Cambridge Assessment International Education

Cambridge International AS & A Level

GEOGRAPHY **9696/12**

Paper 1 Core Physical Geography **October/November 2020**

MARK SCHEME

Maximum Mark: 60

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

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[Turn over

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Section A

Answer **all** questions in this section. All questions carry 10 marks.

Hydrology and fluvial geomorphology

Question	Answer	Marks
1(a)	**Fig. 1.1 is a photograph of a landscape in France.** **Name landform A shown in Fig. 1.1.** Gorge/canyon/deeply incised valley, v-shaped valley, interlocking spur, (river) valley. River/meander on its own not acceptable.	**1**
1(b)	**Describe the landscape features shown in Fig. 1.1.** Some of the features that could be described are: • very steep valley sides/slopes • narrow valley • bare rock outcrops/some indication of rock structure • gentler slopes above the gorge • signs of mass movement • some description of vegetation and/or where it occurs • river on its own is not a description, but if described that is acceptable • mountains with some descriptive elements • description of road, nature/location, etc. • interlocking spurs along the river valley Three points for **3 marks** but they need to be briefly described and not listed.	**3**
1(c)	**Explain how the landscape features shown in Fig. 1.1 may have formed.** Explanation may include: • rapid downcutting by the river • uplift of land • retreat of a waterfall • lack of lateral erosion by river • resistant rock to account for steep valley sides and lack of lateral erosion • explanations for mass movement if notified • river downcutting along a fault • if glaciation, it must be with reference to features that could be related to glaciation • meander formation is not relevant to this situation Explanation of river processes on its own, max **3 marks**. There needs to be more than one feature named. **1 mark** for each simple explanation, **2 marks** for each developed explanation, or **3 marks** for each well developed explanation.	**6**

Atmosphere and weather

Question	Answer	Marks
2(a)	**Fig. 2.1 shows global temperature change and carbon dioxide concentration in the atmosphere since 1850.** **State the temperature change for 1910 shown in Fig. 2.1.** –0.14/–0.15 °C Needs units for the mark.	**1**
2(b)	**Describe the trend in global temperature change and the trend in carbon dioxide concentration shown in Fig. 2.1.** The main trends are: • For carbon dioxide: gentle increase 1850–1950, followed by a rapid rise to 2000. • For global temperature: marked fluctuations 1850–1910, rapid rise 1910–1940, followed by a drop then rapid fluctuating rise to 2000. **2 marks** for each to maximum.	**4**
2(c)	**Explain why there might be a relationship between global temperature and carbon dioxide concentration in the atmosphere.** The explanation will lie in the enhanced greenhouse effect focused on carbon dioxide as it is a greenhouse gas. A well developed explanation should include the passage of incoming shortwave radiation with the trapping of outgoing longwave radiation. No credit for holes in the ozone layer. Answers that suggest that gases other than carbon dioxide are involved in global warming and that there may be other factors can be credited. **1 mark** for a simple explanation, **2 marks** for a developed explanation, **3 marks** for a well developed explanation, **4/5 marks** for an explanation that discusses other factors such as other gases, etc.	**5**

Rocks and weathering

Question	Answer	Marks
3(a)(i)	**Fig. 3.1 shows types of weathering, rainfall and temperature.** **State the weathering occurring at: A** Moderate chemical weathering/very slight physical weathering on its own or in combination.	**1**
3(a)(ii)	**State the weathering occurring at: B.** Slight chemical weathering/very slight physical, but not slight physical on its own. Very slight (or similar qualification) weathering on its own acceptable.	**1**
3(b)	**Calculate the range of mean annual rainfall for 'moderate chemical weathering with slight physical weathering'. Show your working.** 500 for the lower rainfall amount with 1600 to 1700 for the upper rainfall amount. The correct answer (1100–1200) for the extra mark. The units must appear somewhere for full credit.	**2**
3(c)	**Explain how rainfall influences the type of weathering.** Many weathering processes rely on water, especially chemical weathering, e.g. carbonation, hydrolysis, and solution. Some physical weathering also relies on water, such as freeze-thaw and salt crystallisation, as does biological weathering. A detailed explanation of a variety of chemical weathering processes can get maximum marks. Type of weathering associated with a simple explanation, **1 mark**. **1 mark** for each simple explanation, **2 marks** for each developed explanation, or **3 marks** for each well developed explanation to a maximum of **6 marks**.	**6**

Section B

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

Hydrology and fluvial geomorphology

Question	Answer	Marks
4(a)(i)	**Define the hydrological terms *interception* and *throughfall*.** Interception: the trapping of water during a precipitation/rainfall event (1) on leaves of vegetation, etc. (1) Throughfall: the movement of precipitation either through or from vegetation (1) to the ground surface (1)	**4**
4(a)(ii)	**Briefly explain the effect of evaporation in the drainage basin system.** Evaporation will reduce the amount of water available in the drainage basin system. It will thus affect virtually all the processes reducing infiltration, percolation, groundwater flow and overland flow. It will reduce the water in the soil as well. This means that it also affects river flow/discharge. Three relevant points for **3 marks**.	**3**

Question	Answer	Marks
4(b)	**Explain how slopes and soils can affect the shape of a storm hydrograph.** The main influence will be in terms of the effects on infiltration and overland flow. Steeper slopes may lead to greater rates of overland flow because if overland flow is occurring there is less chance of infiltration occurring. Also throughflow will be faster, other things being equal. On gentle slopes there is more chance for infiltration to occur. Impermeable soils (such as clay soils) will inhibit infiltration leading to overland flow. Precipitation will infiltrate permeable sandy soils easily leading to less overland flow. More overland flow will result in a short lag time, steep rising limb and high peak discharge. Less overland flow will lead to a longer lag time, gentler rising limb and low peak discharge. 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 slopes and soils can affect the shape of a storm hydrograph. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Any examples used are appropriate and integrated effectively into the response. **Level 2 (3–5)** Response provides an explanation of the influence of slopes and/or soils on the shape of a storm hydrograph but is unbalanced. Explanations are not detailed. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response contains some understanding of the influence of slopes and/or soils on 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)	**With the aid of examples, assess the relative importance of the factors that caused a recent river flood event.** Candidates are free to develop their own approach to the question and responses will vary depending on the approach chosen. Whichever approach is chosen, essays which address the question and support their argument with relevant examples will be credited. There may be detailed consideration of a case study/one or more examples, or a broadly conceived response, drawing on several examples to illustrate the factors involved. The detail will depend on the chosen flood event/s**.** The scale and extent of the event need description with an assessment of the factors that caused it. Floods usually have a variety of influencing factors such as precipitation intensity, topography of the drainage basin, soils, vegetation, land use and lack of human input. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses the flood event and the factors that caused it. Response has strong contextual understanding of the flood event. Examples used are appropriate and integrated effectively into the response. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. **Level 3 (8–11)** Response discusses the flood event and the factors that caused it but may be unbalanced. Description of the flood event may be lacking in detail and evaluation might be somewhat limited. 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 flood event but may not consider all the factors that caused it. 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 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 terms *latent heat transfer* and *albedo*.** Latent heat transfer**:** the heat transferred without a change of temperature (1) following a change of state, such as gas to a liquid or liquid to gas (1). Albedo: the percentage or equivalent of solar radiation (1) that is reflected back into space from a surface (1).	**4**
5(a)(ii)	**Briefly explain how convection causes precipitation.** Surface heating (1) leading to uplift of air (1), cooling (1) to condensation level causing precipitation (1). Any three for **3 marks**.	**3**
5(b)	**Explain the diurnal energy budget.** The diurnal budget includes both daytime and night time budgets. Description and explanation will be in terms of incoming short wave radiation, radiation absorption, latent heat transfer, sensible heat transfer and outgoing longwave radiation. The first two components will be missing at night time. 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 diurnal energy budget. Any diagram used will be accurate and detailed. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Any examples used are appropriate and integrated effectively into the response. **Level 2 (3–5)** Response describes and explains the diurnal energy budget but is unbalanced. Any diagrams used will cover the main elements but may lack detail. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response contains some understanding of the diurnal energy budget but is unbalanced. Any diagrams used will be rudimentary or inaccurate. 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)	**'Latitude is the most important factor in explaining seasonal variations in temperature.'** **With the aid of examples, how far do you agree?** Candidates are free to develop their own approach to the question and responses will vary depending on the approach chosen. Whichever approach is chosen, essays which address the question and support their argument with relevant examples will be credited. There may be detailed consideration of a case study/one or more examples, or a broadly conceived response, drawing on several examples to illustrate the factors involved. Latitude is clearly important because of the position and passage of the overhead sun between the tropics, but there are other influences such as land/sea distribution, altitude, wind systems and ocean currents. There needs to be an emphasis on seasonal variations and not just a comparison of temperatures at different latitudes. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses latitude and other factors that explain the seasonal variations in temperature. Response has good contextual understanding of the subject. Examples used are appropriate and integrated effectively into the response. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. **Level 3 (8–11)** Response discusses latitude and other factors that explain the seasonal variations in temperature 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 latitude and/or other factors that explain the seasonal variations in temperature. 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 latitude and/or factors that might explain the seasonal variations in temperature 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)	**Contrast the process of sheetwash with that of rainsplash.** Sheetwash is the movement of water over the ground surface in an unconcentrated form. Rainsplash is the detachment of soil particles by raindrops falling on a bare soil surface. On a slope this may lead to downslope movement, although rainsplash can go in any direction. **1 mark** for each simple point, **2 marks** for each developed point up to the maximum.	**4**
6(a)(ii)	**Briefly explain how ocean ridges are formed.** The spreading apart of an ocean plate (1), driven by convection currents (1), allowing magma to rise to the surface (1) where it cools and solidifies to form a ridge (1). Any three for **3 marks**.	**3**
6(b)	**Explain the main differences between the mass movement processes of flows and slides.** Flows are wet movements of usually fine material as a result of loss of cohesion with high pore water pressures. There is much internal deformation and faster flow at the surface. They are not moving over a recognisable slip plane. Slides generally move as a single mass, although they might break up during the movement. They move over a recognisable slip plane or shear surface which may have been lubricated by water. Explanation will also be in terms of the different types of material involved in the movements such as unconsolidated for flows and consolidated for slides. 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 main differences between flows and slides. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. Any examples used are appropriate and integrated effectively into the response. **Level 2 (3–5)** Response explains the main differences between both flows and slides but is unbalanced. Response develops on a largely secure base of knowledge and understanding. Examples may lack detail or development. **Level 1 (1–2)** Response contains some understanding of these types of mass movements but is unbalanced. Knowledge is basic and understanding may be inaccurate. Examples are in name only or lacking entirely. **Level 0 (0)** No creditable response.	**8**

Question	Answer	Marks
6(c)	**With the aid of examples, assess the view that each type of plate boundary has different associated tectonic landforms.** Candidates are free to develop their own approach to the question and responses will vary depending on the approach chosen. Whichever approach is chosen, essays which address the question and support their argument with relevant examples will be credited. There may be detailed consideration of a case study/one or more examples, or a broadly conceived response, drawing on several examples to illustrate the factors involved. The main types of plate boundaries, convergence, (e.g. destructive, collision), divergence, and conservative will need description with an explanation of the tectonic landforms associated with each boundary, such as volcanoes, ocean trenches, fold mountains, ocean ridges. It is the assemblage of landforms that needs analysis. Thus collision boundaries lead to fold mountains but no volcanoes. Destructive boundaries lead to volcanoes, ocean trenches and fold mountains. Diverging boundaries lead to volcanoes but not fold mountains. Conservative boundaries lead to no specific landforms. Award marks based on the quality of the response using the marking levels below. **Level 4 (12–15)** Response thoroughly discusses the different plate boundaries and with good assessment of the landforms associated with each. Response has strong contextual understanding of the set of landforms associated with each plate boundary. Examples used are appropriate and integrated effectively into the response. Response is well founded in detailed knowledge and strong conceptual understanding of the topic. **Level 3 (8–11)** Response discusses the different plate boundaries and examines the landforms associated with each with some assessment 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 different plate boundaries and examines the landforms associated with each but in a basic way with little assessment. 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 different plate boundaries with some account of the landforms associated with each 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**