Cambridge Assessment International Education

Cambridge International AS & A Level

GEOGRAPHY **9696/11**

Paper 1 Core Physical Geography **May/June 2020**

MARK SCHEME

Maximum Mark: 60

Published

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

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

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & AS Level components, and some Cambridge O Level components.

[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 part of a drainage basin system.** **Using Fig. 1.1, name: feature A** water table	**1**
1(a)(ii)	**Using Fig. 1.1, name: flow B.** percolation	**1**
1(b)	**With reference to Fig. 1.1, describe <u>two</u> types of above ground flow.** The answer may include reference to: • throughfall • stemflow • overland flow • channel flow The answer may classify these flows as horizontal or vertical, or in some other way such as by volume or speed. **1 mark** for each simple description, **2 marks** for each developed description. Development may come from the depth of the description or the linking of factors together. **Note:** no credit for <u>below</u> ground flows.	**4**

Question	Answer	Marks
1(c)	**Explain why channel storage may change over time.** Channel storage refers to the water in the channel at any one point in time. Two key aspects can be discussed – the input to or the output from the channel storage. Both of these can be increased or decreased. Inputs to the channel at any one point are: • flow from upstream (tributaries etc.) • direct precipitation input • overland flow from valley sides • throughflow discharging from river banks • input from groundwater flow • discharge from reservoirs Outputs from the channel at any one point are: • discharge downstream • water abstraction • seepage into the bed of the channel such as where the bedrock is limestone • evaporation from the channel water The balance between these inputs and outputs, which needs to be described and explained, will determine how channel storage will vary over time. **1 mark** for each simple explanation, **2 marks** for each developed explanation up to the maximum. Development may come from the depth of the explanation or the linking of factors together.	**4**

Atmosphere and weather

Question	Answer	Marks
2(a)(i)	**Fig. 2.1 shows a simplified diagram of one part of the energy budget over land and sea.** **Using Fig. 2.1: calculate the value of energy at A in W/m^2** 160 W/m^2	**1**
2(a)(ii)	**Using Fig. 2.1: name transfer B.** reflected solar radiation from clouds/atmosphere	**1**
2(b)	**With reference to Fig. 2.1, describe the path of incoming (shortwave) solar radiation.** The three main points are: • absorption by the atmosphere • reflection by clouds • absorption into ground surface **1 mark** for each main point. **1 mark** reserved for the use of data shown in Fig. 2.1.	**4**
2(c)	**Explain why reflected solar radiation may vary over time.** Reflected solar radiation could be reflected from three main areas, reflected from the atmosphere, clouds or the Earth's surface. Therefore, explanation could refer to increased or decreased cloud cover, change of particles or composition in the atmosphere and changes to the Earth's albedo values through e.g. land use change. **1 mark** for each simple explanation, **2 marks** for each developed explanation up to the maximum. Development may come from the depth of the explanation or the linking of factors together.	**4**

Rocks and weathering

Question	Answer	Marks
3(a)	**Fig. 3.1 is a photograph which shows a slope being modified to reduce mass movement.** **Identify <u>two</u> methods of slope modification shown in the photograph in Fig. 3.1.** pinning netting	**2**
3(b)	**Describe how <u>one</u> method of slope modification in Fig. 3.1 increases the stability of the slope.** Netting: these can either drape (1) to help contain loose material (1) or be tensioned (1) restraining the movement of the rock face (1) Pinning: helps to reinforce the surface rock (1) pin the larger block of rock (1) tie together the rock face (1) create anchors for other slope stability methods (1) If more than one method is mentioned, credit only one which has been described. Three relevant points for **3 marks**.	**3**
3(c)	**Explain the role of water in the movement of sediment on a hillslope.** The two main ways that water moves sediment on hillslopes is by rainsplash and sheetwash. This occurs mostly on non-vegetated surfaces where the soil is less protected and on steeper slopes. The kinetic energy of raindrops is crucial for rainsplash and for sheetwash. Rainfall amounts must be greater than infiltration capacity for surface water flow to occur. Both processes will be influenced by the characteristics of the soils. Both processes need explaining. **1 mark** for each simple explanation, **2 marks** for each developed explanation up to the maximum. Development may come from the depth of the explanation or the linking of factors together.	**5**

Section B

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

Hydrology and fluvial geomorphology

Question	Answer	Marks
4(a)(i)	**Describe <u>one</u> way a spring is formed in an area.** Description could be of groundwater coming to the surface, for example through one of the following ways: • confined aquifer • artesian well • resurgence • gravity spring (unconfined aquifer) **1 mark** for a relevant way and **2 marks** for the development of the description up to the maximum.	**3**
4(a)(ii)	**Briefly explain why some parts of a river are braided.** Braiding can mainly be attributed to: • high load in a river • a river's gradient • fluctuating discharge • how bedload might change in the river from tributaries, mass movement or increased sediment from melting glaciers Braiding would typically occur in an area of river which has a high bedload, and fluctuating discharge on a regular basis. **1 mark** for each point and **2 marks** for each developed point up to the maximum. **Maximum 2 marks** for generic description of braiding.	**4**

Question	Answer	Marks
4(b)	**Explain the formation of floodplains <u>and</u> river bluffs.** River flooding means the transported load is deposited as it loses energy and thus deposits suspended load. The water is shallower over the floodplain and thus has a higher hydraulic radius meaning greater friction and a decrease in velocity, leading to deposition. The material is sorted, with the finer lighter material being deposited furthest away from the main river channel. Lateral erosion of the river and migration of meanders downstream may also be mentioned as an explanation. The bluff line is a slope, marking the outer edge of a floodplain, thus floodplains and river bluffs might be explained together. River bluffs are essentially erosional features marking the limits of the floodplain as the river meanders back and forth. Candidates might consider using a diagram to help aid their explanation (full marks can still be gained without one). There may be an imbalance between floodplains and river bluffs, though both must be explained clearly for the highest level. 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 the formation of floodplains and river bluffs. 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 the formation of floodplains and river bluffs but may be unbalanced. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response describes the formation of floodplains and river bluffs with little detailed explanation. 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)	**With the aid of examples, assess the extent to which drainage basin size and shape influence flood risk.** 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. Size and shape of a drainage basin are just two of the factors that might influence flood risk. The larger the catchment area the greater the potential amount of water that could end up in the river. The shape may affect how quickly water enters the river channel but both will be influenced by drainage density. But a variety of other factors may also be discussed to help assess what influences flood risk such as land use, porosity and permeability of soils, rock type, slope, vegetation. Also they must relate it to the influence that the factor mentioned has on flood risk. Discussion could also consider the role of human activities.	**15**

Question	Answer	Marks
4(c)	Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses the factors in relation to flood risk. Response has good contextual understanding of specific examples of floods (possible or actual events). 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 link between drainage basin size and shape and flood risk 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 drainage basin size and shape and flood risk. 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 drainage basin size and shape and the flood risk 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.	

Atmosphere and weather

Question	Answer	Marks
5(a)(i)	**Define the atmospheric terms *evaporation* and *radiation cooling*.** Evaporation is the change of state of water to a gas (1) by the addition of heat (1). Radiation cooling is the emission of longwave (infrared) radiation (1) from the (Earth's) surface/at night time (1) **Maximum 2 marks** for each definition.	**4**
5(a)(ii)	**Briefly describe how ocean currents affect the atmospheric transfer of energy.** Ocean currents transfer heat (1) towards poles (1) and vice versa. It is a horizontal energy transfer (1) that affects the air above the sea and influences wind, which leads to atmospheric transfer of energy (1). Three relevant points for **3 marks**.	**3**

Question	Answer	Marks
5(b)	**Explain how frontal uplift of air and orographic uplift of air cause precipitation.** In each case air is forced to rise. Explanation might include: uplift of air causing decrease in pressure, cooling and condensation of air. Air being forced to rise because of undercutting of warm air by a mass of cooler air (frontal) or because of relief (orographic), and could be aided by use of a diagram. Explanation should include ideas related to the air being forced to rise, with explanation of adiabatic cooling, rising relative humidity levels and thus condensation. 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 the way frontal uplift of air and orographic uplift of air cause precipitation. 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 the process in outline only or may be unbalanced between frontal uplift and orographic uplift. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response describes uplift of air with little explanation of the reasons why the air is uplifted or how it forms precipitation. 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)	**'The causes of global warming are only a result of human factors.' 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. Whilst the cause of global warming is mainly a result of human factors such as the increased emanation of greenhouse gases (the enhanced greenhouse effect), the physical (natural) factors should be discussed within the answer. Changes in volcanic activity, and solar radiation (sun cycles) are two possible mechanisms that could be discussed. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses the causes of global warming and the extent to which global warming is caused by human factors. Response has good contextual understanding of a range of factors which cause global warming. 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 link between global warming and the human factors which may cause it 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 causes of global warming. 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 causes of global warming 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 weathering terms *pressure release (dilatation)* and *freeze-thaw*.** Pressure release is where material overlying the rock is removed (1) allowing the rock to expand (1) causing fractures/joints to be formed (1). Freeze-thaw is a physical weathering process (1) whereby water enters the cracks in a rock and freezes when the temperature is below 0°C (1) and expands by 9% of its volume (1). **Maximum 2 marks** for each definition.	**4**
6(a)(ii)	**Briefly explain why some rock types are more affected by the weathering process of carbonation.** Carbonation is a form of chemical weathering when weak carbonic acid reacts with calcium carbonate rich rocks. Therefore rock types that have calcium carbonate as a constituent, such as chalk and limestone will be more affected by the weathering process of carbonation. Do not credit other reasons which may make carbonation more likely, such as with a change of temperature. Three relevant explanatory points for **3 marks**.	**3**

Question	Answer	Marks
6(b)	**Explain how vegetation <u>and</u> relief affect the type of weathering.** Explanation might include: vegetation producing humic (organic) acids which may increase the rate of weathering. The presence of microbes, such as fungi also affects the rate of weathering. Physical weathering can be increased by the presence of roots from vegetation exerting pressure on the rocks. Relief will have a potential effect such as a steeper angle of the slope may decrease the rate of chemical weathering by removing moisture quicker from soils. Shallow slopes will aid infiltration and chemical weathering of the bedrock. The aspect of the slope may determine the dominant temperature regime, which may result in processes such as freeze-thaw. 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 type of weathering is affected by both vegetation and relief. 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 the weathering types in outline but is unbalanced with respect to either vegetation or relief. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response describes the type of weathering in a generic way and does little to address how vegetation and/or relief affects the type of weathering. 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)	**'All plate tectonic landforms are the result of subduction.'** **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. Essays need to discuss the role of subduction and degree of the subductive process in the resulting landform. The main tectonic landforms are volcanoes, fold mountains, ocean trenches, mid-ocean ridges and fault valleys. Only volcanoes, fold mountains and ocean trenches are related to subduction. This distinction should form the basis of the discussion. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses the role of subduction in relation to plate tectonic landforms. Response has good contextual understanding of specific processes and landforms. 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 link between subduction and a range of plate tectonic landforms 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 subduction relating to some plate tectonic 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) will not get above the middle of Level 2 (6 marks). **Level 1 (1–3)** Response may broadly discuss the role of subduction 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**