management.</b></p> <p>Candidates are free to develop their own approach to the question and responses will vary depending on the example(s) chosen. Whichever approach is chosen, essays which assess a range of solutions to the problems of sustainable management will be credited. There may be detailed consideration of one or more examples or a broadly conceived response, drawing on several examples to show the factors involved.</p> <p>There needs to be a detailed case study. Assessment will consider the nature of the problems and possible solutions to the problems. There needs to be a convincing discussion as to what is sustainable and what might be sustainable.</p> <p>Award marks based on the quality of the response using the marking levels below.</p> <p><b>Level 4 (16–20)</b> Response thoroughly discusses the chosen case study with a description of the problems of sustainable management. An effective and sustained evaluation with a sound conclusion. Response is well founded in detailed exemplar knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response.</p> <p><b>Level 3 (11–15)</b> Response discusses the chosen case study with a description of the problems of sustainable management. There is a somewhat limited assessment of the effectiveness of solutions to the problems. 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 (6–10)</b> Response demonstrates some knowledge and understanding of the chosen case study with a description of the problems of sustainable management. There is a very limited assessment of the effectiveness of solutions to the problems. 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 (1–5)</b> Response makes a few general points about the chosen case study with a description of the problems of sustainable management but without the necessary focus on the question or a convincing assessment. 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 (0)</b> No creditable response.</p>	20