CBSE Test Paper 05

Chapter 15 Our Environment

1. Which of the following constitute a food chain? **(1)**

   a. Grass, wheat and mango.
   b. Goat, cow and elephant
   c. Grass, fish and goat.
   d. Grass, goat and human

2. Match the following with the correct response**: (1)**

(1) Saprotrophs	(A) Organisms obtaining food from green plants
(2) Parasites	(B) Organisms obtaining food from host
(3) Autotrophs	(C) Organisms obtaining food from dead plants and animals
(4) Herbivores	(D) Organisms which prepare their own food

   a. 1-B, 2-D, 3-A, 4-C
   b. 1-C, 2-B, 3-D, 4-A
   c. 1-D, 2-A, 3-C, 4-B
   d. 1-A, 2-C, 3-B, 4-D

3. The ecosystem of the earth is known as**: (1)**

   a. Community
   b. Biosphere
   c. Association
   d. Biome

4. Secondary treatment in sewage treatment plant involves**: (1)**

   a. Chemical treatment
   b. Physical treatment like sedimentation
   c. Passing ultraviolet radiations
   d. Biological treatment

5. Which of the following are environment-friendly practices? **(1)**

    a. Carrying cloth-bag to put purchases in while shopping
    b. Walking to school instead of getting your mother to drop you on her scooter
    c. Switching off unnecessary lights and fans
    d. All of these

6. Why are some substances biodegradable and some non-biodegradable? **(1)**

7. What is incineration? **(1)**

8. Rearrange the following according to their ascending trophic levels in a food chain.

    Hawk, grass, snake, frog, grasshopper. **(1)**

9. Name two salt water ecosystem. **(1)**

10. Which of the following belong to the first trophic level? **(3)**

    i. Grasshopper, mango tree, hawk, snake
    ii. Sunflower plant, grasshopper, cockroach, banyan tree

11. How much energy will be available to hawk in the food chain comprising hawk, snakes, paddy and mice if 10000 J of energy are available to paddy from the sun? **(3)**

12. What is a ozone and what role does it have in any ecosystem? **(3)**

13. Draw a flow diagram showing typical food chain with energy flow and cycling of materials. Give a few examples of food chains. **(3)**

14. Explain the organisation of an ecosystem. **(5)**

15. Name the two fundamental trophic levels and describe the general make up of each. **(5)**

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Answers

1. d. Grass, goat and human

   Explanation: The following chain constitutes a food chain (organisms in order of who eats whom):-

   Grass $\rightarrow$ Goat $\rightarrow$ Human

2. b. 1-C, 2-B, 3-D, 4-A

   Explanation: Organisms can be grouped as producers, consumers and decomposers according to the manner in which they obtain their sustenance from the environment. Producers or autotrophs prepare their own food. Consumers can be classed as herbivores, carnivores, omnivores and parasites. Herbivores obtain food directly from green plants. Parasites obtain food from a host.

(1) Saprotrophs	(C) Organisms obtaining food from dead plants and animals
(2) Parasites	(B) Organisms obtaining food from host
(3) Autotrophs	(D) Organisms which prepare their own food
(4) Herbivores	(A) Organisms obtaining food from green plants

3. b. Biosphere

   Explanation: The ecosystem of the earth is known as **biosphere**. Biosphere is the worldwide sum of all ecosystems.

4. d. Biological treatment

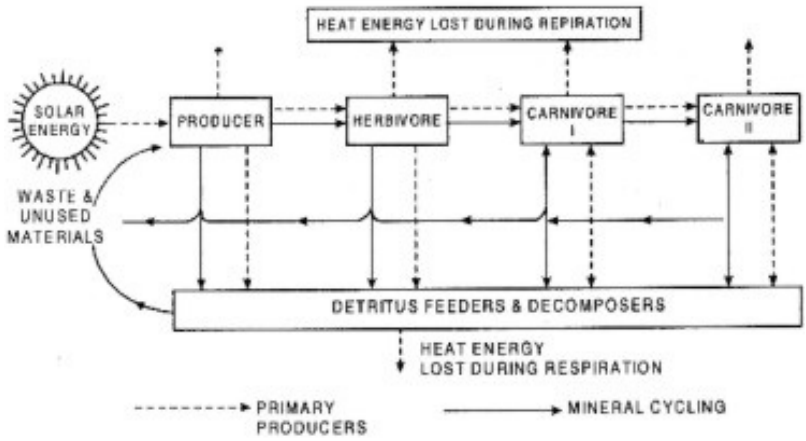
   Explanation: Secondary treatment in sewage treatment plant involves biological treatment (use of microorganisms)

5. d. All of these

   Explanation: All the given practices are environment-friendly practices. Carrying cloth-bag for shopping purchases is an alternative to polythene (which is a non-biodegradable plastic). Switching off lights and fans, when not in use,

saves energy and helps to reduce carbon emissions. Reducing automobile emissions is another way to reduce carbon dioxide emissions.

6. The substances that are natural or made from natural materials that can be degraded or decomposed by enzymes of decomposer organisms like bacteria & fungi into soil are called Biodegradable substances. e.g.. Fruits & Vegetable peels, Paper etc. These substances do not persist in the environment for long as the enzymes of the decomposer organisms convert them into simple substances & make them available to the plants. The substances that can not be decomposed by decomposer organisms & persist in the environment for long period are called Non Biodegradable substances. e.g.. Plastics, Pesticides etc.
7. Incineration means 'reducing to ashes'. The burning of waste at high temperature to form ash is called incineration.
8. Grass $\rightarrow$ grasshopper $\rightarrow$ frog $\rightarrow$ snake $\rightarrow$ hawk.
   A food chain always start with producers and ends with top consumers.
9. Marine and estuaries ecosystem are salt water ecosystem.
10. The first trophic level is always the position for Producers thus, in above two cases the first trophic level is captured by,
    i. Mango tree
    ii. Sunflower plant, banyan tree.
11. $\rightarrow$ The food chain may be written as
    Paddy $\rightarrow$ Mice $\rightarrow$ Snake $\rightarrow$ Hawk
    (10,000 J of energy from sun)
    According to ten per cent law, energy available to next level is 10% of the energy transferred from the previous level.
    Energy transferred to mice from paddy = 10% of 10,000 J = $\frac{10 \times 10000}{100} = 1000J$
    Energy transferred to snake from mice = 10% of 1000 J = $\frac{10 \times 1000}{100} = 100J$
    Energy transferred to hawk from snake = 10% of 100 J = $\frac{10 \times 100}{100} = 10J$
    Energy available to Hawk = 10 J
12. Ozone is a form of oxygen. It has the molecular formula O_3. It is present at a higher level in the atmosphere. It protects the ecosystem from the harmful effects of ultraviolet rays coming from the Sun. UV rays may cause skin cancer, cataract to us. Thus ozone forms a protective shield against harmful UV rays.
13. Typical food chain



Examples of food chains

i. Grass → Goat → Man
ii. Grass → Deer → Lion
iii. Algae → Zooplankton → Fish → Man
iv. Algae → Insects → Frog → Snake → Peacock, etc.

14. **Organisation of the ecosystem**

The structural component of an ecosystem may be classified under two main types: The biotic components comprise the kinds, number and distribution of living organisms present in an ecosystem. These include plants, animals and micro-organisms (bacteria and fungi). Abiotic components consist of the kinds, quantity and distribution of physical and chemical factors such as light, temperature, water, oxygen, carbon, nitrogen and minerals. In this way it is concerned with energy and materials.

The functional aspect of an ecosystem involves the volume and the rate at which the various materials circulate and the rate at which the energy flows through it. The flow of energy is unidirectional. The sun is the ultimate source of energy.

Thus, the study of ecosystem involves the description of biotic communities and the abiotic environment alongwith an understanding of the whole network of relationship involving the exchanges and interactions in these components.

Biotic Components

The biotic components of an ecosystem has been classified by Odum (1971) into three groups:**Abiotic components**

Though all the abiotic factors are not yet known but many have been understood . Various important abiotic factors have been classified as follows:

i. Biotic components

ii. Abiotic components
iii. Producers (Green plants)
iv. Macro consumers (Usually animals)
v. Micro consumers (organisms like bacteria and fungi).
vi. **Climatic factors.** These include light, temperatures, precipitation, atmospheric humidity and wind.
vii. **Topographic factors.** These include altitude, surface slope and exposure etc.
viii. **Edaphic factors.** These include soil and substratum.

15. The two fundamental trophic levels include the following:
    i. **Producers (Autotrophic organism) :** The green plants are the producers in any ecosystem. They also include photosynthetic bacteria. The producers use radiant energy of the sun during photosynthesis whereby carbon dioxide is assimilated and the light energy is converted into chemical energy. This energy is locked up into the energy rich carbon compounds i.e. carbohydrates. The oxygen that is evolved as a by-product in photosynthesis is used in respiration by all living organisms.
    ii. **Consumers (Heterotrophic organisms) :** They are the living members of the ecosystem which consume the food synthesized by the producers. All living animals are thought to be consumers.
    The consumers may be of the following types:
        a. Primary consumers (also called first order consumers) which are purely herbivorous and depend upon green plants i.e. on producers for their food e.g. Cow, Goat, Rabbit, Deer, Grasshopper and other insects.
        b. Secondary consumers (also called second order consumers) which are carnivorous animals and eat flesh of herbivorous animals e.g. Tiger, Lion, Dog, Cat, Frog, etc.
        c. Tertiary consumers are the carnivorous animals that eat other carnivores e.g. Snake eats a frog, birds eat fishes.
        d. Top consumers are carnivores of an ecosystem which are not killed and eaten by other animals e.g. Lions, vultures etc.