2.1 Hot Desert Characteristics, Adaptations and Opportunities for Development: 30-minute Pack

AQA 8035 · Calculators not allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Give TWO challenges that developers face when trying to develop infrastructure or agriculture in a hot desert such as the Thar Desert.

(Total for Question 1 is 2 marks)

2 Table 1: Vegetation cover measured at four distances from an oasis edge in a hot desert area (percentage ground cover).
Distance from oasis edge (m): 0, 50, 200, 1000
Vegetation cover (%): 65, 40, 10, 1
Using the table, describe the pattern shown by vegetation cover with distance from the oasis edge.

(Total for Question 2 is 3 marks)

3 Figure 3: Development opportunities in a hot desert region are listed here as stimulus for this question: large areas of flat, sunlit land suitable for solar farms; visible surface mineral deposits and small open-pit mines; an established tourist route with dunes and cultural sites; an irrigated belt of farmland near a permanent river or aquifer. Describe the opportunities for development shown in Figure 3, using the list above.

(Total for Question 3 is 4 marks)

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4 Explain the challenges of developing a hot desert environment such as the Thar Desert.

(Total for Question 4 is 6 marks)

5 You plan a simple fieldwork transect to measure soil moisture across a 500 metre transect from an oasis edge into the surrounding desert in the Thar Desert. Suggest a suitable method, including how you would sample and what equipment you would use.

(Total for Question 5 is 3 marks)

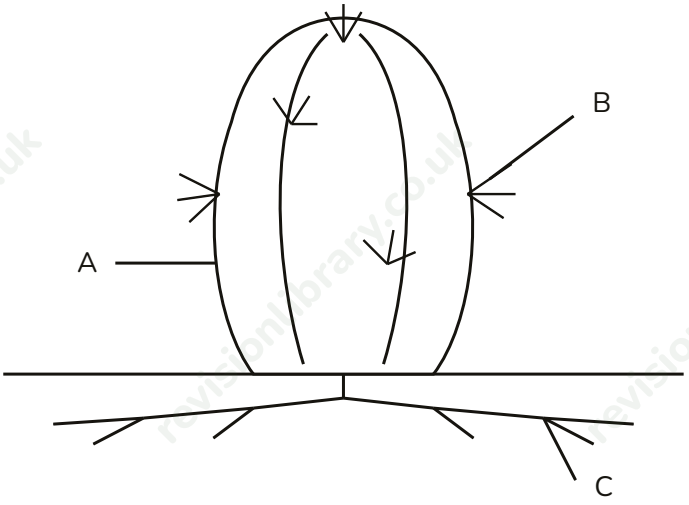
6 Explain ONE way that tourism can both help and challenge development in a hot desert area such as parts of the Sahara or the Thar Desert.

(Total for Question 6 is 3 marks)

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7 Figure 1: A simplified labelled diagram of a barrel cactus from a hot desert such as parts of the Sonoran or Sahara edge is shown here in words: Label A = thick fleshy stem, Label B = spines, Label C = shallow wide roots. Using the diagram context, explain the function of each labelled feature for survival in a hot desert environment.

Diagram NOT accurately drawn



(Total for Question 7 is 3 marks)

8 Explain TWO benefits of developing large-scale solar farms in a hot desert region such as parts of the Sahara or Thar Desert.

(Total for Question 8 is 4 marks)

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Mark scheme · 2.1 Hot Desert Characteristics, Adaptations and Opportunities for Development: 30-minute Pack

Question 1

extreme heat causing problems for workers, machinery and materials, oe **B1**

water scarcity making irrigation and human settlements difficult, oe **B1**

Answer: Extreme heat that affects workers and machinery; and water scarcity that limits irrigation and supply for settlements.

Question 2

vegetation cover decreases as distance from the oasis increases, oe **B1**

supported with data, e.g. 65% at 0 m, 40% at 50 m, 10% at 200 m and 1% at 1000 m, oe **B1**

this suggests plants are concentrated near the water source and thin out rapidly with distance, oe **B1**

Answer: Vegetation cover falls rapidly with distance from the oasis: 65% at 0 m, 40% at 50 m, 10% at 200 m and 1% at 1000 m, showing plants concentrate close to the water and thin out quickly further away.

Question 3

solar energy potential from large, flat, sunlit areas, oe **B1**

mineral extraction from visible surface deposits and small mines, oe **B1**

tourism based on dunes and cultural sites, generating income and jobs, oe **B1**

commercial farming where irrigation is possible near a river or aquifer, oe **B1**

Answer: Opportunities include solar energy on large flat sunlit land; mineral extraction from surface deposits and small mines; tourism based on dunes and cultural sites providing jobs and income; and commercial irrigated farming where water sources exist.

Question 4

Level 3 Detailed explanation of multiple challenges with clear, linked detail and examples, showing how each challenge constrains development, and a coherent overall account. **5-6**

Level 2 Clear explanation of at least two challenges with some linked detail or an example, showing how they affect development. **3-4**

Level 1 One or two simple statements about challenges with limited explanation or detail. **1-2**

Indicative content:

- Extreme heat increases costs and risk for construction, reduces worker productivity, and can damage materials and equipment, making building and maintaining infrastructure harder.
- Water scarcity limits irrigation for agriculture and increases the cost of supplying drinking water, requiring expensive pipelines, wells or desalination which raise development costs.
- Inaccessibility and vast distances raise transport costs for materials and finished goods, making commercial farming or industry less profitable.
- Temperature extremes and sand movement (dunes, sandstorms) damage roads, solar panels and buildings and increase maintenance costs.
- Environmental limits, such as fragile soils and limited native vegetation, make landscapes more vulnerable to disturbance and increase restoration costs.
- Examples could include the need to drill deep wells or import water, the expense of constructing roads over shifting sands, or providing cooling and maintenance for solar infrastructure.

Question 5

method named, e.g. measure soil moisture at regular intervals (e.g. every 50 m) along the 500 m transect, oe **M1**

equipment named, e.g. use a soil moisture meter or gravimetric sampling with labelled bags and a trowel, oe **A1**

sampling justification or quality control, e.g. systematic sampling at set intervals and repeat measurements at each point to improve reliability, oe **B1**

Answer: Measure soil moisture at regular intervals (for example every 50 m) along the 500 m transect, using a soil moisture meter or by collecting samples with a trowel for gravimetric drying; take repeat readings at each point to improve reliability.

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Question 6

help point, e.g. tourism creates income and jobs in hotels, guiding and transport, oe **B1**

linked challenge, e.g. tourism can be seasonal and put pressure on scarce water supplies and local infrastructure, oe **B1**

linked development effect or balance, e.g. income may benefit some but increase inequality or cause environmental damage, oe **B1**

Answer: Tourism creates income and jobs in hotels, guiding and transport, helping the local economy; however it is often seasonal and can put pressure on scarce water and infrastructure, and may cause environmental damage or unequal benefits.

Question 7

A: thick fleshy stem stores water for long dry periods, oe **B1**

B: spines reduce water loss by shading the stem and deter herbivores, oe **B1**

C: shallow, wide roots quickly absorb surface rainfall before it evaporates, oe **B1**

Answer: A stores water in a fleshy stem; B spines shade the stem and deter animals, reducing water loss; C shallow, wide roots absorb surface rainfall quickly before it evaporates.

Question 8

benefit 1 named, e.g. renewable electricity generation using abundant sunlight, oe **B1**

linked detail, e.g. generates low-carbon energy that can reduce fossil fuel use and be exported or used locally, oe **B1**

benefit 2 named, e.g. job creation and new infrastructure, oe **B1**

linked detail, e.g. construction and maintenance create local employment and can lead to improved roads and power grids, oe **B1**

Answer: Solar farms provide renewable electricity from abundant sunlight, cutting reliance on fossil fuels and allowing local use or export; they also create jobs during construction and maintenance and can bring infrastructure improvements such as roads and grid connections.

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