CAMBRIDGE
International Education

Cambridge International AS & A Level

GEOGRAPHY **9696/01**

Paper 1 Physical Geography **For examination from 2027**

MARK SCHEME

Maximum Mark: 60

Specimen

This document has **14** pages. Any blank pages are indicated.

Generic Marking Principles

All examiners must apply these general marking principles when marking candidate responses. Examiners must apply them alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme must 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 descriptions for the question
- the specific skills defined in the mark scheme or in the generic level descriptions 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 descriptions.

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 descriptions in mind.

Guidance on using levels-based mark schemes

Marking of work should be positive, rewarding achievement where possible, but clearly differentiating across the whole range of marks, where appropriate.

The marker should look at the work and then make a judgement about which level statement is the best fit. In practice, work does not always match one level statement precisely so a judgement may need to be made between two or more level statements.

Once a best-fit level statement has been identified, use the following guidance to decide on a specific mark:

- If the candidate's work **convincingly** meets the level statement, award the highest mark.
- If the candidate's work **adequately** meets the level statement, award the most appropriate mark in the middle of the range (where middle marks are available).
- If the candidate's work **just** meets the level statement, award the lowest mark.

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 answer the question and support their argument with relevant examples will be credited. There may be detailed consideration of a detailed specific example/one or more examples, or a broadly conceived response, using several examples to show the factors involved. Evaluation may occur throughout the answer or in one or more evaluative sections such as an overall assessment at the end.

Levels of response

AO1 Knowledge and understanding

AO3 Evaluation

Use this marking grid to give marks for each candidate response for Questions 4, 5 and 6.

Level	Description	Marks
5	**Developed response that evaluates the question** • Relevant and accurate knowledge and clear understanding that answers the question. • Developed reasoning with an assessment of alternative factors/viewpoints to reach a logical decision. • Relevant evidence/examples that are accurate and detailed and support the answer.	13–15
4	**Developed response with relevant evaluation** • Mostly relevant and accurate knowledge with secure understanding that answers the question. • Developed reasoning with discussion of alternative factors/viewpoints. • Relevant evidence/examples that are generally accurate with some detail that mostly support the answer.	10–12
3	**Explanatory response with simple evaluation** • Mostly relevant knowledge with some understanding that answers the question, but with some limitations in breadth and/or accuracy. • Reasoning lacks development and discussion of alternative factors/ viewpoints may be limited; the answer is largely explanatory. • Evidence/examples which are limited in some way (relevance, accuracy or detail) are used in the answer.	7–9
2	**Descriptive response related to the question** • Some relevant knowledge with partial understanding linked to the question. • Limited reasoning; the answer is largely descriptive. • Some limited examples may be used in the answer.	4–6
1	**Limited response related to the topic** • Limited knowledge and understanding related to the topic which does not answer the question. • Examples may be absent or in name only.	1–3
0	• No creditable response.	0

Section A

Answer **all** questions in this section.

Hydrology, river processes and hazards

Question	Answer	Marks
1(a)(i)	**Figure 1.1 is a photograph which shows a river flooding.** **Use Figure 1.1 to:** **identify the landform labelled X.** Point bar / slip-off slope.	**1**
1(a)(ii)	**Use Figure 1.1 to:** **identify the landform shown between Y and Z.** (River) bluff / river cliff.	**1**
1(b)	**Describe the features of the flooding shown in Figure 1.1.** Award **one mark** for each relevant point. Points include: • extensive flooding / much land covered with water • uneven flooding in the right foreground up to the bluff / settlement not flooded • more extensive flooding to the left of the river • floodplain completely covered in the background • levées did not stop the flooding / exceeding bankfull stage • there seems to be more overbank flooding at inner bends • poses a risk to the settlement.	**4**
1(c)	**Suggest <u>two</u> factors that might cause a river to flood.** Award **one mark** for each factor to a maximum of **two marks**. Award **one mark** for development of each factor. A river is prone to flooding because of high runoff in the drainage basin. Factors that affect high runoff in the drainage basin include: • high rainfall amounts/high intensity rainfall or snowmelt • long duration of precipitation • high antecedent moisture in the drainage basin • steep gradients • lack of vegetation cover • low infiltration capacity as a result of impermeable soils and rocks • high runoff from impermeable surfaces, such as those present in urban areas • changes to catchment characteristics, such as land-use changes • lack of specific flood prevention management strategies • hard engineering, such as river straightening, might increase flooding downstream.	**4**

Question	Answer	Marks
1(d)	**Figure 1.2 shows a storm hydrograph.** **Identify feature A of the storm hydrograph shown in Figure 1.2.** Rising limb.	**1**
1(e)	**Describe how deforestation in the drainage basin area might change the storm hydrograph in Figure 1.2.** Award **one mark** for each relevant point up to a maximum of **three marks**. Reserve **one mark** for use of data from Figure 1.2. Relevant points include: • shorter lag time (from the current lag time of 51 hours) • higher peak discharge (higher than 32 cumecs) • steeper rising limb as a result of higher discharge • steeper falling limb as a result of higher discharge • period of higher discharge of shorter duration. Credit can be given for an annotated diagram describing the changes.	**4**

Atmospheric processes and global climate change

Question	Answer	Marks
2(a)	**Figure 2.1 shows incoming (shortwave) solar radiation. Figure 2.2 shows outgoing (longwave) radiation.** **State the total amount of outgoing (longwave) radiation shown in Figure 2.2. Show your working.** 398 Wm^{-2} – 378 Wm^{-2} = 20 Wm^{-2} 20 Wm^{-2} + 219 Wm^{-2} (1) = 239 Wm^{-2} (1) Units for the total amount are needed for full marks.	**2**
2(b)	**Explain how <u>either</u> atmospheric conditions <u>or</u> surface conditions affect the amount of solar radiation absorbed and reflected shown in Figure 2.1.** Award **one mark** for a simple explanation, **two marks** for a developed explanation up to the maximum. Candidates only need to discuss **either** atmospheric **or** surface conditions. If both atmospheric and surface conditions are discussed, mark both and award marks for the **one** that received the highest marks. Atmospheric and surface conditions will reflect and absorb the radiation depending on the nature of those conditions. **Atmospheric conditions** will determine particulate matter, gases and moisture (clouds) and their ability to absorb or reflect energy. **Surface conditions** will determine the albedo of various surfaces (water, ice, vegetation, etc.) and their ability to absorb or reflect energy.	**4**
2(c)	**Figure 2.3 shows global carbon dioxide concentration in the atmosphere and global temperature change from 1850 to 2000.** **Use Figure 2.3 to compare the trends in carbon dioxide concentration in the atmosphere and temperature change from 1850 to 2000.** Award **one mark** for each relevant point. Maximum **two marks** if the response only describes the trends with no attempt to compare. The main points of comparison are: • both are overall increasing trends • carbon dioxide concentration increases from 1850, temperature starts increasing from 1910 • the carbon dioxide trend is smooth but the temperature trend shows many fluctuations especially before 1910 • trends become more similar after 1950 • both trends become steeper after 1950.	**4**

Question	Answer	Marks
2(d)	**Explain the role of greenhouse gases in global warming.** Award **one mark** for a simple explanation or **two marks** for a developed explanation up to the maximum. Development may come from the depth of the explanation or the linking of factors together. Points might include: • the types of greenhouse gases (GHGs): carbon dioxide, methane, nitrous oxides, F-gases • how GHGs allow incoming (shortwave) radiation to pass through the atmosphere but trap outgoing (longwave) radiation • leading to an increase in temperature and global warming • relatively small increases in some GHGs can lead to big changes in trapped longwave radiation / heat • longevity of different GHGs in the atmosphere means that there is a cumulative effect • discussion of the relationship between global warming and the increase of GHGs such as release of methane with the melting of permafrost or the decrease of GHGs by greater absorption such as increased uptake of carbon dioxide by plankton growth as a result of warmer ocean temperatures is also relevant.	**5**

Earth processes and mass movements

Question	Answer	Marks
3(a)	**Figure 3.1 shows two types of mass movement.** **Identify the type of mass movement labelled A in Figure 3.1.** Any type of slide e.g. landslide / rotational slide / slump.	**1**
3(b)	**Compare the features of the mass movements labelled A and B in Figure 3.1.** Award **one mark** each for any four valid points. Maximum **two marks** if the response only describes features of either A or B with no attempt to compare. A is a rotational slide (slump) and B is a flow (mudflow / debris flow). No mark for stating the type of mass movement. The response must have some kind of comparison between A and B. The main points of comparison are: • A has a rotational movement whereas B is more of a translational movement • A is a more varied movement than B • in A movement is in separate parts whereas B is one basic movement • A is a failure on a hillside whereas B exits from a gully / channel in the hills • A has a slide or failure plane whereas B does not • A has a back wall / scar, whereas B does not • A appears to be more consolidated and travels less far whereas B is longer and narrower • both types extend onto the lowland at the base of the slopes as toe lobes • both have flowing components but A less so • A appears to be steeper whereas B is gentler overall • B appears be more fluid / wetter than A.	**4**
3(c)	**Suggest how mass movement B shown in Figure 3.1 was caused.** Award **one mark** for a simple explanation, **two marks** for a developed explanation, or **three marks** for a well developed explanation up to the maximum. B is a mudflow/debris flow, therefore explanations might include: • (heavy) precipitation will be the main cause as water will form the basis of the explanation • water increases weight, increases stress • gravity effect on steep slopes • water increases pore water pressure, reducing cohesion in the fine-grained material, therefore reducing shear strength • water might act as a lubricant / less friction • slope vibrations such as earthquakes • dam collapses • human activities involving water such as excessive irrigation, burst water pipes.	**5**

Question	Answer	Marks
3(d)	**Figure 3.2 is a photograph which shows management strategies used on a slope to reduce mass movement.** **Identify the <u>two</u> management strategies shown in Figure 3.2.** Pinning. Netting.	**2**
3(e)	**Describe how <u>one</u> of the management strategies in Figure 3.2 increases the stability of the slope.** Award **one mark** for each relevant point related to the same management strategy to the maximum. If more than one management strategy is mentioned, mark both and award marks for the **one** management strategy that received the highest marks. Points might include: **Pinning**: helps to reinforce the surface rock (1) pin the larger block of rock (1) tie together the rock face (1) create anchors for other slope stability methods (1) increasing shear strength (1). **Netting**: these can either drape (1) to help contain loose material (1) or be tensioned (1) restraining the movement of the rock face (1) increasing shear strength (1).	**3**

Section B

Answer **one** question from this section.

Hydrology, river processes and hazards

Question	Answer	Marks
4	**'Climate is the most important factor influencing transfers in a drainage basin system.'** **To what extent do you agree with this statement? Use examples to support your answer.** Climate, through precipitation type and intensity, will influence most of the transfers in a drainage basin system. Transfers above ground are throughfall, stemflow, overland flow and channel flow. These are all influenced by the amount, intensity, frequency and seasonality of precipitation. This will also influence transfers below ground such as infiltration, percolation, throughflow and groundwater flow. Snow, rather than rainfall, will also have an influence. Temperature will have a smaller influence but will affect the rate and amount of evapotranspiration. Although climate is the major influence of transfers in the drainage system other factors will also have an influence. Land use, soils and rock type will influence overland flow, throughflow and percolation and ultimately river flow. Human activities such as land-use change, including urbanisation, water abstraction and dam building, will also have an effect on transfers. However, climate, directly or indirectly, will be the most important factor influencing transfers in a drainage basin. The above consideration should form the basis of an evaluation of the question. Award marks based on the quality of the response using the levels of response marking grid.	**15**

Atmospheric processes and global climate change

Question	Answer	Marks
5	**To what extent are ocean currents the main energy transfer within the global energy budget? Use examples to support your answer.** Responses should assess the effect of ocean currents as a transfer of global energy, but then also consider transfers such as wind. It is estimated that currents and ocean gyres transfer about 20% of the global energy. The effect of ocean currents would need to be considered, noting that it is also dependent on whether these currents are warm or cold. The argument could be made that warm ocean currents, such as the North Atlantic gulf stream, are more notable during the winter, and therefore that it is dependent on factors such as seasons and locations. Such an evaluation would indicate a higher level response. The candidate may also classify transfers as being horizontal or vertical. Most global energy is transferred by trade winds which tend to blow in relatively constant direction but all transfer energy from the equator and tropics to higher latitudes. The candidate may support their argument by referring to subtropical high-pressure belts and trade winds as well as mid-latitude and polar easterlies. The role of the intertropical convergence zone (ITCZ) is relevant for discussion. Detailed discussion on concepts such as air masses may be given with discussion of jet streams also being relevant. A consideration of factors such as large continental areas, land/sea distribution or latitude as an influence on pressure and wind systems may also be relevant. Award marks based on the quality of the response using the levels of response marking grid.	**15**

Earth processes and mass movements

Question	Answer	Marks
6	**Assess the extent to which subduction is involved in the formation of tectonic landforms. Use examples to support your answer.** The main tectonic landforms are fold mountains, volcanoes, mid-ocean ridges, ocean trenches, volcanic island arcs, fault scarps and rift valleys. Subduction is when one oceanic plate is forced below either another oceanic plate or a continental plate. Landforms associated with subduction are fold mountains, volcanoes, ocean trenches and volcanic island arcs depending on which plates are involved. Landforms which are not always the result of subduction or are not related to subduction at all should be part of the discussion. Some volcanoes are associated with sea floor spreading or mantle plumes at hot spots e.g. Hawaii. Some fold mountains are associated with collision between two continental plates with no major subduction and melting of the crusts, therefore no volcanic action. Mid-ocean ridges are the result of magma rising at sea floor spreading sites. Fault scarps are the result of faulting and rift valleys are the result of plates moving apart e.g. East African Rift Valley. These considerations will form the basis of the assessment. Award marks based on the quality of the response using the levels of response marking grid.	**15**

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