Cambridge Assessment International Education

Cambridge International AS & A Level

GEOGRAPHY **9696/13**

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: output A** evaporation	**1**
1(a)(ii)	**Using Fig. 1.1, name: flow B.** overland flow/surface flow	**1**
1(b)	**With reference to Fig. 1.1, describe <u>two</u> types of below ground flow.** The answer may include reference to: • infiltration • percolation • throughflow • base flow • ground water flow There may be the discussion as to which ones are horizontal or vertical. There could be discussion as to the speed or types, or simply the description of a variety. **Note:** no credit for overland flow or any other <u>above</u> ground flows.	**4**
1(c)	**Explain why channel flow may change over time.** Two key aspects can be discussed – the level of input or the level of output changing. Therefore, candidates could discuss about increased precipitation and direct channel input or through increased overland flow, for instance as a result of decreased infiltration rates. Greater overland flow or other flows into the channel can lead to increased discharge. Candidates may refer to flooding/drought etc. There may be comments about changes to human activity. Outputs could include water extraction or increased evaporation rates. **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.** **Using Fig. 2.1: calculate the value of energy at A in W/m^2** 136	**1**
2(a)(ii)	**Using Fig. 2.1: name transfer B.** reflected solar radiation from surface	**1**
2(b)	**With reference to Fig. 2.1, describe how solar radiation is absorbed.** The three main points are: • absorbed by water vapour/dust/ozone in the atmosphere • absorbed by clouds (water vapour etc. as above) • absorbed by conduction on the Earth's 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 from clouds may vary over time.** • thickness of clouds • density of clouds • type of cloud • altitude of cloud • presence or absence of clouds • composition of the particles within clouds **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 that has been modified to reduce mass movement.** **Identify <u>two</u> strategies used to increase the stability of the slope shown in Fig. 3.1.** afforestation grading (terracing)	**2**
3(b)	**Describe how <u>one</u> strategy you identified in <u>(a)</u> can increase the stability of the slope.** Afforestation: over time roots provide stability (1) uptake of soil moisture (1) change if water transfers/flows (1) Grading: decreases the gradient of the slope (1) allows surface run off to be directed (1) can increase infiltration and reduce surface run off (1) traps soil (1) allows for cultivation/afforestation (1)	**3**
3(c)	**Explain how human activities may decrease the stability of a slope.** • undercutting/road construction/excavation • building on gradients • changing gradient • deforestation • mining/waste heaps • disturbing drainage Any of the factors above may be used. The explanation will be how the factor mentioned decreases the stability of the slope.	**5**

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 *helicoidal flow* and *saltation*.** Helicoidal flow is suggested to be a secondary flow (1) corklike flow/spiral flow (1) possibly contributing to the formation of river features such as river cliffs and slip off slopes in meanders (1) Saltation is particles 'jumping'/bounced along (1) river bed (1) a form of transportation (1) **Maximum 2 marks** for each definition.	**4**
4(a)(ii)	**Briefly explain how river bluffs are formed.** Cut out from the erosion of a migrating meander downstream (1) alongside the deposition of material when river floods (1). Marks the outer edge of the river floodplain (1). Lateral erosion (1). Answers may be via a well annotated diagram.	**3**

Question	Answer	Marks
4(b)	**Explain how a storm hydrograph is affected by the size and shape of a drainage basin.** <u>Size</u> Size of drainage basin may affect the amount of discharge shown on a storm hydrograph, and if the basin is small may reach the main channel more rapidly. <u>Shape</u> Contrasts could be made between an elongated drainage basin and a rounded drainage basin to give contrasting shapes of the hydrograph. Credit the use of well 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 a storm hydrograph is affected by the size and shape of a drainage basin. 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 a storm hydrograph is affected by the size and shape of a drainage basin. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response shows some understanding of how a storm hydrograph is affected by the size and shape of a drainage basin. 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, evaluate the effectiveness of flood forecasts and warnings in reducing the impacts of river flooding.** 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. Evaluation can cover the level of effectiveness depending on either the type of warning/detail in the forecast, or how the forecasts and warnings are then responded to. The use of examples, at a variety of scales, locations or economic levels may allow an effective evaluation. The argument may be effective in noting the difference between warning/forecasting an event and actually being able to reduce the impact. The level of development may well be discussed. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses the different attempts to forecast and warn of a flood along with consideration of how effective this was in reducing the impact. Response has a detailed contextual understanding of specific attempts to forecast and warn of floods. 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 different attempts to forecast and warn of floods 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 different attempts to forecast and warn of floods. 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 attempts made to forecast and warn of floods 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)	**Briefly explain the formation of hail.** Within cumulonimbus clouds (1). Updraught and falling of water particles forming ice (1). Super-cooled water droplets collide with and freeze around the ice (1). When the droplets are too heavy they will fall as hail (1). Three relevant points for **3 marks**.	**3**
5(a)(ii)	**Explain how the frontal uplift of air may cause precipitation.** Mainly mid-latitudes when warm and cold air meet (1). Warmer moister air rises over the front (1). Forced to rise (1) cools condenses and rain occurs (1). The ITCZ may also be discussed (1). Four relevant explanatory points for **4 marks**.	**4**

Question	Answer	Marks
5(b)	**Explain the global latitudinal pattern of radiation.** • approximately between 35°N and 35°S there is net radiation gain • net radiation loss occurs nearer the poles Explanation from: • sun's rays being more concentrated/direct at the equator • less atmosphere as more direct angle onto surface between tropics • more atmosphere in the higher latitudes to pass through • sun's rays less concentrated and more dispersed closer to the poles • surfaces e.g. tropical rainforests absorb and polar regions reflect radiation. 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 and explains the latitudinal pattern of radiation. 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 and explains the latitudinal pattern of radiation, though discussion 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 contains some description and explains the latitudinal pattern of radiation, though the terms are lacking and the explanation is vague. 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 a result of physical 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. Two possible mechanisms that could be discussed for physical factors are changes in volcanic activity and solar radiation (sun cycles). However, the enhanced greenhouse effect, sources of greenhouse gases and the anthropogenic causes such as large-scale and small-scale production of greenhouse gases should be discussed within the answer. 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 physical 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 physical 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 *carbonation* and *hydrolysis*.** Carbonation is where rainwater combines with carbon dioxide or an organic acid (1) to form an acidic solution/which reacts with calcium/changing it from insoluble to a soluble form (1). Hydrolysis is where rainwater combines with the minerals within the rocks (silicates and carbonates) (1) soluble parts removed by water/decomposition of feldspar to Kaolin (china clay) (1). **Maximum 2 marks** for each definition.	**4**
6(a)(ii)	**Briefly explain how rock can be weathered by heating and cooling.** Weathering is the breakdown of rock in situ (1). The heating and cooling of a rock causes it to expand and contract, weakening the rock (1). This is a physical process which, if repeated, results in the breakdown of the rock (1). Reference to the type of rock and the variation in temperature may also be credited, such as greater physical weathering (of which heating and cooling can be one form) is not present at all temperature regimes.	**3**

Question	Answer	Marks
6(b)	**Explain how <u>two</u> factors affect the type <u>and</u> rate of weathering.** Candidates are expected to know about different forms of weathering and specifically about how factors such as rock type, rock structure, vegetation, relief, rainfall and temperature affect the type and rate of weathering. Candidates should appreciate that the type and rate of weathering may be a result of a combination of factors, but are only required to explain two in detail. Credit diagrams where used if they help explain. Human activity may also be included. 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 two factors affect both the type and rate of weathering. 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 two factors affect the type or rate of weathering, or discussion 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 contains some understanding of the link between type and rate of weathering and the two factors chosen, though the terms are lacking and the link is vague. 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)	**With the aid of examples, assess the role of tectonic processes in determining the type of landforms at different plate boundaries.** 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. The different processes include subduction, convection, sea floor spreading, melting. Types of landforms discussed may include ocean ridges, ocean trenches, volcanoes, volcanic island arcs, fold mountains and rift valleys. Candidates might consider how dominant the different processes are within the formation of the landform and also other processes which may be relevant which are also present. There might be a consideration of broader factors such as the type of plate boundary or a linked process, such as sea floor spreading. In addition, the type of landform may also be the result of the type of the plate boundary and location of the landform within it. Candidates may also consider the scale of the landform and may refer to case studies in the answer.	**15**

Question	Answer	Marks
6(c)	Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses the role of tectonic processes in determining the type of landforms at different plate boundaries. Response has good contextual understanding of specific types of landforms and their formation. 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 tectonic processes and types of 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 tectonic 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) will not get above the middle of Level 2 (6 marks). **Level 1 (1–3)** Response may broadly discuss landforms 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.	