1.7 Ecology: 30-minute Pack

AQA 8461 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Quick-fire recap questions on key ecology ideas.

(a) Which of these is the correct definition of a population? **(1)**

- ☐ A) All the different species living in a habitat
- ☐ B) All the organisms of one species living in the same area at the same time
- ☐ C) All the living and non-living components of an area
- ☐ D) A place where an organism lives

(b) Which of the following is an abiotic factor? **(1)**

- ☐ A) Predation
- ☐ B) Competition for food
- ☐ C) Availability of light
- ☐ D) Disease

(c) What term describes an organism that makes its own food using light energy? **(1)**

- ☐ A) Consumer
- ☐ B) Producer
- ☐ C) Decomposer
- ☐ D) Predator

(d) Which process in the carbon cycle releases carbon dioxide into the atmosphere? **(1)**

- ☐ A) Photosynthesis
- ☐ B) Respiration
- ☐ C) Absorption
- ☐ D) Transpiration

(e) Biodiversity is best described as... **(1)**

- ☐ A) The total number of individual organisms in a habitat
- ☐ B) The range of different species living in an area, or on Earth
- ☐ C) The total biomass of producers in an ecosystem
- ☐ D) The number of trophic levels in a food chain

(Total for Question 1 is 5 marks)

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2 A student samples plants using a quadrat. She records the following numbers of white clover in four quadrats: 3, 5, 4 and 6.

(a) Calculate the mean number of white clover per quadrat from these results. **(2)**

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(b) Suggest one reason why repeating the quadrat sampling more times would give a better estimate of abundance. **(1)**

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(Total for Question 2 is 3 marks)

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3 The human population, and the standard of living for many people, has rapidly increased over the last 200 years. Explain two ways in which this rapid increase in the human population is reducing biodiversity.

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(Total for Question 3 is 4 marks)

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4 A conservation group plans to reintroduce hedgehogs to a local park. They estimate food availability by counting invertebrates. In a sample area of 2 m squared they find 50 invertebrates. They want to estimate how many invertebrates there are per 1 m squared so they can compare with other sites.

(a) Calculate the number of invertebrates per 1 m squared in this sample area. **(2)**

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(b) Give one reason why this estimate might not represent the whole park and suggest one improvement to the sampling method. **(3)**

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(Total for Question 4 is 5 marks)

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5 A field survey records the number of different plant species in three habitats: hedgerow, meadow and woodland. The species counts found were: hedgerow 12, meadow 8, woodland 5. Use the word 'biodiversity' in your answers.

(a) State which habitat has the greatest biodiversity and give one reason based on the species counts. **(2)**

(b) Suggest one management action that could increase biodiversity in the meadow and explain how it would help. **(2)**

(Total for Question 5 is 4 marks)

6 Define the term 'ecosystem'.

(Total for Question 6 is 2 marks)

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Mark scheme · 1.7 Ecology: 30-minute Pack

Question 1

(a) B **B1**

(a) Answer: B) All the organisms of one species living in the same area at the same time.

(b) C **B1**

(b) Answer: C) Availability of light.

(c) B **B1**

(c) Answer: B) Producer.

(d) B **B1**

(d) Answer: B) Respiration.

(e) B **B1**

(e) Answer: B) The range of different species living in an area, or on Earth.

Question 2

(a) adds values and divides by 4: (3 + 5 + 4 + 6) / 4 **M1**

(a) 4.5 cao **A1**

(a) Answer: 4.5

(b) reduces the effect of random variation or chance; increases reliability of the estimate, oe **B1**

(b) Answer: Repeating reduces random variation and increases the reliability of the estimate.

Question 3

more land is used for housing, farming or quarrying, which destroys/reduces natural habitats (named point 1) **B1**

this means fewer species have suitable places to live, so biodiversity falls (linked explanation for point 1) **B1**

more waste (e.g. household or industrial waste) is produced and sent to landfill, or more pollutants are released into water, land or air (named point 2) **B1**

this pollution/waste can poison, harm or destroy the habitats of organisms, reducing biodiversity (linked explanation for point 2) **B1**

Answer: More land is being used for housing, farming and quarrying, destroying natural habitats and leaving fewer species with somewhere to live; and more waste and pollution are being produced, which can harm organisms and damage habitats, both of which reduce biodiversity.

Question 4

(a) substitutes: density = 50 / 2 **M1**

(a) 25 per m squared cao **A1**

(a) Answer: 25 per m squared

(b) identifies a limitation (e.g. only one small sample, habitat variation across park, time of day/season affects invertebrate numbers) **M1**

(b) suggests a sensible improvement (e.g. take many samples in different parts of the park, sample at different times or seasons) **M1**

(b) links improvement to why it gives a better estimate (e.g. increases representativeness and reduces chance effects), oe **A1**

(b) Answer: The sample may not represent the whole park because habitats vary and invertebrate numbers change with location or time. Improvement: take many random samples across the park and at different times; this increases representativeness and reduces chance variation.

Question 5

(a) hedgerow has the greatest biodiversity (12 species) cao **B1**

(a) reason: higher number of species recorded means greater variety of organisms, oe **B1**

(a) Answer: Hedgerow, because it has 12 species which is more species and so higher biodiversity.

(b) suggests a reasonable action (e.g. reduce mowing frequency, introduce wildflowers, create pond) **M1**

(b) explains how it helps: increases habitat variety or food resources, allowing more species to establish, oe **A1**

(b) Answer: Example: reduce mowing so wildflowers can set seed; this increases plant variety and food/habitats so more species can live there.

Question 6

a community of different organisms living together in a particular place, oe **B1**

and the non-living (abiotic) factors of that environment, oe **B1**

Answer: A community of different organisms living together in a particular place and the non-living factors of that environment.

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