Class 10 Science · Chapter 13: Our Environment

Answer key and marking scheme · 20 marks · about 40 minutes · based on NCERT

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1. About 50 000 J of sunlight falls on the leaves of a sugarcane crop in a day. The food energy the crop makes from it is closest to [1]

(a) 500 J (b) 5000 J
(c) 50 J (d) 50 000 J

Answer: (a) Terrestrial green plants capture about 1% of the sunlight falling on their leaves: 1% of 50 000 J = 500 J. 5000 J applies the 10% rule by mistake.

2. A fallen log in the Western Ghats crumbles over a few years and disappears into the forest floor. The organisms chiefly responsible are [1]

(a) green algae (b) deer and wild boar
(c) fungi and bacteria (d) woodpeckers

Answer: (c) Decomposers, the bacteria and fungi, break down dead remains. Deer and boar are herbivores or omnivores, algae are producers, and woodpeckers feed on insects.

3. On a rocky seashore in Ratnagiri, the organisms that make sugar from inorganic substances using sunlight are the [1]

(a) snails (b) crabs
(c) seaweeds (d) fungi growing on driftwood

Answer: (c) Seaweeds are green, carry chlorophyll and photosynthesise, so they are producers. Crabs and snails are consumers; fungi are decomposers.

4. In the sea food chain phytoplankton → zooplankton → sardine → tuna, the sardine occupies the [1]

(a) first trophic level (b) third trophic level
(c) second trophic level (d) fourth trophic level

Answer: (b) Phytoplankton are producers (first), zooplankton herbivores (second), the sardine feeds on them and is at the third level; tuna is fourth.

5. When decomposers act on the dead leaves under a mango tree, the substances they return to the soil are [1]

(a) simple inorganic substances that plants take up again (b) complex organic compounds such as starch
(c) ozone and other gases (d) pesticide residues

Answer: (a) Decomposers break complex organic matter into simple inorganic substances which go into the soil and are used again by plants. Starch is what they break down, not what they return.

6. Clay kulhads were once suggested in place of plastic cups for tea on trains. Why was making them on a large scale not considered a good answer? [2]

Kulhads are made from clay; making millions of them daily would use up the fertile top-soil, which is needed for crops. So paper cups are used instead.

- making kulhads needs large amounts of clay (1)
- this would cost the fertile top-soil (1)

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7. A Class 10 group visiting a school pond lists: sunlight, frogs, dissolved oxygen, water lilies. Sort these into biotic and abiotic components. [2]

Biotic (living): frogs, water lilies. Abiotic (non-living, physical factors): sunlight, dissolved oxygen.

- frogs and water lilies as biotic (1)
- sunlight and dissolved oxygen as abiotic (1)

8. Write the two steps by which ozone forms in the upper atmosphere, as equations, and state what the UV radiation does. [2]

Higher-energy UV radiation splits molecular oxygen into free atoms: $O_2 \rightarrow O + O$ (in the presence of UV). Each free atom then combines with molecular oxygen: $O + O_2 \rightarrow O_3$.

- $O_2 \rightarrow O + O$, with UV splitting the oxygen molecule (1)
- $O + O_2 \rightarrow O_3$ (1)

9. A buffalo eats fodder containing 6000 kJ of energy, but only about 600 kJ becomes part of its body. State three ways the remaining energy is used or lost. [3]

Much of it is lost as heat to the environment; some is used in digestion; some is used in doing work (moving, grazing). Only the rest, about 10%, goes into growth and reproduction.

- lost as heat (1)
- used in digestion (1)
- used in doing work (1)

10. A municipal corporation must handle three kinds of waste: (i) leftover vegetables from a market, (ii) old newspapers and glass bottles, (iii) residue that can be neither composted nor recycled. Suggest a suitable method for each. [3]

(i) Composting, since the vegetable waste is biodegradable. (ii) Recycling of the paper and glass. (iii) Landfill in low-lying ground, or incineration at high temperature to ash.

- composting for vegetable waste (1)
- recycling for paper and glass (1)
- landfill or incineration for the residue (1)

11. Over thirty years, the waste collected from a town has doubled and much more of it is plastic. Give three changes in the way people live that account for this. [3]

Improvements in life-style mean more is bought and more waste is produced; attitudes have changed, so more of what we use is disposable; and packaging has changed, so much of the waste is now non-biodegradable.

- improved life-style, more waste (1)
- more disposable items (1)
- changed packaging, non-biodegradable (1)

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