
GEOGRAPHY

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Paper 1 Global Environments

May/June 2018

MARK SCHEME

Maximum Mark: 50

Published

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This document consists of **13** printed pages.

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.

Question	Answer	Marks
SECTION A		
Hot Arid and Semi-Arid Environments		
1(a)	Fig. 1 shows the global distribution of hot arid and semi-arid environments.	
1(a)(i)	<p>Identify the following: the hot arid areas marked <u>W</u> and <u>X</u> the semi-arid area marked <u>Y</u> the ocean current marked <u>Z</u>.</p> <p>W = Sahara Desert X = Atacama Desert Y = Sahel Z = Benguela Current</p>	4
1(a)(ii)	<p>Briefly explain the pattern of hot arid and semi-arid environments shown in Fig. 1.</p> <p>Responses should relate to the lines of latitude, and continental locations. Some naming is preferable with examples. Explanation should relate to the sub-tropical high pressure systems and some reference to local influences such as ocean currents. Clear explanations should be rewarded.</p>	6
1(b)(i)	<p>To what extent is weathering in hot arid and semi-arid areas dominated by physical processes?</p> <p>Indicative content:</p> <p>The processes of physical weathering, e.g. exfoliation. The results: i.e. flaking of superficial rock surfaces. The context of the extremes of temperature with some climatic data to produce exfoliation and possible freeze-thaw at night. These processes should be well developed and the effects illustrated. Chemical weathering should be discussed in relation to the water found in deserts at night, i.e. dew which may trigger a more rapid rate and/or facilitate freeze-thaw action. Salt weathering may be mentioned. Climatic parameters such as temperature range and rainfall variability and reliability should be mentioned along with water scarcity even after rainfall i.e. high evaporation rates to provide a full context to the question and for the answer. Other types of weathering may be mentioned such as honeycomb weathering etc.</p>	15

Question	Answer	Marks
1(b)(ii)	<p data-bbox="316 248 1209 315">Discuss the extent to which humans contribute to, and reap the consequences of, desertification.</p> <p data-bbox="316 349 563 383">Indicative Content:</p> <p data-bbox="316 421 1310 651">Definition of desertification as a process. A named area where the process is located should set the context. The contribution of human activities such as population increase, over-cultivation, over-grazing and resource use etc. to desertification. Physical processes such as climate change might form an important aspect of the evaluation. The consequences should be discussed, such as soil degradation, migration, innovation, and the physical feedback mechanisms which may exacerbate the problems.</p> <p data-bbox="316 689 1225 757">A balance of physical processes is needed, not just the role of human activities in cause and consequence for the top level answers.</p>	15

Question	Answer	Marks
Glacial and Periglacial Environments		
2(a)	Photograph A shows a cirque (corrie/cwm) in Snowdonia, North Wales.	
(a)(i)	<p>Identify and briefly describe the features labelled as E and F on Photograph A.</p> <p>E = weathered back wall and scree slope F = corrie lip</p>	4
2(a)(ii)	<p>Explain how these features have formed.</p> <p>The back wall is the result of frost shattering beneath the ice cap within the depression and then plucking of the shattered rock from the back wall as the ice rotates out of the increasingly deep depression. The scree slope is the natural angle of rest of the shattered material at the base of the corrie wall. The corrie lip results indirectly from the over-deepening of the corrie due to abrasion as the ice moves and rotates. The tool for the abrasion originates from the shattered rock from the back wall which becomes embedded within the base of the ice.</p>	6
2(b)(i)	<p>‘Permafrost plays a dominant role in producing landforms in a periglacial environment.’</p> <p>Discuss the validity of this statement</p> <p>Indicative content:</p> <p>Definition of permafrost. The consequences of ground ice in landform terms. Micro-landforms to the macro landforms of thermocast landscapes. To balance the argument there needs to be reference to mass movement, water action and weathering etc. Evaluations may suggest that landforms are not the result of a single process, but a number acting in conjunction. Some specific landforms should be named and illustrated to exemplify and reinforce the strength of the argument. Scale could be a key method of distinguishing efficacy of the processes.</p>	15
2(b)(iii)	<p>‘Glacial environments are environmentally fragile.’</p> <p>Discuss the implications of this statement for the management of glacial environments.</p> <p>Indicative content:</p> <p>Environmental fragility should be defined and described. Might include reference to both the physical and the human environments. E.g. traditional lifestyles like the Inuit or Saami, as well as ecosystems and landforms/landscapes.</p> <p>Implications of threats that compromise management issues.</p> <p>Scale may be indicated as a yardstick for evaluation as may climate change. The latter should appear as an integral part of the discussion.</p>	15

Question	Answer	Marks
Coastal Environments		
3(a)	Photograph B shows a section of beach on a coastline.	
3(a)(i)	<p>Describe the evidence in Photograph B that coastal protection strategies have been introduced in this section of coastline.</p> <p>Wooden revetments parallel to the sea and groynes at right angles protruding into the water. Some form of rock armour at the base of the cliff.</p>	4
3(a)(ii)	<p>Suggest how this section of coastline may be more effectively protected in the future.</p> <p>Mass movement and slumping of some type has taken place. This is the result of unconsolidated material which has become saturated by the rain or possibly sea and the internal strength has been reduced so that the mass of material has slipped or slumped. There may be evidence of rotational slip. Some form of cliff face protection would be appropriate.</p> <p>Drainage pipes to minimise water retention and rods to strengthen the cliff might have the desired effect by increasing the internal strength of the cliff material. Candidates may suggest replacing gabions or rock armour or a sea wall but it is the cliff face, not the foot, which needs the protection arguably. Any reinforcements are acceptable.</p>	6
3(b)(i)	<p>'Marine erosion is more significant than sub-aerial processes in the recession of cliffs.' Discuss the validity of this statement.</p> <p>Indicative Content:</p> <p>Context of the question: a cliff profile with some knowledge of recession.. The ways in which recession can take place (1) cliff foot: marine erosion by destructive waves, undermining the cliff forming a notch and then collapse of overlying cliff face. (2) Cliff face: sub-aerial processes of weathering and mass movement. Examples e.g. Holderness coastline. Processes like longshore drift exacerbate the processes by narrowing the beach buffer allowing enhanced cliff foot erosion. Evaluation may depend upon location and management strategies. The latter indicates responses which characterise the top level.</p>	15

Question	Answer	Marks
3(b)(iii)	<p>'Sand dunes contribute in a number of ways to the coastal environment but require careful management.' To what extent is this statement true?</p> <p>Indicative Content:</p> <p>Psammoseres are environmentally fragile ecosystems characterised by particular plant succession and plant assemblages. They have environmental value. They offer buffers to coastal erosion and tourism and leisure activities. They are threatened and require management. The strategies need development with discussion of management issues forming a significant part of the question in the context of these ecosystems. Better responses will include the role of climate change and other physical processes in potential environmental damage. Studland Bay or Braunton Burrows could be useful examples.</p>	15

Question	Answer	Marks
Section B		
Tropical Environments		
4(a)	Figs. 2A and 2B show nutrient cycling in a tropical rainforest ecosystem. Fig. 2A shows nutrient cycling before shifting cultivation and Fig. 2B shows changes to the nutrient cycle after clearance for shifting cultivation.	
4(a)(i)	<p>Using Figs. 2A and 2B, describe the changes in the stores and flows after clearance.</p> <p>Flows: Increase in fallout (temporary) and increase in decomposition and increase in uptake, although there is less biomass. The litter and soil stores increase too, but only by a small amount.</p>	4
4(a)(ii)	<p>Explain the reasons for the changes in the litter and soil stores before and after clearance shown in Figs. 2A and 2B.</p> <p>Litter store is small because of perennial nature of the leaf fall. Therefore small number of leaves all the time. Soil has few nutrients because of huge biomass, so uptake is constant and large. The perennial climate means these processes are taking place all the year round rather than seasonally. The litter increases because of the tree cutting and the soil store increases because, although the crops planted take up nutrients, a great amount of biomass has been added by felling and burning of the undergrowth (to produce potash as a nutrient). Crops are not as nutrient hungry as dense rainforest</p>	6
4(b)(i)	<p>To what extent is climate the only explanation for the global distribution of tropical rainforest environments?</p> <p>Indicative content:</p> <p>Climate data must be included (e.g. temperatures, range, variability, rainfall amounts, light levels, humidity, cloud amounts, evapotranspiration etc.) with figures to reinforce the general points. Perennial nature of the climate - this should be specifically related to the ecosystem and how there is an inextricable link between vegetation and climate. Location by latitude and continent - a simplified world map could reinforce the point. Knowledge based context before consideration of variations within. The syllabus mentions: tropical lowland evergreen forest, semi evergreen forest and montane forest; suggesting factors like altitude and drainage and soil may be important factors in producing sub climaxes. Equally human activities and climate change may be significant influences. Conclusion must include an evaluation of all the factors but it likely that it will be suggested that climate is the overwhelming factor in influencing global distribution.</p>	15

Question	Answer	Marks
4(b)(ii)	<p>Discuss the extent to which scale plays an important role in successful management of tropical rainforest environments.</p> <p>Indicative Content:</p> <p>Scale must be defined and itemised. Not all need extensive coverage but some awareness of a range linked to examples would be ideal.</p> <p>The fragility of these ecosystems must play a part in order to contextualise the question and answer. Also awareness of functioning is needed otherwise the answer may be more representative of a response to a question on a human geography paper.</p> <p>The conclusion should emerge from a strong argument for relative success at a particular scale, or be more balanced because of pros and cons of different schemes at different scales and their suitability for the environment chosen.</p>	15

Question	Answer	Marks
Temperate Environments		
5(a)	Figs. 3A and 3B show the above to below ground biomass ratios for two temperate environments.	
5(a)(i)	<p>Describe the differences in the above and below ground ratios shown in Figs. 3A and 3B.</p> <p>The temperate deciduous forest has a relatively lower below ground biomass to its above ground biomass whereas the grassland has a far higher below ground ratio. Figures must be quoted and some indication of interpretation is essential i.e. multiples or per cent difference.</p>	4
5(a)(ii)	<p>Explain the reasons for the differences you have described in <u>(a)(i)</u>.</p> <p>Trees produce more biomass than grasslands due to the wetter less extreme temperate environment. The litter is seasonally large and the humus in the soil the result of fairly rapid decomposition. Therefore the constant recycling means that the above to below ground ratios are not evenly balanced. Grasslands are more at the mercy of seasonal variations in temperature and rainfall. In the drier season there is little grass growth but rapid breakdown and a large litter layer means that most of the biomass is held beneath the surface. Climate is the key here and needs to be used as the explanation. Candidates need to show awareness of what humus and litter are.</p>	6
5(b)(i)	<p>With reference to temperate deciduous forest, discuss the extent to which climate influences its global distribution.</p> <p>Indicative Content:</p> <p>Depends upon the environment chosen. A simplified world map would be ideal with latitudinal bands and named areas. The climatic parameters need detailed itemisation; figures, seasonality etc. Water supply may be included in the event of seasonal water scarcity. The other factors are human intervention (which is significant), soil, altitude etc.</p> <p>The subject must be contextualised, i.e. located and described.</p> <p>The functioning of the ecosystem must be included and case studies used to illustrate general functioning principles.</p> <p>Air pollution, disease and water pollution threaten lowland habitats. Uncontrolled wild fires, urban development etc. afforestation, conversion to grassland overgrazing. There are a range of activities which may be discussed.</p> <p>Human activities and climate change should also be considered because they result in ecological change. Conclusion: confident evaluation of the factors which in the end may be location specific.</p>	15

Question	Answer	Marks
5(b)(ii)	<p data-bbox="316 248 1313 315">To what extent are heathland and moorland environments under threat from human activities?</p> <p data-bbox="316 349 555 383">Indicative content:</p> <p data-bbox="316 421 1241 488">Candidates will need to make some comments about these functioning ecosystems before explaining their response to human intervention.</p> <p data-bbox="316 521 1273 622">The heathland and moorland may involve a greater sense of the role of human intervention in the functioning ecosystem than other temperate ecosystems, but this may be true of most of the temperate environments.</p>	15

Question	Answer	Marks
The Atmospheric Environment		
6(a)	Fig. 4 shows some of the possible consequences of global warming in North America.	
6(a)(i)	<p>Describe the distribution of the possible consequences shown in Fig. 4</p> <p>Flooding to drought due to rising temperatures and then forest fires and increased ice melt at the extremities of the continents. Expansion of water in the oceans resulting in rising sea levels, especially on the Caribbean and eastern seaboard of North and Central America. Flooding in the major river basins such as the Missouri, Mississippi and the longest rivers in South America such as the Orinoco and Amazon. The Andes and the Rockies also see more ice melt on the mountain tops, altering the snow line. Forest fires induced by increased inflammation from higher temps and more drought e.g. Canada (spring 2016) and the Amazon basin in South America. The candidates need a range with some clearly located examples which include reference to Central, North and South America. Careful interpretation of the locational detail here with some interpretation is the key to a successful answer.</p>	4
6(a)(ii)	<p>Explain how these consequences may be linked to changes in the composition of the atmosphere</p> <p>Rising temperatures: result of an increase in the amounts of greenhouse gases. Examples of greenhouse gases and how they increase the temperature by absorbing outgoing long wave radiation at night. A well labelled diagram could enhance the answer.</p>	6
6(b)(i)	<p>‘A new predictive study for future monsoon failure in Asia suggests that full season failure will become more likely in the next 200 years.’</p> <p>Discuss the implications of this forecast.</p> <p>Candidates will need to describe a monsoon season with the onset of the rains and the dependency of the economy and lives of those who live in monsoon climates. Location is important and the physical background is crucial to this answer. There does not need to be great detail about the reasons for the season though. However, it is thought that there is a link to climate change therefore there will be some speculation. The main thrust of is how the people of Asia utilise the rains which create both opportunities and constraints. These should be outlined and discussed for a higher level response.</p>	15

Question	Answer	Marks
6(b)(ii)	<p>To what extent does the weather in a cool temperate western maritime climate impact upon commercial spending patterns and upon leisure and tourism?</p> <p>Short-term variations, unpredictability and reliability are all important. What is the key to a good answer here is relationship of commercial spending and leisure and tourism to the climate. Responses need to be predominantly about physical geography and the atmospheric environment. Some accounting for weather extremes, which may be used to illustrate the points, need to focus a little on the reasons for these extremes. E.g. heatwaves to El Nino events and or climate change. Response of fashion and food consumption to unseasonal wet and cold, result of the position of the jet stream too far south and it drags down unseasonably cold air from the Arctic in the winter to the south and too far north it can drag in continental and north African air in the summer to produce drought and heatwaves. Fashion and food supplies are notoriously long on response times. Consumers do not tend to buy holidays to destinations, go out for the day nor buy clothes if the weather is unseasonable. Vulnerable ageing populations are more likely to die from extreme heat and or cold. Crop yields affect retail prices. Attendance at outdoor events may not be affected these days because of all-weather football pitches, glass roofs at Wimbledon etc. Climate figures should be quoted and reasons for these vagaries are needed to reinforce the physical Geography underpinning to this answer.</p>	15