How Nature Works in Harmony

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. The living parts of an ecosystem are called:
(a) minerals **(b)** climate
(c) abiotic components **(d)** biotic components

2. In a food chain, a deer is a:
(a) decomposer **(b)** omnivore **(c)** herbivore **(d)** carnivore

3. What kind of relationship is this: a louse on a person's head?
(a) decomposition **(b)** commensalism **(c)** mutualism **(d)** parasitism

4. Which of these is an ABIOTIC part of a pond ecosystem?
(a) rocks **(b)** fish **(c)** grass **(d)** algae

5. In the food chain grain → mouse → owl, what does the owl eat?
(a) owl **(b)** sunlight **(c)** grain **(d)** mouse

6. Four 1 m × 1 m quadrats had 14, 19, 9, 25 grass plants. What is the average number per square metre?
(a) 25 plants **(b)** 67 plants **(c)** 16.75 plants **(d)** 33.5 plants

7. On average there are 16 plants of a kind in each square metre. About how many are there in a field of 69 m^2?
(a) 1,120 plants **(b)** 85 plants **(c)** 1,104 plants **(d)** 69 plants

8. Which of these is a DECOMPOSER?
(a) an earthworm's gut bacteria **(b)** a crow
(c) grass **(d)** a leopard

Section B — Short answer — 8 × 2 = 16 marks

9. What is an ecosystem?

10. Is each a producer, herbivore, carnivore, omnivore or decomposer? (a) a leopard (b) a crow

11. Name the relationship (mutualism, commensalism or parasitism): (a) Rhizobium in a bean plant's roots (b) a louse on a person's head

12. Write "biotic" or "abiotic": (a) grass (b) sunlight

13. In grass → grasshopper → lizard → hawk, if the number of grasshoppers falls sharply, what happens to the amount of grass and the number of lizards?

14. Five quadrats counted 15, 17, 6, 17, 9 clover plants. Find the total and the average per quadrat.

15. A field has about 324 grass plants, 30 grasshoppers and 4 snakes. Arrange them as a pyramid of numbers from the base up. Which level has the fewest?

16. Why is each important in nature? (a) predators (b) pollinators

Section C — Word problems — 4 × 4 = 16 marks

17. Explain how removing frogs from a food chain affects other organisms.

18. Look at the food chain grass → grasshopper → lizard → hawk. (a) Name the producer and the top consumer. (b) What would happen if the lizard disappeared? (c) Why is a food web more stable than this single chain?

19. Students placed four 1 m × 1 m quadrats in a 300 m^2 meadow and counted 21, 16, 13, 21 daisies. (a) What is the average per square metre? (b) Estimate the total number of daisies. (c) Why use several quadrats, not one?

20. Explain the relationship in (a) a louse on a person's head and (b) Rhizobium in a bean plant's roots: who gains, and who is harmed, if anyone?

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Answer key

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Q	Answer	Working
1	(d) biotic components	—
2	(c) herbivore	—
3	(d) parasitism	—
4	(a) rocks	—
5	(d) mouse	—
6	(c) 16.75 plants	67 ÷ 4 = 16.75
7	(c) 1,104 plants	16 × 69 = 1104
8	(a) an earthworm's gut bacteria	—
9	All the living things in an area together with the non-living things around them.	—
10	(a) carnivore (b) omnivore	—
11	(a) mutualism (b) parasitism	—
12	(a) biotic (b) abiotic	—
13	The amount of grass goes up (less is eaten); the number of lizards goes down (less food).	—
14	64; 12.8	64 ÷ 5
15	grass (324) → grasshoppers (30) → snakes (4); snakes are fewest	—
16	(a) keep the numbers of other animals in check (b) help plants make seeds	—
17	In grass → grasshopper → frog → snake, removing frogs means grasshoppers increase and eat more grass, while snakes have less food and decrease. This happened in India when frogs were over-caught in the 1980s and insect pests rose.	—
18	(a) Producer: grass; top consumer: hawk (b) The grasshopper would increase and the hawk would lose food and decrease. (c) In a web, animals have other foods, so the loss of one does not break everything.	—

Q	Answer	Working
19	**(a) 17.75 (b) About 5325 (c) Plants are not spread evenly; several quadrats give a fairer average.**	—
20	**(a) parasitism (b) mutualism**	—

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