Cambridge Assessment International Education

Cambridge International AS & A Level

GEOGRAPHY **9696/11**

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.

Cambridge International is publishing the mark schemes for the October/November 2020 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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 some components of the drainage basin system.** **Using Fig. 1.1, name: A** Infiltration	**1**
1(a)(ii)	**Using Fig. 1.1, name: B.** Groundwater flow / Base flow	**1**
1(b)	**Describe the process of throughflow in the drainage basin system.** The following points are worthy of credit: • infiltration of water from the land surface into the soil • water moving parallel to the slope within the soil in a downslope direction • sometimes emerging onto the surface as springs or overland flow • slower than overland flow / faster than base flow Three points for **3 marks**.	**3**
1(c)	**Use Fig. 1.1 to explain how land use can affect the movement of water in a drainage basin.** The information in Fig. 1.1 could be used to underpin the answer. Whichever type of land use is chosen, it should be used to explain how the movement of water is affected by this use. The emphasis will probably be on its effect on infiltration rates and thus overland flow and the various below ground flows. Land use involving trees could be shown to affect evapotranspiration, interception, throughflow and stem flow. • Increased vegetation leads to greater interception, more evaporation and more transpiration. • Removal of vegetation increases run off / river discharge. • Pasture increases run off compared to forest. • Heavy machinery compacts soil, reduces infiltration and increases surface run off. **1 mark** for each simple explanation, **2 marks** for each developed explanation, or **3 marks** for each well developed explanation to the maximum.	**5**

Atmosphere and weather

Question	Answer	Marks
2(a)	**Fig. 2.1 shows an energy balance for a rural area and for an urban area.** **State <u>two</u> differences in the energy balance between the rural area and the urban area shown in Fig. 2.1.** Some relevant points are: • reflected solar radiation greater in rural area • outgoing infrared radiation greater in urban area • latent heat transfer greater in rural area • sensible heat transfer greater in urban area • storage heat greater in urban area • no anthropogenic heat in rural area Any two for **2 marks**.	**2**
2(b)	**Use Fig. 2.1 to calculate the maximum difference between incoming (shortwave) solar radiation and reflected solar radiation. Show your working.** Urban area with incoming 7.6 W/m^2, outgoing reflected radiation at 0.4 W/m^2 equal to 7.2 W/m^2 **1 mark** for the calculation and values, and **1 mark** for the correct answer, **if calculation is valid**.	**2**
2(c)	**Explain why temperatures in urban areas are often higher than in surrounding areas.** Credit any relevant points concerning the effect of the urban landscape in increasing urban temperatures compared to the surroundings. Possibilities include: • decreased ventilation and decreased throughflow of air by buildings • absorption of heat by darker materials (buildings, tarmac, etc.) later to be re-radiated • differences in albedo with different materials affecting the absorption of radiation • industrial/domestic sources of heat • pollution restricting loss of outgoing longwave radiation • less evapotranspiration to reduce temperatures **1 mark** for each simple explanation, **2 marks** for each developed explanation, or **3 marks** for each well developed explanation to the maximum.	**6**

Rocks and weathering

Question	Answer	Marks
3(a)	**Fig. 3.1 is a photograph which shows several mass movements on a slope in Malaysia.** **Identify <u>two</u> mass movements shown in Fig. 3.1.** The following are relevant points: • two large slides in the centre of the photograph, with the right hand one having a later slide at the top • smaller slides at the top of the slope • an old slide at the extreme right • some suggestion of flows within the right hand slide • possible soil creep on terraced hillside **1 mark** for each feature, up to a maximum of **2 marks**.	**2**
3(b)	**Suggest how <u>one</u> mass movement shown in Fig. 3.1 might have occurred.** The detail will depend on the chosen mass movement. Relevant factors that could form an explanation are: • associated with steep slopes increasing shear stress • the area has been cleared of vegetation (deforested), reducing shear strength • there seems to be a track across the middle which might have de-stabilised the slopes • vegetation might suggest high precipitation amounts which will increase shear stress (weight of water content) and reduce shear strength (increasing pore water pressure) • earthquake shaking might be a possibility There may be other possibilities that can be credited. **1 mark** for each simple explanation, **2 marks** for each developed explanation, or **3 marks** for each well developed explanation to the maximum.	**4**
3(c)	**Explain how slopes may be modified to reduce mass movement.** Indicative content: Pinning, Netting, Gabions, Drainage, Afforestation, Shotcrete, Terracing, Grading, etc. Some explanation is required. A simple list is insufficient. **1 mark** for each simple explanation, **2 marks** for each developed explanation, or **3 marks** for each well developed explanation to the maximum.	**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 *cavitation* and *traction*.** Cavitation: explosion of air bubbles (1) trapped in river banks by water action (1) Traction: the transport of coarse material (1) by rolling along the river bed (1)	**4**
4(a)(ii)	**Briefly describe the conditions required for river beds to be eroded.** The main points that might be considered are: • periods of high velocity, perhaps with turbulence • the transport of abrasive materials • highly erodible bank and bed materials / structural weakness • soluble rock such as chalk/limestone Three points for **3 marks**.	**3**

Question	Answer	Marks
4(b)	**Explain the formation of levées and floodplains.** Levées • Overbank flow of the river • Change in velocity leads to deposition on the river bank • Largest particles are deposited first • Resulting in a raised bank Floodplains • Overbank deposition during times of flood • Lateral movement of river from one bluff to another • Point bars and other deposition areas form the basis of floodplain deposits 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 both levées and floodplains. 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 both features but may be unbalanced. Explanations are not detailed. 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 one feature. 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 attempts to reduce the impact of river floods.** 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 detail will depend on the chosen examples. The scale and extent of the event need description with an assessment of impact. Floods usually have a variety of impacts, so the attempts to prevent the impacts need to be seen in conjunction with the nature of the impacts. Flood management depends upon: • the level of economic development • commitment of governments • ability to give warnings • hard engineering solutions • soft engineering solutions Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses river floods and attempts to reduce their impact. Response has good contextual understanding of flood prevention with respect to the chosen examples. 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 river floods and attempts to reduce their impact 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 river floods but may not consider all the attempts to prevent their impacts. 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 some river 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**

Question	Answer	Marks
5(a)(i)	**Define the atmospheric terms *longwave radiation* and *convection*.** Longwave radiation: the radiation released from the earth (1), usually during night time (1), readily absorbed by atmospheric gases (1). Max. **2 marks**. Convection: the heating of the air just above the ground surface (1) leading to uplift of air (1). Max. **2 marks**.	**4**
5(a)(ii)	**Briefly explain the formation of dew.** The main points are: • outgoing radiation from the Earth's surface on clear nights • leading to a reduction of temperature to condensation point • resulting in surface condensation Three relevant and accurate points for **3 marks**.	**3**
5(b)	**Explain the latitudinal pattern of radiation excesses and deficits.** There is a general excess at the equator and deficits at the poles. This can be explained by the position of the overhead sun, the tilting of the Earth, the thickness of atmosphere that radiation has to pass through, degree of cloudiness and the albedo of the ground surface. 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 latitudinal pattern of radiation excesses and deficits. 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 latitudinal pattern of radiation excesses and deficits 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 contains some understanding of radiation excesses and deficits 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)	**'The atmospheric impact of global warming depends on latitude.'** **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. Explanation for global warming will be in terms of the enhanced greenhouse effect. The atmospheric impact will mainly be in terms of its possible effect on increased frequency of storms, possibly tropical cyclones and drought. Many of these events are influenced by latitude such as tropical cyclones. However, these will have an influence beyond the tropics such as hurricanes tracking into the north Atlantic. There may be an effect on the operation of wind belts and pressure systems which are related to latitude. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses global warming and the effect of latitude on its impacts. Response has good contextual understanding of the atmospheric effects with respect to latitude. 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 possible impacts of global warming as related to latitude 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 global warming in relation to latitude and its possible atmospheric effects. 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 some of the effects of global warming with respect to latitude 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)	**Briefly describe the weathering process of pressure release (dilatation).** • erosion of material above a rock • reduction of pressure on the rock • leading to dilation creating rock joints • rock falls may also lead to pressure release Three valid points for **3 marks**.	**3**
6(a)(ii)	**Explain how ocean trenches are formed.** The main points are: • converging of either an oceanic and a continental plate or two oceanic plates • powered by convection currents • subduction of the denser plate • which creates the trench Four relevant and accurate points for **4 marks**.	**4**

Question	Answer	Marks
6(b)	**Explain the movement of material on slopes.** The slope processes can be either mass movements or the movement of water and sediment (rainsplash, sheetwash, rills). The movement of material will be determined by a combination of water availability, slope steepness, soil and rock characteristics and nature of vegetation cover, if any. Reference can be made to Creep, Flows, Slides and Falls. 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 movement of material on slopes using a range of processes. 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 movement of material on slopes but may be limited in the range of 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 the movement of material on slopes but is limited in the range of processes. 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)	**'Rainfall 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. Answers will need to be based on an understanding of the weathering of rocks and how rainfall affects this weathering. Discussions could include Freeze/Thaw, Salt Crystal growth, Chemical Weathering, Biological Weathering, etc. Evaluation needs to be in terms of the role of other factors such as rock structure and composition, temperature, vegetation, 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 role of rainfall in the weathering of rocks. Response has good contextual understanding of the influence of rainfall on the weathering of rock with evaluation of the role of other factors. 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 influence of rainfall in the weathering of rocks with some evaluation of the role of other factors 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 influence of rainfall in the weathering of rocks but with limited evaluation of the role of other 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 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 influence of rainfall 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. **Level 0 (0)** No creditable response.	**15**