Cambridge Assessment International Education

Cambridge International AS & A Level

GEOGRAPHY **9696/13**

Paper 1 Core Physical Geography **October/November 2020**

MARK SCHEME

Maximum Mark: 60

Published

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

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

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

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[Turn over

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.

Section A

Answer **all** questions in this section. All questions carry 10 marks.

Hydrology and fluvial geomorphology

Question	Answer	Marks
1(a)(i)	**Fig. 1.1 shows a hydrograph for two storm events.** **State the maximum precipitation for Storm 2.** 11 mm (needs both units and number)	**1**
1(a)(ii)	**Calculate the lag time for Storm 1. Show your working.** 04:00–05:00 precipitation, 14:00–15:00 discharge (1) 9–11 hrs. (1) Needs units in either calculation or answer.	**2**
1(b)	**Describe the hydrograph shown in Fig. 1.1 for the two storm events.** Description could include: • rising limbs steep in both cases, but Storm 1 is shorter and steeper • lag times shorter for Storm 1 (10 hrs.), Storm 2 (11 hrs.) • peak discharges for Storm 2 higher, 74 cumecs compared to 60 cumecs • receding limb steep, but Storm 2 the steeper of the two Reserve **1 mark** for the use of data. Accept separate descriptions and/or comparisons.	**4**
1(c)	**Suggest reasons for the differences in response of the hydrograph shown in Fig. 1.1.** Relevant points that could be made include: • short lag time for Storm 1, a response to high rainfall amounts • rising limb for Storm 1 steeper because of high rainfall • rapid rise of discharge for Storm 2 due to antecedent moisture • rising to a higher peak as a result of antecedent rainfall, even though the precipitation amount was less than for Storm 1 • recession limb steeper for Storm 2 because of antecedent moisture (limited infiltration, etc.) **1 mark** for simple reason, **2 marks** for developed reason.	**3**

Atmosphere and weather

Question	Answer	Marks
2(a)(i)	**Fig. 2.1 shows major pressure systems and wind belts at the Earth's surface in January and July.** **Using Fig. 2.1: State the major pressure system over east Africa in January.** Low (or L)	**1**
2(a)(ii)	**Using Fig. 2.1: Name the major wind belt over the North Atlantic Ocean in July.** Westerlies	**1**
2(b)	**Describe the main differences in pressure systems and wind belts between January and July shown in Fig. 2.1.** The main relevant points are: • high pressure over central Asia in January but low pressure in July • low pressure over south-east Asia and northern Australia in January • high pressure over North America in January, but not in July • low pressure off north-west North America in January, but high pressure in July • low pressure over east Africa in January, but not in July • winds in low latitudes: NE Trades in January, SE Trades in July • monsoon in January blows from over the land towards the ocean and the reverse in July There are others that could be mentioned but these are the major differences. Four points for **4 marks**. Both pressure and winds are required for full marks.	**4**
2(c)	**Suggest <u>two</u> reasons for the main differences in pressure systems and wind belts you described in <u>(b)</u>.** Explanations will depend on the differences noted in **(b)**, but most are related to the seasonal passage of the overhead sun and its effect on temperature patterns which lead to pressure differences. The wind systems are related to the nature of the pressure systems and so much of the explanation will be in terms of the pressure systems. The contrast between land and sea is also relevant. **1 mark** for each simple reason, **2 marks** for each developed reason. Both pressure systems and wind belts are required for full marks.	**4**

Rocks and weathering

Question	Answer	Marks
3(a)	**Fig. 3.1 is a photograph which shows an eroded landscape in Kenya.** **Draw a labelled diagram to show <u>two</u> landforms shown in Fig. 3.1.** **1 mark** for the diagram and **1 mark** for each accurate labelled landform. Vegetation not relevant. Labelling could include: • rills on upper slopes • incised narrow valley/gully • rounded ridges • original plateau surface	**3**
3(b)	**Explain the formation of the landscape shown in Fig. 3.1.** The main features to be explained are: • deep gullies • high density of rills on the sides of the gullies • narrow, sharp ridges • some rounded ridges • lack of vegetation over wide area Explanation will be in terms of: • water flowing over a bare surface which becomes concentrated into rills because of highly erodible and impermeable soils • possibly high intensity precipitation • rills then develop into gullies • rills develop on the sides of the main gullies • possible unconcentrated slopewash on the broader ridge tops • deforestation (timber, agriculture) **1 mark** for a simple explanation, **2 marks** for a developed explanation, or **3 marks** for a well developed explanation.	**3**
3(c)	**Explain the mass movement process of heave.** Heave is the process whereby: • a result of freeze-thaw • the growth of needle ice in the soils • or wetting and drying • with expansion and contraction • soil particles are moved out of their original position Four valid points for **4 marks**.	**4**

Section B

Answer **one** question from this section. All questions carry 30 marks.

Hydrology and fluvial geomorphology

Question	Answer	Marks
4(a)(i)	**Define the fluvial terms *abrasion* and *hydraulic action*.** Abrasion: the erosion of river bed/bank (1) by material carried in the river rubbing the bed/bank (1). Hydraulic action: the erosion of river bed/bank (1) by the sheer force of the river flow (1). Accept reference to the process of cavitation as alternative to sheer force.	**4**
4(a)(ii)	**Describe how percolation occurs in a drainage basin system.** The movement of water after infiltration (1) downwards (1) through pores in the soil and joints and cracks in rock (1)	**3**

Question	Answer	Marks
4(b)	**Explain how levées and deltas are formed.** Levées are natural features formed by deposition when a river overtops its banks. Coarser material is dropped first and finer material later. Deltas are formed by deposition in a lake or sea as a result of the river flow losing velocity. Coarse material is dropped nearest the shore and finer material further out. Deposition on water entering the sea is aided by the flocculation of clay particles making them heavier. Marine currents may also be a factor. Much explanation could be provided in annotated diagrams. Award marks based on the quality of explanation and breadth of the response using the marking levels below. **Level 3 (6–8)** Response clearly explains how levées and deltas are formed. 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. **Level 2 (3–5)** Response explains how levées and/or deltas are formed but is unbalanced. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response contains some understanding of the formation of levées and/or deltas but is unbalanced. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely. **Level 0 (0)** No creditable response.	**8**

Question	Answer	Marks
4(c)	**'The processes and landforms of a braided channel and of a meandering channel are different.'** **With the aid of examples, how far do you agree?** Candidates are free to develop their own approach to the question and responses will vary depending on the approach chosen. Whichever approach is chosen, essays which address the question and support their argument with relevant examples will be credited. There may be detailed consideration of a case study/one or more examples, or a broadly conceived response, drawing on several examples to illustrate the factors involved. Braided channels are characterised by multiple minor channels usually in a wide general channel. There are a series of islands, some vegetated, and numerous sand bars of different shapes and sizes. Bed material is usually quite coarse. The features of meandering channels are point bars, river cliffs, pools and riffles with the occasional sand bar. Explanation will be in terms of fluctuating discharge and large, coarse sediment size in the case of braided channels. Meandering channels are related to the development of pools and riffles. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses the processes and landforms of braided and meandering channels. Response has good contextual understanding of both channel types. Examples used are appropriate and integrated effectively into the response. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. **Level 3 (8–11)** Response discusses the processes and landforms of braided and meandering channels but may be unbalanced. Examples may lack detail or development. Response develops on a largely secure base of knowledge and understanding. **Level 2 (4–7)** Response shows general knowledge and understanding of the processes and landforms of braided and meandering channels but may not consider all the processes and landforms. Response is mainly descriptive or explanatory with limited use of examples and understanding of the topic may be partial or inaccurate. Some concluding remarks. General responses without the use of example(s) or valid comparisons will not get above the middle of Level 2 (6 marks). **Level 1 (1–3)** Response may broadly discuss the processes and landforms of braided and/or meandering channels but does not address the question and does not come to a convincing conclusion. Response is descriptive, knowledge is basic and understanding is poor. **Level 0 (0)** No creditable response.	**15**

Atmosphere and weather

Question	Answer	Marks
5(a)(i)	**Define the atmospheric terms *sublimation* and *evaporation*.** Sublimation: the change of state from a solid to a gas or vice versa (1) without going through the liquid phase (1). Evaporation: the change of water to water vapour (1) by the addition of heat (1).	**4**
5(a)(ii)	**Briefly explain longwave radiation.** Incoming shortwave radiation (1) heats the ground surface (1), the heated surface then re-radiates this radiation as longwave radiation (1).	**3**
5(b)	**Describe the possible atmospheric impacts of global warming.** The possible atmospheric impacts of global warming will be in terms of increased temperature and the possible effect of this increased temperature on atmospheric processes: • reduction of ice/snow, reduces albedo, which increases atmospheric temperature • more evaporation, increased clouds and rainfall • increased frequency and intensity of storms, tropical cyclones • heat waves/droughts • Siberian warming releases methane which increases atmospheric temperature • changes in weather patterns (El Niño/La Niña) Award marks based on the quality of explanation and breadth of the response using the marking levels below. **Level 3 (6–8)** Response clearly describes the possible atmospheric impact of global warming. It is well balanced with respect to cause and effect. 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. **Level 2 (3–5)** Response describes the possible atmospheric impact of global warming but is unbalanced. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response contains some understanding of the possible atmospheric impact of global warming but is unbalanced. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely. **Level 0 (0)** No creditable response.	**8**

Question	Answer	Marks
5(c)	**Using <u>one</u> example of an urban area, assess the local climatic effects of human activity.** Candidates are free to develop their own approach to the question and responses will vary depending on the approach chosen. Whichever approach is chosen, essays which address the question and support their argument with relevant examples will be credited. There should be detailed consideration of one example of an urban area drawing on several climatic effects to illustrate the factors involved. The detail will depend on the specific urban area chosen. Human activity can refer either to specific activities or the urban structure. Full responses will need to consider temperature, precipitation amounts, winds and humidity. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses the effects of human activity on the local climate of the chosen urban area. Response has good contextual understanding of the climate of the chosen urban area. Examples used are appropriate and integrated effectively into the response. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. **Level 3 (8–11)** Response discusses the effects of human activity on the local climate of the chosen urban area but may be unbalanced. Examples may lack detail or development. Response develops on a largely secure base of knowledge and understanding. **Level 2 (4–7)** Response shows general knowledge and understanding of the effects of human activity on the local climate of the chosen urban area but may not consider all the factors. Response is mainly descriptive or explanatory with limited use of examples and understanding of the topic may be partial or inaccurate. Some concluding remarks. General responses of climatic effects without proper reference to one example of an urban area will not get above the middle of Level 2 (6 marks). **Level 1 (1–3)** Response may broadly discuss the effects of human activity on the local climate of the chosen urban area but does not address the question and does not come to a convincing conclusion. Response is descriptive, knowledge is basic and understanding is poor. **Level 0 (0)** No creditable response.	**15**

Rocks and weathering

Question	Answer	Marks
6(a)(i)	**Define the tectonic terms *sea floor spreading* and *subduction*.** Sea floor spreading: the moving apart of ocean plate boundaries (1) as a result of convection currents (1). Subduction: the movement of a tectonic plate below another tectonic plate (1) as a result of convection currents (1).	**4**
6(a)(ii)	**Briefly explain the weathering process of carbonation.** The dissolving of carbon dioxide in water (1), producing carbonic acid (1) which reacts with calcium carbonate to produce soluble calcium bicarbonate (1).	**3**
6(b)	**Explain the effects of the mass movement processes of slides and flows on the shape of slopes.** The effects will vary with the mass movements discussed. Both processes can be rapid and large, leaving scars where the material has moved from and leaving deposits or lobes at the slope base. Rotational slides leave a steep head scar (cliff) and a backward dipping failure block. Planar slides also leave a head scar and the material often disintegrates at the slope base forming a jumble of large rocks. Flows create a flow track with a distinct lobe of material at the slope base. The general trend is to reduce the overall angle of the slope. Overall slope angle is usually decreased by both processes. Award marks based on the quality of explanation and breadth of the response using the marking levels below. **Level 3 (6–8)** Response clearly explains how the mass movement processes of slides and flows affect slopes. 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. **Level 2 (3–5)** Response explains how the mass movement processes of slides and/or flows affect slopes but may be unbalanced with respect to the two processes. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response contains some understanding of how the mass movement processes of slides and/or flows affect slopes but is unbalanced. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely. **Level 0 (0)** No creditable response.	**8**

Question	Answer	Marks
6(c)	**'Temperature is the most important factor in the weathering of rocks.'** **With the aid of examples, how far do you agree?** Candidates are free to develop their own approach to the question and responses will vary depending on the approach chosen. Whichever approach is chosen, essays which address the question and support their argument with relevant examples will be credited. There may be detailed consideration of a case study/one or more examples, or a broadly conceived response, drawing on several examples to illustrate the factors involved. There needs to be discussion of the factors that affect the weathering of rocks. Temperature is clearly one factor: • freeze-thaw • heating/cooling • salt crystal growth • chemical weathering • biological weathering Availability of water is also important as well as other factors such as rock type and structure, vegetation cover, topography (relief) and human activity. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses the weathering of rocks and assesses the importance of temperature and other factors in that weathering. Response has good contextual understanding of the topic. Examples used are appropriate and integrated effectively into the response. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. **Level 3 (8–11)** Response discusses the weathering of rocks and assesses the importance of temperature and other factors in that weathering but may be unbalanced. Examples may lack detail or development. Response develops on a largely secure base of knowledge and understanding. **Level 2 (4–7)** Response shows general knowledge and understanding of the role of temperature in the weathering of rocks but may not consider many other factors that affect it. Response is mainly descriptive or explanatory with limited use of examples and understanding of the topic may be partial or inaccurate. Some concluding remarks. General responses without the use of example(s) will not get above the middle of Level 2 (6 marks). **Level 1 (1–3)** Response may broadly discuss the role of temperature in the weathering of rocks but does not address the question and does not come to a convincing conclusion. Response is descriptive, knowledge is basic and understanding is poor.	**15**

Question	Answer	Marks
6(c)	**Level 0 (0)** No creditable response.	