Cambridge Assessment International Education

Cambridge International AS & A Level

GEOGRAPHY **9696/11**

Paper 1 Core Physical Geography **October/November 2023**

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 2023 series for most Cambridge IGCSE, Cambridge International A and AS Level 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.

AS Level Geography 9696 (Paper 1 and Paper 2) specific marking instructions

Examiners must use the following annotations:

Annotation	Meaning	Use
	Correct point	Point-marked questions only: Section A, Section B part (a)
	Incorrect	Point-marked questions only: Section A, Section B part (a)
L4	Level 4	Levels-marked questions only: Section B part (c)
L3	Level 3	Levels-marked questions only: Section B parts (b) and (c)
L2	Level 2	Levels-marked questions only: Section B parts (b) and (c)
L1	Level 1	Levels-marked questions only: Section B parts (b) and (c)
0	Level 0 – No creditable response	Levels-marked questions only: Section B parts (b) and (c)
Highlight	Creditworthy part of an extended response	Levels-marked questions only: Section B parts (b) and (c)
EVAL	Evaluative point	Levels-marked questions only: Section B part (c)
^	Omission or further development/detail needed to gain credit	All questions
	Unclear or validity is doubted	All questions
DEV	Developed point	All questions
EG	Appropriate example or case study given	All questions
IRRL	Irrelevant	All questions
NAQ	Material that does not answer the question	All questions
	Highlighting a significant part of an extended response – to be used with another annotation e.g. IRRL or EVAL	Levels-marked questions only: Section B parts (b) and (c)

SEEN	1 Diagram or essay plan has been seen but no specific credit given 2 Additional page has been checked	1 Any diagrams or essay plans 2 All blank pages in the provided generic answer booklet and/or extension answer booklet(s).
R	Rubric error	Optional questions only (place at start of question not being credited): Section B (Candidates answer one question)

Examiners must consider the following guidance when marking the essay questions:

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.

Section A

Answer **all** questions in this section. All questions are worth 10 marks.

Hydrology and fluvial geomorphology

Question	Answer	Marks
1(a)	**Fig. 1.1 shows two storm hydrographs for the same precipitation event.** **State the storm hydrograph which has the shortest lag time.** A	**1**
1(b)	**Compare the characteristics of the two storm hydrographs shown in Fig. 1.1.** The main points are: • Both rise and fall • Both have a single peak • A has a steeper rising limb than B • A has a higher peak discharge than B • A has a shorter lag time than B (peak is earlier) • A has a steeper recession (falling) limb than B • A starts lower • A starts earlier **1 mark** for each comparison.	**3**
1(c)	**Suggest <u>two</u> reasons for the shape of storm hydrograph A shown in Fig. 1.1.** There could be several reasons for the shape of the storm hydrograph, all related to the drainage basin characteristics that govern the amount and speed of runoff. The most relevant are: • Land use such as urban areas where infiltration is low and runoff high • Soils and rock type – impermeable soils (clay) and impervious rocks (granite, basalt) • Drainage basin shape – round basins lead to rapid concentration of flow to the main channel • Drainage basin density – greater drainage density leads to more rapid flow to main channel • Gradient influences rate of runoff • Antecedent moisture • Lack of vegetation The two reasons should justify the shape of the hydrograph. **Mark 3/3, 2/4 or 4/2** depending on detail and accuracy.	**6**

Atmosphere and weather

Question	Answer	Marks
2(a)	**Fig. 2.1 and Fig. 2.2 show two possible causes of precipitation.** **State the cause of precipitation shown in Fig. 2.1.** Convection	**1**
2(b)	**Compare the processes which lead to the heavy rainfall shown in Fig. 2.1 with the processes shown in Fig. 2.2.** The main points are: • Both have evaporation • Fig. 2.1 has evapotranspiration but not Fig. 2.2 • Both have rising of warm, moist air • Leading to cooling and condensation and formation of clouds • Rising air in Fig. 2.2 is caused by the topography (mountain) but by convection in Fig. 2.1 • Sun heating in Fig. 2.1 but not in Fig. 2.2 • Winds involved in Fig. 2.2 but not in Fig. 2.1 • May mention that a large body of water in Fig. 2.2 but not necessary in Fig. 2.1. Some may adopt a more general comparison of Convectional and Orographic rainfall, both involving rising air, condensation and precipitation. Credit should also be given for this approach. Maximum two marks if no specific comparison. **1 mark** for each comparison.	**4**
2(c)	**Explain how frontal precipitation occurs.** This will be by frontal uplift. The main points for consideration are: • Interaction of warm and cold air masses • Uplift is caused by undercutting of warm air by cold air at the fronts • Moderate to light showers at warm front and heavy showers at cold front • Mechanism of condensation at dew point and formation of raindrops; condensation nuclei provide a surface for water vapour to condense on • Precipitation occurs when water droplets increase sufficiently in size (collision idea) and fall • Discussion of condensation and occluded fronts is also relevant **1 mark** for each simple explanation, **2 marks** for a developed explanation up to the maximum. Diagrams would enhance explanations.	**5**

Rocks and weathering

Question	Answer	Marks
3(a)	**Fig. 3.1 is a photograph which shows a mass movement.** **Name the type of mass movement labelled A in Fig. 3.1.** It is essentially a rotational landslide (slump), but mudslide, earthslide are also acceptable. Must be something related to a slide (not flow and not fall).	**1**
3(b)	**Describe the features of the mass movement labelled A in Fig. 3.1.** There are many features that could be described, such as: • Steep scar at the top • Concave and bowl-shaped at the top • Bare scar at the top • Small, detached blocks of soil and vegetation at the top • Some detached portions on main slide face • Bare surface with some indication of rills • Main mass of the failure has been removed from the failure surface • Initially steep slope and then more gentle • Unconsolidated material (scree) • Smooth toe at base **1 mark** for each feature described.	**4**
3(c)	**Explain how a mass movement such as that shown in Fig. 3.1 is formed.** The main reason will be increased water content by precipitation which leads to a decrease of strength and an increase of stress because of: • Greater weight increasing shear stress • Increased pore water pressure reducing cohesion and shear strength • Lubrication of potential shear surfaces • Water erosion for the rill • Steep gradient • Human interference (removing vegetation) • Weakening of material by weathering Other possible reasons are: • Undercutting by the sea • Earthquake activity Reasons need to be integrated in a coherent manner. **1 mark** for each simple explanation, **2 marks** for a developed explanation up to the maximum.	**5**

Section B

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

Hydrology and fluvial geomorphology

Question	Answer	Marks
4(a)(i)	**Define the fluvial terms *traction* and *abrasion*.** Traction is the force of moving water (1), transporting material along the bed of the river (1). Abrasion is the erosion (1) caused by the rubbing (sandpaper effect) of sediment against the bed and banks of the river channel (1).	**4**
4(a)(ii)	**Describe the process of suspension within a river channel.** The main points that will form the explanation are: • Suspension is a river transport process • Of the finer grained sediment • In the body of the water (not in contact with the bed or banks of the river) • Influenced by velocity and discharge **1 mark** for each point.	**3**

Question	Answer	Marks
4(b)	**Explain the formation of river bluffs and levées.** **River bluffs** are the steep boundaries at the edges of the floodplains where meanders migrating across the floodplain have impinged on the valley sides. **Levées** are the embankments on either side of the river channel caused by overbank deposition in times of flood. The coarser particles are deposited first closer to the river with fine sediments spread in a lower angle over the flood plain. This is marked by levels, thus it is not marked 4/4 although there is the expectation that both are covered adequately for a mark in Level 3. Diagrams may be used to enhance responses and should be credited if correct and clear. 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 river bluffs and levées. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response. **Level 2 (3–5)** Response explains the formation of river bluffs and levées but the explanation may be unbalanced between the two elements. 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 river bluffs and levées. 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 reference to a recent river flood event, assess the causes of the flood and evaluate attempts to reduce its impact.** The detail will depend on the river flood event chosen. The causes will reflect the example chosen and the nature of the river response such as a general rise in the river discharge or a sudden flash flood. **Causes** may consider heavy/persistent rainfall, snowmelt, impermeable surfaces, lack of vegetation, urbanisation, climate change, alterations to river channels. **Reducing impact** will be seen through hard engineering (dam construction, building embankments, dredging, etc.), and soft engineering (flood plain zoning, wetland creation, afforestation, etc.). Some may consider factors such as insurance and prediction/forecasting. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly assesses the causes of a recent river flood event and evaluates attempts to reduce its impact. 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 assesses the causes of a recent river flood event and evaluates attempts to reduce its 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 a recent river flood event with some evaluation of attempts to reduce its impact. 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 a recent river flood event 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 *hail* and *dew*.** Hail is a form of solid precipitation (1) of pellets (or larger) of frozen rain/ice (1). Dew is water in the form of droplets (1) that condense on cold surfaces (1).	**4**
5(a)(ii)	**Describe how the characteristics of the Earth's surface affect the amount of solar radiation absorbed.** The main points are: • The absorption of radiation will depend on the albedo of the surface. • Dark surfaces absorb solar radiation, light surfaces, e.g. snow/ice, reflect radiation rather than absorb it. • Description will be in terms of the nature of the surface and the varying albedos of different surfaces. Examples could be given. • Curved surface affects the concentration of energy received at high latitudes. • South facing slopes in the northern hemisphere receive increased solar radiation/north facing slopes in the southern hemisphere. **1 mark** for each point.	**3**

Question	Answer	Marks
5(b)	**Explain how latitude affects the seasonal variation in global pressure.** Pressure is related to rising and falling air, thus the factors that affect this will affect variations in pressure. One of the main influences on pressure is temperature which varies with the position of the overhead sun. This varies throughout the year with latitude. The tropics have low pressure because of rising air associated with the Hadley cell, but this zone moves north and south with the overhead sun. Hadley, Ferrel, and Polar cells should be discussed. High pressure is associated with the descending limb of the Hadley and the other cells. The best example of seasonal changes is the changing pressure over the Asian land mass: high pressure in winter and low pressure in the northern hemisphere summer which triggers the annual monsoon. The simple pattern is complicated by land/sea distribution. 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 latitude affects the seasonal variation in global pressure. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response. **Level 2 (3–5)** Response explains how latitude affects the seasonal variation in global pressure. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response describes how latitude affects the seasonal variation in global pressure. 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)	**With the aid of examples, assess the extent to which global warming is caused by large organisations.** Global warming is caused by the build-up of greenhouse gases in the atmosphere, thus any process or factor that leads to more greenhouse gases is relevant for discussion. Candidates will probably argue that emissions of greenhouse gases by industry, power generation, general transport and other organisations are far more important, because of the carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (NO_x) emissions. However, greenhouse gases caused by individuals can be related to personal vehicles, home heating, farming, and other factors. This, however, will vary with the level of development around the world and the wealth of individuals. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly assesses the extent to which global warming is caused by large organisations. 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 assesses the extent to which global warming is caused by large organisations 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 extent to which global warming is caused by large organisations. 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 extent to which global warming is caused by large organisations 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 *heating and cooling* and *vegetation root action*.** Heating and cooling is the process where the alternate expansion of the rock by heating and contraction by cooling (1) leads to rock breakdown (1). Vegetation root action is the break-up of rock by the prising apart of joints (1) by the growth of roots in the crack (1).	**4**
6(a)(ii)	**Briefly explain how sheetwash occurs on slopes.** The main points are: • Heavy rainfall • Sloping surfaces • On bare surfaces • Exceeding the infiltration capacity of the soil • Leading to surface runoff in sheets (unconcentrated) because of relatively smooth surfaces • Homogenous surface geology/texture **1 mark** for a simple explanation, **2 marks** for a developed explanation, **3 marks** for a well developed explanation.	**3**

Question	Answer	Marks
6(b)	**Explain the formation of fold mountains.** Fold mountains can be formed by convergence and subduction of an oceanic plate below a continental plate or the collision of two continental plates. Movement of plates is caused by convection currents, ridge push and slab pull. In the subduction process, marine sediments (accretionary wedges) get crushed between the plates causing uplift of the sediments and the formation of fold mountains. Fold mountains caused at collision plate boundaries will initially be formed by sediment being crushed between the continental plates, but the main uplift will be caused by one continental plate being thrust underneath the other. The best example is the Himalayas whose initial formation was the crushing of the marine sediments of the Tethys Sea followed by the thrusting of the Indian plate below the Eurasian plate. 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 fold mountains. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Examples used are appropriate and integrated effectively into the response. **Level 2 (3–5)** Response explains the formation of fold mountains. 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 fold mountains. 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)	**'Human activity is the main factor in reducing the stability of slopes.'** **With the aid of one or more examples, how far do you agree with this statement?** Human activity reduces the stability of slopes by increasing the likelihood of mass movement such as by undercutting of slopes, increasing stress by building, clearance of vegetation, increasing water on slopes, etc. This is an assessment, so the role of human activity needs to be compared with other natural factors that can reduce the stability of slopes, such as intense rainfall, steep gradients, unconsolidated rock, earthquakes, etc. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly assesses the role of human activity in reducing the stability of slopes. 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 assesses the role of human activity in reducing the stability of slopes 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 human activity in reducing the stability of slopes. 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 human activity in reducing the stability of slopes 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**