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Paper 1 Living with the Physical Environment

Mark scheme

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Section A – The challenge of natural hazards**Question 1**

Qu	Part	Marking guidance	Total marks
01	1	What is meant by a natural hazard? • A natural hazard endangers people's lives (1) and their property. (1) • It has social/economic effects on people. (1) • It occurs due to environmental factors (1) and is beyond the control of people. (1) No credit for naming examples. 2 × 1 mark per basic point. 1 + 1 mark for a developed point.	2 marks AO1=2

Qu	Part	Marking guidance	Total marks
01	2	Which of the following is an example of a natural hazard? B Earthquake	1 mark AO1=1

Qu	Part	Marking guidance	Total marks
01	3	State two facts about the global distribution of earthquakes shown in Figure 1. Any valid fact that is apparent from Figure 1. Facts are likely to include the following: • they mainly occur at plate margins (1) • they occur in lines (1) • they are usually in clusters (1) • there is a lot on the edge of the Pacific Ocean (1) • there are some away from plate margins as in East Africa. (1)	2 marks AO4=2

Qu	Part	Marking guidance	Total marks
01	4	Calculate the straight line distance between volcanoes A and B in Figure 2. 180–220 km	1 mark AO4=1

Qu	Part	Marking guidance	Total marks									
01	5	Suggest why earthquakes and volcanoes occur in Iceland. Use Figure 2 and your own understanding. <table><tr><td>Level 2 (Clear)</td><td>3–4 marks</td><td>Explanation of why earthquakes and volcanoes occur at constructive plate margins is clear and sequential, with reference to specific processes. There may be clear imbalance between the two hazards but there should be some reference to both.</td></tr><tr><td>Level 1 (Basic)</td><td>1–2 marks</td><td>Explanation of why earthquakes and/or volcanoes occur at constructive plate margins is simple and partial. Order is likely to be random. There may be reference to processes.</td></tr><tr><td></td><td>0</td><td>No relevant content.</td></tr></table> Indicative content At constructive plate margins, the plates are moving apart. This is due to the presence of convection currents in the mantle on which the plates float and is also linked to ridge push and slab pull. The movement leads to magma coming to the surface and causes volcanoes to form. The pressure exerted by the upwelling magma can lead to earthquakes. These can also occur due to the plate movement itself which causes pressure and cracks/faults to occur in the crust and the movement then triggers an earthquake.	Level 2 (Clear)	3–4 marks	Explanation of why earthquakes and volcanoes occur at constructive plate margins is clear and sequential, with reference to specific processes. There may be clear imbalance between the two hazards but there should be some reference to both.	Level 1 (Basic)	1–2 marks	Explanation of why earthquakes and/or volcanoes occur at constructive plate margins is simple and partial. Order is likely to be random. There may be reference to processes.		0	No relevant content.	4 marks AO2=2 AO3=2
Level 2 (Clear)	3–4 marks	Explanation of why earthquakes and volcanoes occur at constructive plate margins is clear and sequential, with reference to specific processes. There may be clear imbalance between the two hazards but there should be some reference to both.										
Level 1 (Basic)	1–2 marks	Explanation of why earthquakes and/or volcanoes occur at constructive plate margins is simple and partial. Order is likely to be random. There may be reference to processes.										
	0	No relevant content.										

Qu	Part	Marking guidance			Total marks
01	6	Assess the effectiveness of protection and planning in reducing risks from earthquakes and/or volcanoes.			6 marks AO2=3 AO3=3
		Level 3 (Detailed)	5–6 marks	Specific, detailed understanding of how protection and planning can reduce risks from earthquakes and/or volcanoes. Statements are developed and linked, logically ordered, linking the strategies to the reduction of the risk from the hazards. There is explicit assessment of the effectiveness of the strategies.	
		Level 2 (Clear)	3–4 marks	Some specific understanding of how protection and/or planning can reduce risks from earthquakes and/or volcanoes. Some statements are developed and linked, with linking at least one strategy to the reduction of the risk from the hazards. Begins to assess the effectiveness of at least one strategy.	
		Level 1 (Basic)	1–2 marks	Simple, separate statements with reference to protection and/or planning. Separate reference to the nature of the risks. There may be some simple, unsupported assessment. Order may be random.	
			0	No relevant content.	
		Indicative content			
Protection involves action taken to safeguard the population before the earthquake/volcanic eruption and includes constructing earthquake-proof buildings and infrastructure or taking action during an event such as diverting lava. Features of an earthquake-proof building include having shock absorbers between the foundations and the building as well as reinforced foundations which reduce the risk of collapse and trapping occupants; having shutters that come down over windows to reduce the risk of injury from broken/falling glass; using fire-resistant materials to reduce the scale or occurrence of fire. These measures are relatively successful although it depends on the severity of the earthquake. For volcanoes, the protection technology is different as buildings cannot be constructed to withstand lava or ash flows and lahars. Therefore, lava can sometimes be diverted from settlements by blasting out channels or creating embankments. Such measures are less effective and less widespread than the protection measures for earthquakes.					

		Planning also involves actions taken prior to earthquake/volcanic eruption. For both hazards, this may involve educating the population so that they know what to do in the event of an earthquake or volcanic eruption. Earthquake drills are often carried out linked to essential supplies, getting out of buildings, turning off gas with emergency services rehearsing events. These save time and subsequently lives as people know what to do. They vary in their effectiveness depending on the nature of the country where the earthquake or volcanic eruption has occurred – generally being more effective in richer countries. Evacuation is effective with volcanic eruptions as there is often time to get people away from the danger areas reducing loss of life and injury. Planning can also mean avoiding building on areas at risk from earthquakes, especially key buildings like hospitals, and therefore removing people from high risk areas. This is an effective way but can be too late if hazard maps indicate that there is a high risk in areas already built on.	
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Qu	Part	Marking guidance	Total marks
01	7	Identify two features of Cyclone Idai shown in Figure 3. • Cyclone Idai is roughly circular in shape. (1) • An eye can be seen in the centre. (1) • The eye is not as obvious as it is with some tropical storms. (1) • There is dense cloud around this. (1) • Cloud is being pulled in especially to the south. (1) • The shape of this suggests it is spinning in a clockwise movement. (1) • It is very large (1) • It covers a section of the Mozambique Channel/the northern half of Madagascar/is about 800km west-east through the eye. (1)	2 marks AO4=2

Qu	Part	Marking guidance	Total marks
01	8	Calculate the proportion of the total aid raised (US \$40.4 million) that was spent in Beira. Total spent in Beira is US \$20.2 million which is half/50% of the total of the appeal of US \$40.4 million. (1)	1 mark AO4=1

Qu	Part	Marking guidance	Total marks
01	9	In Mozambique, Cyclone Idai caused 6000 cases of cholera from which eight people died. Calculate the ratio of people dying to the total number of cholera cases. Show your working. Of 6000 cases, only 8 died. $6000 \div 8 = 750$ (1) and then write as a ratio of 1:750. (1)	2 marks AO4=2

Qu	Part	Marking guidance			Total marks																
01	10	‘The secondary effects of tropical storms are more severe than the primary effects.’ Do you agree? Use Figure 4 and a named example to justify your answer. <table><tr><td>Level 3 (Detailed)</td><td>7–9 marks</td><td colspan="2">Specific, detailed understanding of the primary and secondary effects of tropical storms. Statements are developed and linked, with detailed reference to a named example and Figure 4. There is a clear explicit view which is effectively justified.</td></tr><tr><td>Level 2 (Clear)</td><td>4–6 marks</td><td colspan="2">Some specific understanding of the primary and secondary effects of tropical storms. Some statements are developed and linked, with reference to a named example and/or Figure 4. There is a clear view which has some justification.</td></tr><tr><td>Level 1 (Basic)</td><td>1–3 marks</td><td colspan="2">Simple, separate statements describing the primary and/or secondary effects of tropical storms. Simple statements with reference to a named example and/or Figure 4. View may change throughout with little/no support. Order may be random.</td></tr><tr><td></td><td>0</td><td colspan="2">No relevant content.</td></tr></table>			Level 3 (Detailed)	7–9 marks	Specific, detailed understanding of the primary and secondary effects of tropical storms. Statements are developed and linked, with detailed reference to a named example and Figure 4. There is a clear explicit view which is effectively justified.		Level 2 (Clear)	4–6 marks	Some specific understanding of the primary and secondary effects of tropical storms. Some statements are developed and linked, with reference to a named example and/or Figure 4. There is a clear view which has some justification.		Level 1 (Basic)	1–3 marks	Simple, separate statements describing the primary and/or secondary effects of tropical storms. Simple statements with reference to a named example and/or Figure 4. View may change throughout with little/no support. Order may be random.			0	No relevant content.		9 marks AO1=3 AO2=3 AO3=3
Level 3 (Detailed)	7–9 marks	Specific, detailed understanding of the primary and secondary effects of tropical storms. Statements are developed and linked, with detailed reference to a named example and Figure 4. There is a clear explicit view which is effectively justified.																			
Level 2 (Clear)	4–6 marks	Some specific understanding of the primary and secondary effects of tropical storms. Some statements are developed and linked, with reference to a named example and/or Figure 4. There is a clear view which has some justification.																			
Level 1 (Basic)	1–3 marks	Simple, separate statements describing the primary and/or secondary effects of tropical storms. Simple statements with reference to a named example and/or Figure 4. View may change throughout with little/no support. Order may be random.																			
	0	No relevant content.																			
Indicative content The question commands are ‘do you agree’ and ‘justify’. Candidates can agree, partly agree or disagree, or suggest that both are equal in their impact. The justification that follows should reflect the decision made. This should be supported by an example and information from Figure 4. The decision will depend upon the candidate’s interpretation of Figure 4 but also the example used. The top image in Figure 4 shows extensive flooding as a primary effect (those that occur as a direct result of the tropical storm and immediately) – likely covering farmland and some ‘buildings’ – some structures have been damaged. In Typhoon Haiyan, as here there was much flooding and strong winds also had a significant impact on power, crops and destroying 30 000 fishing boats. 6300 people died due to the storm surge, 40 000 homes were damaged or destroyed, including 90% of Tacloban.																					

		The lower image shows a series of tents (secondary effect as these are the result of the primary effects and occur subsequently) – used to provide shelter for people displaced and made homeless by the storm and shows a reliance on aid. In Typhoon Haiyan, 14 million people were affected; there were water and food shortages as was likely to be the case in Figure 4. The lack of clean water led to the spread of disease. Power supplies were lost for a month; landslides blocked roads hampering aid getting through. There may be comment regarding the differences in the numbers affected; the time scale involved.	
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Section B – The living world**Question 2**

Qu	Part	Marking guidance	Total marks
02	1	Identify a source of food for frogs in the food web shown in Figure 5. Grasshoppers	1 mark AO4=1

Qu	Part	Marking guidance	Total marks
02	2	Which producer is eaten by all primary consumers in the food web shown in Figure 5? Banana trees	1 mark AO4=1

Qu	Part	Marking guidance	Total marks
02	3	Give one role of decomposers in an ecosystem. - Decomposers break down organic matter/plants/animals. (1) - They return nutrients to the soil. (1)	1 mark AO1=1

Qu	Part	Marking guidance	Total marks
02	4	‘Tropical rainforests have a high level of biodiversity.’ Use Table 2 to justify this statement. - There are higher numbers of all categories in tropical rainforest. (1) - Tropical rainforests have about 42%/200 more mammals than temperate forests. (1) - About 80%/700 more birds. (1) - Just over double/380 more reptiles and 50%/10 000 more plants. (1) - In total, there are 33020 different species in tropical rainforest and 21716 in temperate forest. (1) - This is a difference of 11304/52% more in tropical rainforest. (1) There must be specific reference to Table 2 in a comparative context for credit.	2 marks AO3=2

Qu	Part	Marking guidance	Total marks
02	5	Outline one reason why the biodiversity in tropical rainforests is being reduced. - Any valid reason including deforestation (1) and its impact. (1) Or - Reasons for deforestation, such as logging, subsistence farming, commercial farming, road building, mining, settlements, population pressure (1 mark per reason) and its impact. (1) There must be reference to the impact with regard to loss of habitat, effects on food chain/web, change in humidity, soil conditions for the second mark. 1 mark for a basic point. 1 + 1 mark for a developed point.	2 marks AO1=2

Qu	Part	Marking guidance	Total marks									
02	6	Explain the physical characteristics of the tropical rainforest. Use Figure 6 and your own understanding. <table><tr><td>Level 2 (Clear)</td><td>3–4 marks</td><td>Two or more vegetation characteristics shown in Figure 6 are accurately recognised. Explanation is clear linking and sequential relating to specific features.</td></tr><tr><td>Level 1 (Basic)</td><td>1–2 marks</td><td>One or more vegetation characteristics shown in Figure 6 is/are recognised. Explanation is partial with simple, separate statements.</td></tr><tr><td></td><td>0</td><td>No relevant content.</td></tr></table> Indicative content Figure 6 shows the rainforest canopy and the presence of emergents. The trunks are tall and thin, often lacking in leaves until near the top of the tree. They seem to be smooth. The tallest trees, the emergent and the canopy layer, are the strongest and have grown tall in search of sunlight for photosynthesis. This is the reason for the lack of leaves lower down – the limited amount of sunlight. The trees do not need thick bark on their trunks as the temperatures are high and the smoothness allows the large amounts of rainfall to run off easily. May explain mist/low cloud visible above the trees linked to the evapotranspiration process.	Level 2 (Clear)	3–4 marks	Two or more vegetation characteristics shown in Figure 6 are accurately recognised. Explanation is clear linking and sequential relating to specific features.	Level 1 (Basic)	1–2 marks	One or more vegetation characteristics shown in Figure 6 is/are recognised. Explanation is partial with simple, separate statements.		0	No relevant content.	4 marks AO2=2 AO3=2
Level 2 (Clear)	3–4 marks	Two or more vegetation characteristics shown in Figure 6 are accurately recognised. Explanation is clear linking and sequential relating to specific features.										
Level 1 (Basic)	1–2 marks	One or more vegetation characteristics shown in Figure 6 is/are recognised. Explanation is partial with simple, separate statements.										
	0	No relevant content.										

Qu	Part	Marking guidance			Total marks
02	7	Assess the extent to which people are the main cause of desertification.			9 marks AO1=3 AO2=3 AO3=3
		Use example(s) to support your answer.			
		Level 3 (Detailed)	7–9 marks	Statements are developed and linked, and logically ordered with specific reference to two or more causes of desertification. There is specific reference to example(s) to illustrate causes. There is explicit assessment of the extent to which people are the main cause of desertification, with comments likely to be present throughout the answer.	
		Level 2 (Clear)	4–6 marks	Some statements are developed and linked, with reference to two or more causes of desertification. There is some reference to example(s). There is some, possibly implicit, assessment of the extent to which people are the main cause of desertification.	
		Level 1 (Basic)	1–3 marks	Simple, separate statements, possibly in a random order with reference to one or more causes of desertification. There may be mention of example(s) but answer is likely to be generic. There may be a basic assessment of the extent to which people are the main cause of desertification.	
			0	No relevant content.	
Indicative content					
References can be made to climate change, population growth, removal of fuelwood, overgrazing, over-cultivation and soil erosion as causes of desertification. All but climate change are linked to people and climate change is also partly linked to people but with natural elements also.					
The response should consider two or more causes, explain the sequence of how the cause leads to desertification and assess the role of people per cause and overall. There may be a recognition of population pressure being responsible for many of the other causes; the interlinks between the causes and the similar sequence that ensues. The likely assessment is to indicate the high level of contribution people make to causes, perhaps tempered by natural aspects of climate change and reduced rainfall or prevalence of droughts if this is one of the causes considered.					

		Thus, for removal of fuelwood, responses are likely to indicate that an increasing population leads to an increase in demand for wood for cooking. This means more shrubs/trees need to be chopped down and so the vegetation is lost; there is less interception and the rain hits the ground directly when it falls. This, together with the loss of roots, means that the soil is washed away and so new vegetation cannot grow leading to desertification ie the areas that were formerly not desert become desert. The Badia, for example, can be used to illustrate the natural environment with temperatures in excess of 40 °C and minimal precipitation of 150 mm which makes this area vulnerable to desertification. The addition of many sheep from neighbouring Iraq following the 1991 Gulf War led to overgrazing as previously sustainable levels maintained by the nomadic Bedouin people were exceeded causing a loss of vegetation, soil erosion and people, who were the cause, moving away.	
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Section C – Physical landscapes
Coastal landscapes

Question 3

Qu	Part	Marking guidance	Total marks
03	1	Outline the process of attrition. Attrition occurs when material being carried by the waves (1) hits other material being carried (1) and so becomes smaller/more rounded in shape. (1) 2 × 1 mark	2 marks AO1=2

Qu	Part	Marking guidance	Total marks
03	2	Suggest how differences in rock type are likely to affect coastal landforms in the area shown in Figure 7. - The areas of hard rock will be more resistant to erosion than the areas of soft rock (1). - Therefore, these will not retreat as fast as the soft rock areas. (1) - As a result, the coast will become indented. (1) - The areas of hard rock will form headlands/stick out into the sea (1) - while the areas of soft rock will form bays. (1) 2 × 1 mark	2 marks AO3=2

Qu	Part	Marking guidance	Total marks
03	3	Calculate the range in height of the sand dunes. 8.4–0.5, so 7.9 m	1 mark AO4=1

Qu	Part	Marking guidance	Total marks									
03	4	Explain how the sand dunes are shaped by deposition. Use Figure 8 and your own understanding. <table><tr><td>Level 2 (Clear)</td><td>3–4 marks</td><td>More complete explanation that addresses most aspects of sequence and specific processes of sand dune formation. Statements are developed, linked and usually logically ordered.</td></tr><tr><td>Level 1 (Basic)</td><td>1–2 marks</td><td>Partial explanation focusing on either sequence or process of sand dune formation. Simple, separate statements, possibly in a random order.</td></tr><tr><td></td><td>0</td><td>No relevant content.</td></tr></table> Indicative content Figure 8 shows an extensive area of sand deposition with vegetation visible in the area next to the sea and larger dunes with a ridge inland. A large amount of sand on a beach is essential for dunes to form as this is the supply of the sediment. The sand collects around obstacles that are present near the beach such as pebbles or wood. As it is held for a while, vegetation such as marram grass begins to grow which holds the sand in place as it has long and extensive roots. Reference to the wind losing energy and therefore depositing material may be the starting point. The wind must blow from sea to land to transport the sand inland and over time as distance from the sea increases the height of the dunes increases from embryo to fore to the main ridge, and vegetation also increases further stabilising the system.	Level 2 (Clear)	3–4 marks	More complete explanation that addresses most aspects of sequence and specific processes of sand dune formation. Statements are developed, linked and usually logically ordered.	Level 1 (Basic)	1–2 marks	Partial explanation focusing on either sequence or process of sand dune formation. Simple, separate statements, possibly in a random order.		0	No relevant content.	4 marks AO1=2 AO2=2
Level 2 (Clear)	3–4 marks	More complete explanation that addresses most aspects of sequence and specific processes of sand dune formation. Statements are developed, linked and usually logically ordered.										
Level 1 (Basic)	1–2 marks	Partial explanation focusing on either sequence or process of sand dune formation. Simple, separate statements, possibly in a random order.										
	0	No relevant content.										

Qu	Part	Marking guidance			Total marks
03	5	To what extent do the costs of managed retreat outweigh the benefits as a strategy to protect the coastline?			6 marks AO2=3 AO3=3
		Level 3 (Detailed)	5–6 marks	An awareness of the costs and the benefits of managed retreat as a strategy for protecting the coastline. Detailed, developed and linked statements, logically ordered. There is clear and supported assessment as to what extent costs outweigh the benefits.	
		Level 2 (Clear)	3–4 marks	Some awareness of the costs and/or the benefits of managed retreat as a strategy for protecting the coastline. Some linked statements usually logically ordered. There is an assessment as to what extent costs outweigh the benefits with some support.	
		Level 1 (Basic)	1–2 marks	Simple statements of the costs and/or the benefits of managed retreat as a strategy for protecting the coastline. Simple, separate statements possibly in a random order. Simple assessment statements if present.	
			0	No relevant content.	
Indicative content					
The command is ‘to what extent’ so there should be an assessment as to what extent costs outweigh benefits of managed retreat. The assessment should reflect the content of the answer and be supported by it. Managed retreat is a strategy that involves no specific action to be taken but rather is the result of a conscious decision to allow certain areas of the coast to flood. Such areas are seen as areas of low value – such as farmland – which can be sacrificed to protect other areas of the coast which have higher value land uses such as housing or industry. It is seen as a type of soft engineering as natural processes occur – but no specific action is taken to offset erosion and flooding. This has the impact of changing the shape of the coast – coastal realignment. Costs include the loss of land – whether it be farmland, recreational land or areas that may have housed valuable coastal habitats – such as wetlands to be flooded with salt water. Thus land and fresh water habitats are lost. Some people’s homes will be sacrificed as will a limited number of businesses. Thus, the shape of the coastline will change as the sea moves further inland in parts that are identified.					

		Benefits link to the relatively low cost of this strategy – as no action is directly needed in contrast to other strategies such as building sea walls (although can be taken to protect areas behind the designated area that is allowed to flood at times); it can lead to the creation of new saltmarsh habitats allowing new plant and animal species to be present; sacrificing areas of low value should lead to the protection of the more valuable areas of the coast which have cities, houses and businesses within them. It is more sustainable than many other strategies in the context of limited maintenance, low costs and relatively limited impact on the natural environment. Rising sea levels are likely to see this strategy increase in significance due to the increasing challenges created.	
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Section D – Physical landscapes

Hot desert landscapes or River landscapes

Question 4 – Hot desert landscapes

Qu	Part	Marking guidance	Total marks
04	1	State the difference between saltation and suspension as water transportation processes in hot desert areas. • Saltation is the hopping movement (1) of particles of sand for example on the bed of a stream. (1) • Suspension is where very small particles – of clay/silt for example (1) are carried within the water itself. (1) There must be reference to both processes in order to make the difference clear. Maximum 1 mark for reference to one process only.	2 marks AO1=2

Qu	Part	Marking guidance	Total marks
04	2	Complete the partly drawn sketch of the landform shown in Figure 9 and add labels to identify two features of this landform. 1 mark for completing the missing right hand part of the sketch so that it is recognisable. (1) The labels must have an arrow to connect the label to the specific part of the landform being written about. Any label that describes what is visible with regard to the landform is acceptable. Labels may include outcrop of rock; overhanging parts at the top; different colours of the rock; mainly bare rock; surface is pitted in places; surface is smooth in others. Marks are for describing what is visible. 2 × 1 mark per label.	3 marks AO4=3

Qu	Part	Marking guidance	Total marks									
04	3	Explain the role of the wind in the formation of the landform shown in Figure 9. Use Figure 9 and your own understanding. <table><tr><td>Level 2 (Clear)</td><td>3–4 marks</td><td>More complete explanation that addresses aspects of sequence and process in the formation of zeugen, the landform in Figure 9, with the role of the wind clearly addressed. Developed and linked statements, logically ordered.</td></tr><tr><td>Level 1 (Basic)</td><td>1–2 marks</td><td>Partial explanation focusing on either sequence or process in the formation of zeugen, the landform in Figure 9, with some possible reference to the role of the wind. Simple, separate statements possibly in a random order.</td></tr><tr><td></td><td>0</td><td>No relevant content.</td></tr></table> Indicative content Zeugen are formed where there are different layers of rock which are placed on top of each other, so layers are horizontal. The upper layers are more resistant than the lower layers which can result in the top heavy appearance of the landform. Figure 9 clearly shows the different types of rocks by the contrasting colours of them – the darker rock is the cap rock and is harder to erode. The wind carries material that erodes the lower softer rock by abrasion when it hits the area near the surface – especially the first metre off the ground. This undercuts the harder cap rock. Wind does have a very significant role to play in the formation of zeugen but there are other contributors also – such as in the form of water. Moisture present as dew is likely to weaken the rock and also variation in temperature will weather the rock; water when present after rainfall can also contribute to erosion.	Level 2 (Clear)	3–4 marks	More complete explanation that addresses aspects of sequence and process in the formation of zeugen, the landform in Figure 9, with the role of the wind clearly addressed. Developed and linked statements, logically ordered.	Level 1 (Basic)	1–2 marks	Partial explanation focusing on either sequence or process in the formation of zeugen, the landform in Figure 9, with some possible reference to the role of the wind. Simple, separate statements possibly in a random order.		0	No relevant content.	4 marks AO2=2 AO3=2
Level 2 (Clear)	3–4 marks	More complete explanation that addresses aspects of sequence and process in the formation of zeugen, the landform in Figure 9, with the role of the wind clearly addressed. Developed and linked statements, logically ordered.										
Level 1 (Basic)	1–2 marks	Partial explanation focusing on either sequence or process in the formation of zeugen, the landform in Figure 9, with some possible reference to the role of the wind. Simple, separate statements possibly in a random order.										
	0	No relevant content.										

Qu	Part	Marking guidance			Total marks																
04	4	‘Limited water supply and inaccessibility create challenges for the development of hot desert areas.’ To what extent do you agree with this statement? <table><tr><td>Level 3 (Detailed)</td><td>5–6 marks</td><td colspan="2">Detailed, developed and linked statements, logically ordered which show an awareness of the challenges resulting from limited water supply and inaccessibility in the development of hot desert areas. There is explicit assessment which is supported – there may be reference to a specific example and issues could be considered in the assessment. Developed and linked statements, logically ordered.</td></tr><tr><td>Level 2 (Clear)</td><td>3–4 marks</td><td colspan="2">Clear, linked statements which show some awareness of the challenges resulting from limited water supply and/or inaccessibility in the development of hot desert areas. There is some (implied) assessment of ‘to what extent’. There are some developed and linked statements, usually logically ordered.</td></tr><tr><td>Level 1 (Basic)</td><td>1–2 marks</td><td colspan="2">Simple, separate and random points relating to the challenges resulting from limited water supply and/or inaccessibility in developing hot desert areas. There may be some simple assessment statements.</td></tr><tr><td></td><td>0</td><td colspan="2">No relevant content.</td></tr></table>			Level 3 (Detailed)	5–6 marks	Detailed, developed and linked statements, logically ordered which show an awareness of the challenges resulting from limited water supply and inaccessibility in the development of hot desert areas. There is explicit assessment which is supported – there may be reference to a specific example and issues could be considered in the assessment. Developed and linked statements, logically ordered.		Level 2 (Clear)	3–4 marks	Clear, linked statements which show some awareness of the challenges resulting from limited water supply and/or inaccessibility in the development of hot desert areas. There is some (implied) assessment of ‘to what extent’. There are some developed and linked statements, usually logically ordered.		Level 1 (Basic)	1–2 marks	Simple, separate and random points relating to the challenges resulting from limited water supply and/or inaccessibility in developing hot desert areas. There may be some simple assessment statements.			0	No relevant content.		6 marks AO2=3 AO3=3
Level 3 (Detailed)	5–6 marks	Detailed, developed and linked statements, logically ordered which show an awareness of the challenges resulting from limited water supply and inaccessibility in the development of hot desert areas. There is explicit assessment which is supported – there may be reference to a specific example and issues could be considered in the assessment. Developed and linked statements, logically ordered.																			
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Level 1 (Basic)	1–2 marks	Simple, separate and random points relating to the challenges resulting from limited water supply and/or inaccessibility in developing hot desert areas. There may be some simple assessment statements.																			
	0	No relevant content.																			
Indicative content The command is ‘to what extent’ so there must be an assessment of the extent to which limited water supply and inaccessibility create challenges for the development of hot desert areas. Evaluation is critical for the higher levels. Water supply is essential for development – in the wellbeing of the population and to enable the growth of crops/rear livestock, process minerals and allow tourism. Limited access to water in terms of both quantity and quality will hinder attempts to develop hot desert areas. The lack of rainfall and high evaporation rates in areas like the Thar limit development unless there are alternative supplies via water storage and transfer. This happens with the Indira Gandhi Canal which transforms certain areas around Jodhpur and Jaisalmer, two main cities, and enables commercial growing of crops like wheat and cotton.																					

		Thus, where water is not present there is a very limited ability to develop areas – this is transformed when water is available. Accessibility is another key factor needed for development – the lack of this is a further critical disadvantage. The weather/climate with temperatures high enough to melt tarmac; torrential rain which can take out roads and the presence of sand blowing on the roads due to the wind make access in many areas of the Thar Desert a real challenge. Traditional means of transport by camel and buses packed to bursting inside and people on roofs will not encourage development but will hinder it.	
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Question 5 – River landscapes

Qu	Part	Marking guidance	Total marks
05	1	State the difference between saltation and suspension as river transportation processes. • Saltation is the hopping movement (1) of particles of sand for example on the bed of a stream. (1) • Suspension is where very small particles – of clay/silt for example (1) are carried within the river itself. (1) There must be reference to both processes in order to make the difference clear. Maximum 1 mark for reference to one process only.	2 marks AO1=2

Qu	Part	Marking guidance	Total marks
05	2	Complete the partly drawn sketch of the landform shown in Figure 10 and add labels to identify two features of this landform. One mark for completing the missing right hand part of the sketch so that it is recognisable. (1) The labels must have an arrow to connect the label to the specific part of the landform being written about. Any label that describes what is visible with regard to the landform is acceptable. Labels may include winding (river channel); fairly steep valley sides; V-shaped valley; bits of land sticking out into the river/interlocking spurs. Marks are for describing what is visible. 2 × 1 mark per label.	3 marks AO4=3

Qu	Part	Marking guidance	Total marks									
05	3	Explain the role of erosion in the formation of the landform shown in Figure 10. Use Figure 10 and your own understanding. <table><tr><td>Level 2 (Clear)</td><td>3–4 marks</td><td>More complete explanation that addresses aspects of sequence and process in the formation of V-shaped valley/interlocking spurs, the landform in Figure 10, with the role of erosion clearly addressed. Developed and linked statements, logically ordered.</td></tr><tr><td>Level 1 (Basic)</td><td>1–2 marks</td><td>Partial explanation focusing on either sequence or process in the formation of V-shaped valley/interlocking spurs, the landform in Figure 10 with some possible reference to the role of erosion. Simple, separate statements possibly in a random order.</td></tr><tr><td></td><td>0</td><td>No relevant content.</td></tr></table> Indicative content V-shaped river valleys are formed in the upper course of the river where it is actively cutting down to get a smooth long profile. Erosion actively deepens the bed of the river and is the result of processes such as abrasion and hydraulic action. The fingers of land that jut out from either side of the V-shaped valley are interlocking spurs. These are the result of erosion but also of some differences in rock type or structure where these pieces of land may be harder to erode and the stream near the source does not have enough water/energy to be able to erode through them. Thus the stream winds its way around them. The valley sides would be very steep if they were just due to vertical erosion but these are weathered and so some material is loosened and falls down the sides to make them less steep. Erosion does have a very significant role to play in the formation of V-shaped valleys/interlocking spurs but there are other contributors also such as weathering, movement downslope and differences in the rock.	Level 2 (Clear)	3–4 marks	More complete explanation that addresses aspects of sequence and process in the formation of V-shaped valley/interlocking spurs, the landform in Figure 10, with the role of erosion clearly addressed. Developed and linked statements, logically ordered.	Level 1 (Basic)	1–2 marks	Partial explanation focusing on either sequence or process in the formation of V-shaped valley/interlocking spurs, the landform in Figure 10 with some possible reference to the role of erosion. Simple, separate statements possibly in a random order.		0	No relevant content.	4 marks AO2=2 AO3=2
Level 2 (Clear)	3–4 marks	More complete explanation that addresses aspects of sequence and process in the formation of V-shaped valley/interlocking spurs, the landform in Figure 10, with the role of erosion clearly addressed. Developed and linked statements, logically ordered.										
Level 1 (Basic)	1–2 marks	Partial explanation focusing on either sequence or process in the formation of V-shaped valley/interlocking spurs, the landform in Figure 10 with some possible reference to the role of erosion. Simple, separate statements possibly in a random order.										
	0	No relevant content.										

Qu	Part	Marking guidance			Total marks
05	4	‘The benefits of hard engineering as a river management strategy are greater than the costs.’			
		To what extent do you agree with this statement?			
		Level 3 (Detailed)	5–6 marks	Detailed, developed and linked statements, logically ordered which show an awareness of the benefits and costs of hard engineering as a river management strategy. There is explicit assessment which is supported – there may be reference to a specific hard engineering strategy or an example. Developed and linked statements, logically ordered.	
		Level 2 (Clear)	3–4 marks	Clear, linked statements which show some awareness of the benefits and/or costs of hard engineering as a river management strategy. There is some (implied) assessment which some support – perhaps reference to a specific hard engineering strategy or an example. There are some developed and linked statements, usually logically ordered.	
		Level 1 (Basic)	1–2 marks	Simple, separate and random points relating to benefits and/or costs of hard engineering as a river management strategy. There may be some simple assessment statements. Information is generic.	
			0	No relevant content.	
Indicative content					
The command is ‘to what extent’ so there must be an assessment of the extent to which the benefits of hard engineering are greater than the costs as a river management strategy. The answer may refer to hard engineering generally or refer to specific strategies – dams and reservoirs, straightening, embankments and flood-relief channels.					
The benefits of hard engineering include the effectiveness of the strategies in preventing flooding which saves much money in terms of people’s property but also people’s lives. There is greater security with this option as dams and reservoirs prevent floods and people feel safe. Greater investment is likely to occur and there can be environmental benefits with wetlands being developed along a flood-relief channel for example. The costs are the expense of the strategies – building dams and diversion canals and even embankments are very expensive and do require maintenance.					

		Some strategies like channel straightening can take the water away from one area very quickly and lead to flooding further downstream. Some can be unsightly: large concrete embankments and dams are not in keeping with the surrounding area and can cause issues with river flow and natural processes. There is no correct assessment but the points made must reflect the content of the answer.	
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