CAMBRIDGE
International Education

Cambridge International AS & A Level

GEOGRAPHY **9696/12**

Paper 1 Core Physical Geography **October/November 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 October/November 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)
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)
Highlighter	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

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)	**Fig. 1.1 shows the land use in areas at different levels of risk of river flooding in north-east Greece.** **Describe the relationship between land use and the level of risk of river flooding shown in Fig. 1.1.** Description of the relationship could include: • Higher risk areas are more urbanised/low risk areas are less urbanised. • High flood risk areas have most of their land under cultivation ~65%, low risk areas are ~14%. • Low risk areas have most of their land under mixed forest (73%), high risk has only 20% mixed forest. • Pasture and low density vegetation has similar levels of risk across all levels. Points must relate to at least 2 risk categories for credit or different types of land use within each risk category. **1 mark** for each description. **Max 3** without use of data.	**4**
1(b)	**Briefly explain how land use might influence the risk of river flooding.** Likelihood of flooding can be either increased or decreased, as land use can determine the amount of runoff. Main factors that could be considered are: • Trees reduce runoff and the possibility of flooding by interception and absorption of water. • Crop cultivation where the land is bare for a time increase runoff as water moves into the channel faster. • Urban areas have impermeable surfaces which reduce infiltration and increase runoff. • Livestock/machinery can compact the surface, reducing infiltration and therefore increasing surface runoff. Deforestation by itself is not a land use. **1 mark** for each simple explanation, **2 marks** for a developed explanation.	**3**

Question	Answer	Marks
1(c)	**Explain how river floods may be prevented by <u>one</u> method of hard engineering.** Hard engineering methods include: • Dams and reservoirs **(1)** to control discharge **(1)** by holding back water and releasing gradually **(1)**. • River straightening **(1)** to speed up flow **(1)** so removes water out of vulnerable area **(1)**. • Embankment/levee construction **(1)** raises the height of the bank **(1)** so more water can be contained in the channel **(1)**. • Diversion spillways **(1)** to remove water from main channels **(1)** reduces discharge in main channel **(1)**. • Dredging **(1)** to deepen river channel **(1)** so increases the volume of water that can be carried in the river/channel **(1)**. • Flood relief channels/lakes/retention basins **(1)** to divert water from main river channel and store it **(1)** reduces discharge in main channel **(1)**. **1 mark** for stating method **2 marks** for a simple explanation. **3 marks** for a developed explanation.	**3**

Atmosphere and weather

Question	Answer	Marks
2(a)	**Fig. 2.1 shows the distribution of temperatures in the urban area of Boston and surrounding areas, Massachusetts, USA, in the afternoon (15:00), 29 July 2019.** **State the temperature at South End shown in Fig. 2.1.** 35 °C (accept 34.8–35 °C). Must have °C for mark.	**1**
2(b)	**Describe the pattern of temperatures shown in Fig. 2.1.** Description of the pattern could include: • Highest temperature in central Boston/near CBD such as South End, around Downtown. • Lowest temperatures are found in south around Milton, and the far west. • Temperatures generally fall with distance from the CBD/river mouth. • Temperatures generally decrease from the NE to SW/N to S. • Along coastline there is a variation in temperatures. • There are pockets of cooler temperatures within the built-up area, such as West End and Cambridge. • Outliers of high temperatures such as Ashmont and Wollaston. **1 mark** for each description. **Max 3** if no use of temperature data.	**4**
2(c)	**Explain why temperatures might vary within an urban area.** Variation will be caused by variation in infrastructure, traffic and presence or absence of vegetation/water. The main factors that could be considered are: • Varying albedos of the urban surfaces as a control on radiation reflection and absorption e.g. buildings have higher heat capacity retaining then slowly releasing heat. • Varying release of anthropogenic heat from differing activities – heating of buildings by air-con systems, central heating, industrial processes. • Concentration of traffic in specific areas/road vehicles burning fuels. • Presence of water bodies (lakes rivers) which increase evaporation, have varying albedo and heat capacity – creates cooling effect. • Presence of vegetation (parks, large gardens) increasing evapotranspiration and have varying albedos – creates cooling effect. • Variation of wind strength as a result of building heights leading to still air and less dispersal of heat or canyoning. • CBD tends to have highest temperatures due to high concentration of activities in this area. Global warming and CO_2 emissions by themselves are not valid points. **1 mark** for each simple explanation, **2 marks** for a developed explanation and **3 marks** for a well-developed explanation up to a maximum.	**5**

Rocks and weathering

Question	Answer	Marks
3(a)	**Fig. 3.1 shows four simplified diagrams of tectonic boundaries.** **Name the type of tectonic boundary shown in diagram A in Fig. 3.1.** Divergent/constructive.	**1**
3(b)	**Compare the patterns of earthquakes between the four diagrams shown in Fig. 3.1.** Diagram A = divergent/constructive Diagram B = collision Diagram C = conservative/passive/sliding Diagram D = convergent/destructive/subduction zone Responses could refer to diagram letters or types of boundaries. Comparisons could include: • All four boundaries have shallow earthquakes. • A and/or C have only shallow earthquakes/B and D and/or have both shallow and deep earthquakes. • Deep earthquakes go deeper at D than at B. • B has the most earthquakes/A has the least. • C has the most shallow earthquakes. • D has the most deep. **1 mark** for each comparison. **Max. 3 marks** if only differences or similarities. **Max. 1 mark** if separate descriptions with no attempt at comparison.	**4**
3(c)	**Explain the pattern of earthquakes shown in diagram B in Fig. 3.1.** Explanation for the pattern could include: • The plates are converging/collision boundary. • Due to convection currents in the mantle • Both plates are of similar density. • Neither plate subducts beneath the other. • Collision produces a large shear zone where one plate is thrust beneath and into the other/plates are compressed/crumpled/fold. • This produces/builds up stress at all points of the contact – hence earthquake occurs. • Compression builds both deep in the crust and along shallower fault lines, hence both shallow and deep earthquakes. **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)	**Describe the process of traction within river channels.** The main points are: • Traction is the movement of material (usually large/heavy material/boulders). • By dragging/rolling/sliding/with continuous contact along the bed of the river. • Usually occurs at times of high flow velocities/high discharge/ force of the river. **1 mark** for each description.	**3**
4(a)(ii)	**Explain how point bars are formed in river channels.** Explanation will be related to the development of meanders. • Point bars are depositional features found on meanders. • It is crescent shaped structure that extends from the slip off slope into the river channel. • Velocity of the river flow is lowest on the inner bends (and highest on the outer bends). • Decreased velocity allows sediment to be deposited on the inner bend, creating a gently sloping inner bank (slip off slope). • Deposits came from erosion on the outer bank - moved by helicoidal flow. **1 mark** for a simple explanation, **up to 4 marks** for a developed explanation up to the maximum.	**4**

Question	Answer	Marks
4(b)	**Explain how the size and shape of a drainage basin may affect the shape of a storm hydrograph.** Size: This is a vary variable influence because drainage density will vary. Depending on the type of precipitation large drainage basins might be expected to receive more precipitation. However, the water will probably take longer to reach the main river thus increasing the lag time. Smaller drainage basins tend to experience a more flashy response but the discharge values and thus peak discharge might be lower. Shape: Circular drainage basins exhibit a more rapid discharge response to a precipitation event as tributaries converge on the main channel. Elongated drainage basins tend to experience a lower peak and longer lag time as the tributaries do not converge. Note: Candidates may refer to the relief of the basin as part of shape – steep slopes, water flows quickly, decreased lag time and increasing peak discharge. This by itself only shows a basic understanding of shape. Award marks based on the quality of explanation and breadth of the response using the marking levels below. **Max 4 marks** if only size or shape is correctly explained. **Level 3 (6–8)** Response clearly explains how the size and shape of a drainage basin may affect the shape of a storm hydrograph. 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 the size and/or shape of a drainage basin may affect the shape of a storm hydrograph. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response describes how the size and/or shape of a drainage basin may affect the shape of a storm hydrograph. 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)	**'River velocity is the main factor influencing the formation of braided river channels.'** **With the aid of examples, how far do you agree with this statement?** The main features of braided river channels are a wide overall channel, multiple water channels within the main channel, and bars and islands (eyots) which may or not be vegetated. Braided channels are a result of variations in velocity. Velocity (variable flow) determines the processes of erosion, transport and deposition. Fluctuation in velocity affects the ability of the river to erode the banks. Decreases in velocity lead to deposition and the creation of separate channels. Velocity will be affected by discharge and gradient. Variations in discharge may be caused by seasonal rainfall patterns, seasonal snowmelt, release of water from dams, water abstraction. Sudden decrease in gradient may reduce velocity. Other factors may include and be used for evaluation: • High sediment load – linked to geology upstream, human activity and seasonality (e.g. outwash of glacier during summer melting). • Erodibility of riverbanks to enable the overall channel to expand. • Growth of vegetation to stabilise the bars and islands/stability of bars and islands to allow vegetation to grow. Thus, velocity is important as it determines which processes occur and when, but the other factors also need to be considered. 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 river velocity is the main factor influencing the formation of braided river channels. 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 river velocity is the main factor influencing the formation of braided river channels 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 extent to which river velocity is the main factor influencing the formation of braided river channels. 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 river velocity is the main factor influencing the formation of braided river channels 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)	**Describe the atmospheric process of condensation.** Condensation is the process whereby: • Water vapour changes to water droplets/from a gas to a liquid. • Air is cooled by named/described processes. e.g. convection/rising air or conduction/cooling surfaces. • Until dew point is reached/air becomes saturated. • Latent heat is released. • Droplets form on a surface (dew) or as water droplets in the air around condensation nuclei. **1 mark** for each descriptive point.	**3**
5(a)(ii)	**Explain why some areas experience radiation deficits.** • Radiation deficit refers in areas where output of radiation is greater than input of radiation. • These areas are at high latitude. • Incoming radiation is spread over a wider area than at the equator, due to angle of the sun. • Radiation passes through more of the atmosphere due to the angle of the incoming radiation, increasing scattering and absorption by atmospheric gases/pollution/dust particles. • High albedo from snow and ice cover/clouds also reflect more incoming radiation meaning less is absorbed and will be less than outgoing radiation. **1 mark** for each simple explanation, **2 marks** for a developed explanation up to the maximum.	**4**

Question	Answer	Marks
5(b)	**Describe and explain the atmospheric impacts from global warming.** The main effect is related to the increasing temperatures in the atmosphere. This will increase the melting of sea ice and snow cover which will reduce albedo, leading to less reflection of solar radiation and a greater heating of the earth and atmosphere, so increasing the effects. These increased temperatures will have an effect on processes such as hurricanes and tropical cyclones which are influenced by increased temperatures and especially by the increases in ocean temperatures. Warmer air results in more evaporation, which increases the amount of water vapour in the atmosphere. Water vapour acts as greenhouse gas. With more water vapour, more clouds form and trap more heat. With more cloud, there is more precipitation, releasing energy into the atmosphere. As energy builds up, storms develop with high intensity rainfall. The jet stream, particularly in the Northern hemisphere becomes more sinuous, changing the weather patterns. Ocean currents may also be affected by the atmosphere (e.g. ENSO and NAO) Some areas might be subjected to extreme temperatures and drought. The effects can be extremely variable. Melting of permafrost releases methane, which accelerates global warming. 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 atmospheric impacts from global warming. 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 describes and explains the atmospheric impacts from global warming. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response describes the atmospheric impacts from global warming. 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)	**Assess the extent to which albedo is the main factor affecting the diurnal energy budget.** The main factors affecting the diurnal energy budget are: • Incoming (shortwave) solar radiation • Reflected solar radiation (albedo) • Energy absorbed into the surface and subsurface • Sensible heat transfer • Longwave radiation • Latent heat transfer. Albedo will affect some of these factors and the assessment will be in terms of how albedo affects these factors and how significant it is. Albedo ONLY occurs in the daytime energy budget however – not the nighttime. 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 albedo is the main factor affecting the diurnal energy budget. 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 albedo is the main factor affecting the diurnal energy budget 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 albedo is the main factor affecting the diurnal energy budget. 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 albedo is the main factor affecting the diurnal energy budget 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 mass movement terms 'heave' and 'fall'.** Heave is slow movement **(1)** involving soil particles rising perpendicular to the slope and then dropping down vertically **(1)** by wetting and drying/or freezing and thawing **(1)**. Fall is rapid movement **(1)** of rock from a steep slope/cliff **(1)** Usually triggered by a specific event e.g. earthquakes, human activities etc **(1)**. Credit can be given to weathering if it refers to a specific event. **2 marks** for each definition.	**4**
6(a)(ii)	**Briefly explain the formation of ocean ridges.** Ocean ridges are formed by: • Oceanic plates moving apart/diverging • Aided by convection currents and/or ridge push/slab pull • Magma moves up in the gap created • Cools/solidifying to form ocean ridges (higher relief because consists of hot, thermally expanded rock). **1 mark** for each simple explanation, **up to 3 marks** for a developed explanation up to the maximum.	**3**

Question	Answer	Marks
6(b)	**Explain how human activity can cause slope instability.** Instability can be caused by increasing shear stress or decreasing shear strength or both. Human-induced increase in shear stress can be many and varied such as undercutting for road construction, disruption of slopes by building constriction, vibrations by traffic as well as loading of slope by buildings, waste tips or water. Reduction in shear strength can be by deforestation. 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 human activity can cause slope instability. 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 human activity can cause slope instability. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response describes how human activity can cause slope instability. 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)	**'Temperature is the main factor affecting physical weathering whereas rainfall is the main factor affecting chemical weathering.'** **With the aid of examples, how far do you agree with this statement?** The question needs to consider both physical and chemical weathering. Discussion of the Peltier diagram may underpin some of the answers. Chemical weathering relies on water (rainfall) for the reactions to occur though increased temperatures speed up the rate of reaction. Some physical weathering processes also require water, some such as insolation weathering (heating and cooling) do not and temperature is more important. Evaluation should be based on the temperature and rainfall requirements of both sets of processes. Other factors may include and be used for evaluation: rock type rock structure vegetation relief etc. Thus, rainfall and temperature are important, but other factors also need to be considered. 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 temperature is the main factor affecting physical weathering whereas rainfall is the main factor affecting chemical weathering. 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 temperature is the main factor affecting physical weathering whereas rainfall is the main factor affecting chemical weathering 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 temperature is the main factor affecting physical weathering whereas rainfall is the main factor affecting chemical weathering. 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).	**15**

Question	Answer	Marks
6(c)	**Level 1 (1–3)** Response may broadly discuss the extent to which temperature is the main factor affecting physical weathering whereas rainfall is the main factor affecting chemical weathering 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.	

