1.5 Ecosystems and Interdependence: 10-minute Pack

Calculator allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A student investigates how different fertiliser types affect plant growth. She grows identical bean plants in pots and applies either no fertiliser, fertiliser X or fertiliser Y. After 4 weeks the mean heights are: no fertiliser 12.0 cm, X 18.4 cm, Y 20.1 cm.
State what conclusion can be drawn about the effect of fertiliser X and Y compared to no fertiliser, and suggest one improvement to the method to make the test fairer.

(a) State the conclusion about the effect of fertiliser X and Y compared to no fertiliser. **(2)**

(b) Suggest one improvement to make the method fairer. **(1)**

2 A pyramid of numbers for a pond community shows: 400 algae at bottom, 40 water fleas that eat algae, 4 small fish that eat water fleas, 1 heron that eats small fish.

(a) Calculate the approximate percentage of energy transferred from algae to water fleas assuming numbers are proportional to energy (use: energy transferred = (number at next level / number at previous level) x 100%). **(2)**

(b) Explain one limitation of using a pyramid of numbers to represent energy transfer. **(2)**

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3 Give one example of mutualism between two species and briefly describe the benefit to each species.

(a) Give an example and a one-line description of benefits. **(1)**

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4 Define biodiversity in one sentence.

(a) Write a definition of biodiversity. **(2)**

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Mark scheme · 1.5 Ecosystems and Interdependence: 10-minute Pack

Question 1

(a) both fertilisers increase mean plant height compared to no fertiliser shown by 18.4 and 20.1 > 12.0 — **M1**

(a) conclusion that Y appears slightly more effective than X (20.1 > 18.4), oe — **A1**

(a) Answer: **Both fertilisers increase growth compared with no fertiliser; fertiliser Y appears slightly more effective than X.**

(b) one improvement eg use more replicates per treatment, keep light and temperature constant, use same soil and pot size, randomise pot positions, same watering regime, oe — **B1**

(b) Answer: **Use more replicate plants for each treatment and randomise pot positions to reduce variation.**

Question 2

(a) substitution 40 / 400 x 100 — **M1**

(a) 10% cao — **A1**

(a) Answer: **10%**

(b) limitation named eg pyramid of numbers does not account for organism size or actual energy content — **M1**

(b) explanation eg a single large organism may contain more energy than many small ones so numbers are misleading, oe — **A1**

(b) Answer: **Pyramids of numbers ignore organism size and energy content; many small algae may give the same energy as a few larger organisms so the numbers can be misleading.**

Question 3

(a) example and benefit eg bees and flowering plants: bees get nectar, plants get pollinated; clownfish and sea anemone; oxpeckers and rhinos, oe — **B1**

(a) Answer: **Bees and flowering plants: bees get nectar and pollen for food, plants get pollinated.**

Question 4

(a) definition that biodiversity is the variety of different species in an area or the variety of living things in a habitat — **M1**

(a) mention of species and variety or genetic or habitat diversity, oe — **A1**

(a) Answer: **Biodiversity is the variety of different species of plants and animals living in an area or habitat.**

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