CAMBRIDGE
International Education

Cambridge International AS & A Level

GEOGRAPHY **9696/11**

Paper 1 Core Physical Geography **May/June 2025**

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 May/June 2025 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 descriptions 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.

Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

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)
	Level 4	Levels-marked questions only: Section B part (c)
	Level 3	Levels-marked questions only: Section B parts (b) and (c)
	Level 2	Levels-marked questions only: Section B parts (b) and (c)
	Level 1	Levels-marked questions only: Section B parts (b) and (c)
	Level 0 – No creditable response	Levels-marked questions only: Section B parts (b) and (c)
Highlighter	Creditworthy part of an extended response	Levels-marked questions only: Section B parts (b) and (c)
	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
	Developed point	All questions

Annotation	Meaning	Use
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)(i)	**Fig. 1.1 shows a hydrograph for the River Ray, UK, March 2022.** **Using Fig. 1.1: state the maximum discharge shown.** 6.3 cumecs (must have units). Allow tolerance of 6.30–6.35.	**1**
1(a)(ii)	**Using Fig. 1.1: calculate the lag time.** 2 days/48 hours (must have units). Allow tolerance 1.6–2.4 days.	**1**
1(b)	**Describe the shape of the hydrograph shown in Fig. 1.1.** Description could include: • steep rising limb and steep falling limb • rising limb steeper than falling limb • initially a small increase in discharge before lowering again then rise to the peak • high and narrow peak/flashy • final flow level lower than initial flow level • small fluctuation between days 24 and 26 **1 mark** for each descriptive point.	**3**
1(c)	**Explain <u>two</u> reasons why the shape of a hydrograph may change over time.** The emphasis has to be on shape and change over time. Reasons could include: • seasonal weather changes e.g. particularly frozen ground or drought conditions • antecedent soil moisture conditions • changing amount/intensity of precipitation • seasonal/annual changes in vegetation e.g. deciduous trees • land use changes e.g. agricultural activity, deforestation/urbanisation • water management e.g. construction of dam/reservoir or water abstraction There needs to be links between these factors and either greater or decreased volume or faster runoff and the effect on the shape of the hydrograph. **1 mark** for a simple explanation, **2 marks** for a developed explanation and **3 marks** for a well-developed explanation. **Max. 3 marks** if there is only one well-developed reason.	**5**

Atmosphere and weather

Question	Answer	Marks
2(a)	**Fig. 2.1 is a photograph which shows an area after snowfall.** **Describe the distribution of snow cover shown in Fig. 2.1.** Description could include: • most/majority of the landscape covered/large area in foreground/around village covered by snow • variety of amounts of snow on the rooftops, some roofs are clear (e.g. church), others have snow cover • mountain tops appear mostly to have a deeper/more continuous snow cover • large gap between trees has less snow • road on edge of valley is clear • no/little snow on the trees **1 mark** for each descriptive point.	**3**
2(b)	**Suggest reasons for the distribution of snow cover shown in Fig. 2.1.** Reasons could include: • altitude – more snowfall on higher ground and less melting because of lower temperatures • vegetation such as trees have a shape which encourages snow to fall further/slide off (less interception due to lack of leaves) • shelter provided by trees on the slopes • some buildings sheltered by others • steep/flat roofs/gradient of slopes • aspect – snow more likely to melt on roofs facing south (if northern hemisphere), shelter from wind (blizzard) • some surfaces may be releasing heat, for example through uninsulated rooftops, meaning snowmelt is faster • other human influence e.g. road clearing, traffic flow • differing initial temperatures of the surfaces such as the effect of albedo on snow settling **1 mark** for a simple explanation, **2 marks** for a developed explanation up to the maximum.	**4**
2(c)	**Explain <u>one</u> cause of precipitation.** Candidates can choose between orographic, convectional or frontal. In all cases the following factors are relevant: • the mechanism that forces the air to rise • the air on rising then cools • and if it cools (to below dew point), condensation occurs • water droplets may coalesce to produce rain/snow **1 mark** for a simple explanation, **2 marks** for a developed explanation and **3 marks** for a well-developed explanation.	**3**

Rocks and weathering

Question	Answer	Marks
3(a)	**Fig. 3.1 shows a written extract about a mass movement event.** **Identify <u>four</u> factors in Fig. 3.1 that may have influenced the mass movement event.** Factors include: • snowmelt • intense rainfall • steep slope/cliff • different rock types • unconsolidated rock • fault line • road (mountainous) • prior mass movement (small rockfalls)/bulge **1 mark** for each factor identified.	**4**
3(b)	**Explain how <u>two</u> of the factors you identified in <u>(a)</u> may have resulted in the mass movement event described in Fig. 3.1.** Reasons could include: • snowmelt/intense rainfall – saturated material increases the weight and this increases shear stress, water can act as a lubricant/pore water pressure reduces the shear strength of the material • steep slope/cliff – steep gradient, increased gravitational stress • different rock types with differing shear strengths in juxtaposition • unconsolidated rock – generally low shear strength which makes it susceptible, may also easily absorb water • fault line – evidence of potential earth movement, could imply there is tectonic activity in the area with land shaking • road at the slope base – potentially undercutting the slope or increasing its gradient/transient stress from the vibrations of vehicles • prior mass movement which may destabilise the slope • freeze–thaw may lead to rockfalls **1 mark** for simple explanation of the factor identified in **(a)**. **1 mark** for development of that explanation. **Max. 2 marks** if there is only one explanation.	**3**

Question	Answer	Marks
3(c)	**Describe <u>one</u> method that can be used to reduce mass movement.** Methods covered in the syllabus are: pinning, netting, grading and afforestation. Accept other valid methods e.g. shotcrete. <u>Pinning</u> involves drilling of a long pin/pole/bolt into the material through to where there is stable rock. <u>Netting</u> is used to cover the rock face, keeping loose or weathered rock together and preventing the fall of the loose material. <u>Grading</u> aims to reduce the slope angle thus reducing gravitational effect. <u>Terracing</u> – creation of large steps on the slope to reduce the possibility of large-scale mass movement by subdividing the slope into more stable zones. <u>Afforestation</u> is the planting of vegetation/trees. This helps in two ways, the first is through the roots helping to secure or anchor the material, the second is the increase in interception and evapotranspiration, which helps to reduce water entering the ground. <u>Grouting/shotcrete</u> – cementing over joints/fissures in rock slope preventing water access. <u>Slope drainage</u> – reducing water in the slope. <u>Retaining walls</u> – increasing strength at the base of the slope. **1 mark** for identification of method. **1 mark** for simple description. **1 mark** for development of description.	**3**

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 'laminar flow' and 'thalweg'.** Laminar flow is smooth flow/no eddies/uniform **(1)** in the form of sheets **(1)** parallel to riverbed **(1)**. Thalweg is the line of maximum velocity flow **(1)** along the deepest part of the river channel **(1)**. **2 marks** for each term.	**4**
4(a)(ii)	**Describe the conditions required for braiding to occur in a river channel.** Description could include: • high amount of load • fluctuating velocity/discharge • erodible riverbanks • vegetation to stabilise islands **1 mark** for each descriptive point.	**3**

Question	Answer	Marks
4(b)	**With reference to the Hjulström curve, explain how rates of deposition and erosion vary in a river channel.** This is related to both sediment size and velocity of a river. Higher velocities are needed for entrainment (and once entrained, lower velocities for transportation). There are variations with sediment size: • smallest material (clay) requires high velocity to set in motion – cohesive in nature • larger material (gravel) also needs high velocity (heavier) • lower velocity needed to move medium sized material (sand) A decrease or drop in velocity would result in deposition, with the larger sediments being deposited first. Clays may remain in suspension until water cools considerably or where flocculation occurs that increases the mass. In terms of a river channel, some indication of flow (including helicoidal flow) in meandering channels with greater erosion on the outside of meander bends as velocity is higher and therefore more energy is available with deposition on the inner bend as a result of lower velocity. Allow comments which explain that the Hjulström curve may not fully explain these, as factors such as the type of erosion are a result of e.g. attrition and turbulence/solution and chemical reactions. Credit use of diagram. 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 rates of deposition and erosion vary in a river channel with a clear reference to the Hjulström curve. 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 rates of deposition and/or erosion vary in a river channel. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response describes how rates of deposition and/or erosion vary in a river channel. 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)	**'Land-use changes always result in an increase in channel flow.'** **With the aid of examples, how far do you agree with this statement?** Land-use change results in a change of channel flow. However, it is not always an increase. For example, the candidate may suggest the change from forested land to urban land results, in part, to an increase due to more impermeable surfaces being introduced and also the reduction in vegetation which would have previously diverted some water. However, the candidate may also discuss the use of water in the urban area, thus the change in channel flow is not always an increase. The discussion of abstraction and water storage can also be used to exemplify the argument as there may also be the suggestion that this may be a delay to the channel flow (e.g. if the water is being used and then returned) or an increase in a different drainage basin. Land-use changes that might increase channel flow: • urbanisation • deforestation/removal of vegetation • farming practices Land-use changes that might decrease channel flow: • dams and reservoirs • afforestation • restoration of wetlands • farming practices 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 land-use changes always result in an increase in channel flow. 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 land-use changes always result in an increase in channel flow but may be unbalanced. Examples may lack detail or development. Response develops on a largely secure base of knowledge and understanding.	**15**

Question	Answer	Marks
4(c)	**Level 2 (4–7)** Response shows general knowledge and understanding of the land-use changes that can result in an increase or decrease in channel flow. 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 land-use changes that can result in an increase or decrease in channel flow 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 'reflected solar radiation' and 'latent heat transfer'.** Reflected solar radiation is solar radiation (shortwave radiation) that is reflected back into the atmosphere **(1)** by clouds or by the Earth's surface **(1)**. Latent heat transfer is the heat transferred without a change of temperature **(1)** following a change of state/gas to liquid or liquid to gas **(1)**. **2 marks** for each term.	**4**
5(a)(ii)	**Briefly describe how land/sea distribution affects seasonal variation in temperature.** The main points of consideration are: • difference in specific heat capacity • oceans slowly absorb and release heat from the sun/land heats and cools more quickly than the sea • sea has moderating effect leading to less extreme seasonal temperature variations/more extreme seasonal temperature variations on land **1 mark** for a simple description, **2 marks** for a developed description and **3 marks** for a well-developed description.	**3**

Question	Answer	Marks
5(b)	**Explain how latitude influences the global energy budget.** The latitude of a location determines both the angle of the sun and the time exposed to insolation. The global energy budget is the balance between incoming (shortwave) solar radiation and outgoing radiation (this needs to be emphasised). At high latitudes there is a deficit, this is where the outgoing longwave radiation is greater than the incoming shortwave radiation – towards the poles. Polar areas are cooler as the sun's energy is dispersed over a wider area, and solar radiation passes through more of the atmosphere (therefore scattering and reflection are likely to occur). Higher latitudes are affected by the tilt of the earth and therefore have distinct seasons which create variations in the amount of solar radiation received. At the lower latitudes there is an excess in the budget, as the sun's energy is concentrated over a smaller area and, as the sun is almost always overhead, there is little seasonal change in the amount of insolation received. Credit accurate 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 latitude influences the global energy budget. 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 influences the global energy budget. 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 influences the global energy budget. 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 a result of human activity.** Candidates can suggest the main atmospheric impact of global warming is a result of human activity, as human activities are amplifying global warming. This is due to the increase in the release of the greenhouse gases as a result of human activities, which include: • burning of fossil fuels e.g. coal and oil • deforestation, particularly of tropical forests • loss of carbon sinks – wetlands, peat • livestock farming However, candidates can also suggest that there are underlying natural factors which may contribute to the current observed warming, though the dominant change is due to human activity (anthropogenic causes): • variations in Earth's orbit • solar output variations (sunspots) • volcanic activity 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 a result of human activity. 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 a result of human activity 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 a result of human activity. 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 how global warming is a result of human activity 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)	**Describe the differences between oceanic tectonic plates and continental tectonic plates.** Differences include: • oceanic plates are denser 3 gm/cm^3 compared to 2.7 gm/cm^3 • continental crust is generally much older • oceanic plates are thinner/5–10 km compared to 20–70 km for continental crust) • oceanic plates are mostly made of basalt whereas continental plates are mostly granite/gneiss/rich in silica **1 mark** for each difference.	**4**
6(a)(ii)	**Briefly describe the process of sea floor spreading.** Description could include: • occurs when two plates are moving apart/divergent boundary • magma from the mantle rises • new oceanic crust/ocean ridges are formed • ridge push/slab pull/convection currents enhances the sea floor spreading **1 mark** for each descriptive point.	**3**

Question	Answer	Marks
6(b)	**Explain how temperature can affect the type and rate of weathering.** Temperature can affect the type of weathering, for example if there is fluctuation of temperature around 0°C, the process of freeze–thaw may be described. The type of weathering moves from being more dominantly physical at lower temperatures, to chemical at higher temperatures. Credit use of Peltier diagram to explain both the type of weathering (physical more dominant at lower temperatures than chemical) and rate (dominant at extreme temperatures). Higher temperatures may increase the rate of chemical weathering. Candidates may explain how the higher the temperature the more dominant the degree of chemical weathering is. There is a positive relationship between temperature and the rate of chemical weathering, as with every increase of temperature, the rate of chemical reaction increases (e.g. hydration and hydrolysis). The rate of physical weathering is different, as fluctuations around 0°C gives rise to physical weathering such as freeze–thaw. Physical weathering is also present at higher temperatures, but again requires fluctuations in temperature (e.g. exfoliation, granular disintegration). Salt crystallisation is also valid. Reference to other factors such as precipitation and rock type can also be useful here. Temperature needs to be discussed for both chemical and physical weathering for an effective answer that addresses the type of weathering. 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 temperature can affect the type and rate of weathering. 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 temperature can affect the type and/or rate of weathering. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response describes how temperature can affect the type and/or rate 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)	**'The nature of tectonic plate boundaries determines the resulting tectonic landforms.'** **With the aid of examples, how far do you agree with this statement?** Types of plate boundary mostly determine the landforms found there. Candidates may discuss the general differences, for example: Converging destructive boundaries produce: • island arcs • fold mountains • ocean trenches • acidic/composite volcanoes • accretion wedges Converging collision boundaries produce: • fold mountains • faulting Constructive/diverging boundaries produce: • rift valleys • mid-ocean ridges • fissure volcanoes • basic volcanoes • fault scarps Conservative boundaries • limited landforms but possible fault scarps However, there are similar landforms that are found at different plate boundaries, for example trenches can be found at oceanic-oceanic collision boundaries and oceanic-continental boundaries. Fold mountains are found at convergent boundaries (both oceanic–continental and continental–continental) but volcanic activity is not found at continental–continental boundaries. Volcanoes are found at both divergent and convergent boundaries, but the type and nature of the volcanic eruption are different. 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 the nature of tectonic plate boundaries determines the resulting tectonic 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 assesses the extent to which the nature of tectonic plate boundaries determines the resulting tectonic landforms but may be unbalanced. Examples may lack detail or development. Response develops on a largely secure base of knowledge and understanding.	**15**

Question	Answer	Marks
6(c)	**Level 2 (4–7)** Response shows general knowledge and understanding of the extent to which the nature of tectonic plate boundaries determines the resulting 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 nature of tectonic plate boundaries and whether they determine the resulting tectonic 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.	

