CHAPTER 15

# Our Environment

EXAM DRILL

## ANSWERS

1. Sunlight, air, temperature, soil, etc., are the abiotic factors of ecosystem whereas producers, consumers, decomposers are the living or biotic components of ecosystem.

**OR**

Ozone layer is found in stratosphere which acts as a shield to protect against harmful UV radiations.

2. Chlorofluorocarbons (CFCs) are the ozone depleting substances.

3. **(c)**

4. Decomposers include bacteria and fungi. They degrade dead remains of plants and animals and waste organic matter into simple small organic molecules. So, decomposers are also called saprotrophs.

5. Forests, oceans, ponds, etc., are natural ecosystem whereas gardens, parks, crop fields are the examples of artificial or man-made ecosystem.

6. The energy from the sun flows into autotrophs and it passes to herbivores and then to carnivores. The energy does not revert from autotrophs to the solar input or from herbivores back to autotrophs. Hence, the flow of energy is always unidirectional.

**OR**

If snake is missing from the given food chain, the population of rats may increase.

7. Primary consumers or herbivores include all the organisms that utilise plant products. Here, rat is the primary consumer that occupies second trophic level.

8. Organisms which are able to manufacture their food from inorganic raw materials are called autotrophs or producers.

9. In detritus food chain, energy source is organic remains or detritus.

**OR**

The distinct sequential steps in the food chain where transfer of energy occurs are referred to as trophic level.

10. The process of concentration of harmful chemicals such as pesticides, at each successive step in a food chain is called biological magnification.

11. Jute bags can be reused repeatedly for shopping and get decomposed when discarded. Polybags on the other hand keep on accumulating as solid waste and harm our environment. They can clog drainage, pollute river bodies and are extremely dangerous to grazing animals who chew them mistakenly. So, jute bags are more environment friendly than polybags.

**OR**

Producers or green plants have chlorophyll which can trap the solar energy. The first trophic level in a food chain is a producer, *i.e.*, those organisms which can produce food with the help of sunlight and chlorophyll by a process called photosynthesis.

12. In a lake, the producers are mainly phytoplanktons, rooted and floating plants. Zooplanktons are the primary consumers. They constitute the second trophic level.

**OR**

Some animals eat both plants as well as other animals. These are called omnivores, *e.g.*, human beings, dog, crow, etc.

13. Acid rain refers to the precipitation with a pH of less than 5. It is a mixture of $H_2SO_4$ and $HNO_3$. $SO_2$ emitted by the factories can rise in the atmosphere and react with rain water to form $H_2SO_4$.

14. **(c) :** Manure is partially decomposed organic matter derived from plant and animal wastes which is added to the soil to increase its fertility. Fertilisers are chemical formulations which are either provided directly to plants or added to the soil in order to supply minerals required for optimum growth of plants.

15. **(a) :** Organic wastes are biodegradable and so less harmful in nature unless produced in excess amount.

16. **(d) :** The second trophic level of a food chain is occupied by herbivores that feed on plants or producers that are present at first trophic level.

**OR**

**(b) :** Plastics are non-biodegradable. They cannot be decomposed by the action of microbes. Recycling them can manage them effectively.

**17. (i) (a)**

**(ii) (b)**

**(iii) (c)**

**(iv) (d) :** Removal of bird population will increase the population of grasshopper as birds feeds on grasshopper.

**(v) (a) :** Rabbit, mouse, grasshopper and bird act as primary consumer in the given food web.

**18. (i) (b)**

**(ii) (a)**

**(iii) (d)**

**(iv) (a) :** Ozone hole was first discovered over Antarctica in 1985. Ozone absorbs UV-radiations in the range 2000-2900Å.

**(v) (b)**

**19. (i) (a)**

**(ii) (b) :** Tiger is a secondary consumer in food chain B and tertiary consumer in food chain D.

**(iii) (a) :** Top consumer of food chain A will have maximum energy as it is the shortest food chain.

**(iv) (d) :** In food chain D, wild cat is the secondary consumer. Therefore, according to 10% law, amount of energy present in secondary consumer will be 200 KJ.

**(v) (b) :** Food chain E belong to aquatic ecosystem. Therefore, its pyramid of biomass will be inverted.

**20. (i) (b) :** 1% of solar radiation is captured by plants. Sun is the ultimate source of all energy.

**(ii) (d)**

**(iii) (d)**

**(iv) (d) :** The given pyramid is pyramid of energy that shows the two basic laws of thermodynamics.

**(v) (c) :** Light energy from the sun is converted to chemical energy in producers *via* photosynthesis. This chemical energy is then transferred to primary consumer, then subsequently to secondary consumer *via* feeding.

**21.** For example, the affluent life style has forced people to start using more of disposable items like paper plates, plastic items, polythene, etc.

Suggestion – We can reuse polythene bags, plastic containers, etc.

**OR**

Highest concentration of harmful non-biodegradable chemicals are found in top consumer hawk. The phenomenon exhibited here is biomagnification.

**22.** Food chain 'A' has minimum trophic levels (three trophic levels).

Longer is the food chain, lesser is the amount of energy at top of the food chain. So, in the food chain 'B' which has five trophic levels, the energy available to eagle (organisms at the top) will be minimum.

**23.** We can reuse plastic and glass jars of jams and pickles, etc., for the purpose of storage of things like salt, sugar, tea, etc., whereas we can recycle newspapers, plastic of some types, broken glass and metalwares for making fresh paper, plastic, glass and metal objects.

**OR**

Yes, a balanced and large aquarium can be a complete ecosystem consisting of both biotic and abiotic components. Water, oxygen supply source, light source are abiotic factors, whereas aquatic plants, small animals and decomposers serve as biotic components.

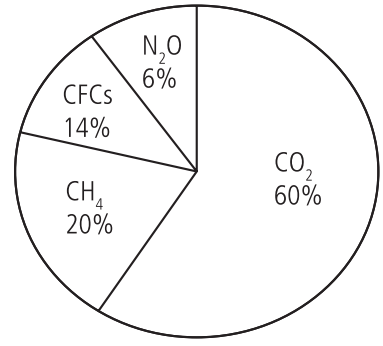
**24.** In the given figure : (1) is $T_1$ – First trophic level *i.e.*, producers.

(2) is $T_2$ – Second trophic level *i.e.*, herbivore (Primary consumer).

(3) is $T_3$ – Third trophic level *i.e.*, small carnivorous bird (Secondary consumers).

(4) is $T_4$ – Fourth trophic level *i.e.*, large carnivorous bird (tertiary consumers).

**25.** Relative contributions of different GHGs in global warming are as follows:




**26.** Recycling is the process of converting waste materials into reusable objects to prevent waste of potentially useful materials. Thus, it reduces the consumption of fresh raw materials, energy, air and water pollution. *E.g.*, recycling of paper, glass, plastic, etc.

Paper recycling is done at industry level, school and at home also. Recycled paper is developed by processing of all the waste paper materials collected from different places. Some advantages are :

(i) If we recycle paper, we can reduce the number of trees that are cut to produce papers.

(ii) The garbage constituted by paper can be reduced to a considerable amount.

(iii) Level of pollution can be decreased as papers are biodegradable and there will be less accumulation if papers are recycled.

**27.** Longer is the food chain, lesser is the amount of energy at top of the food chain. This is because of 10% (ten percent) law which was proposed by Lindemann in 1942. According to this law, during transfer of energy from lower trophic level to higher trophic level 90% of energy is lost, and only 10% of energy is transferred to next trophic level. As the trophic level increases, the available energy goes on decreasing.

**OR**

Any precipitation or deposition having a pH lower than 5.6 is called acid rain. Acid rain occurs by the emission of sulphur dioxide and oxides of nitrogen that react with rain water and form acids.

Following measures can be taken to prevent and control acid rain:

(i) Acid rain is mainly caused due to air pollution. Air pollution can be reduced by using pollution-controlling equipment, such as scrubber.

(ii) Other sources for the generation of electricity, such as nuclear fuel or solar power can be used instead of using fossil fuel to reduce the release of oxides of nitrogen and sulphur.

(iii) Cleaner fuels, such as LPG,, CNG, etc., could be used in automobiles.

(iv) Use of neutralising agents such as powdered lime stone can be sprayed over areas that are prone to acid rain.

**28.** Chlorofluorocarbons are the principal oxygen depleting substances. They are synthetic, harmful chemicals which are widely used in refrigerators and air conditioners as coolants, in fire extinguishers, in aerosol sprayers and as propellants. CFCs are composed of carbon, chlorine and fluorine. When it comes in interaction with UV rays, the chlorine atoms get detached and combine with an oxygen atom of ozone molecule and leave behind oxygen molecule ($O_2$). Thus, ozone gets converted to oxygen due to the presence of atomic chlorine and gets depleted.

**29.** Major regulations of Ecological Solid Waste Management Act of 2000 (Republic Act 9003) are:

(i) It provides for the implementation of a systematic, comprehensive and ecologically sound management of solid waste.

(ii) Mandatory segregation of solid waste at the source such as household, institutional, industrial, commercial and agricultural sources.

(iii) Prohibition on non-environmentally acceptable products and packaging.

(iv) Establishment of Materials Recovery Facility in every locality.

(v) Prohibition against the use of open dumps.

**30.** Differences between production and decomposition are as follows:

| S.No. | Production | Decomposition |
|---|---|---|
| (i) | It is the phenomenon of synthesis of fresh biomass. | It is the phenomenon of degradation of waste biomass (complex or organic matter) by decomposers. |
| (ii) | It builds up biomass from inorganic nutrients. | It releases inorganic nutrients from the biomass into the environment. |
| (iii) | It traps energy. | It releases energy. |

**31.** With the advancement in technology over time, there has been improvement in lifestyle of people. Such changes have also changed their attitudes. When people have more resources at their end they tend to overuse and misuse it thereby generating huge amounts of waste materials. For example, the affluent lifestyle has forced people to start using more of disposable articles, ***e.g.***, plastic cups, bags, etc., which keep on accumulating in the environment and lie undecomposed, thereby negatively affecting the environment.

Similarly, excessive use of refrigerators and air conditioners, plastic foams, etc., also release high quantities of CFCs which are responsible for ozone depletion.

**32.** Major greenhouse gases are $CO_2$-60%, $CH_4$-20%, CFCs-14% and $N_2O$-6%. Out of which $CO_2$ is present in maximum amount. Source of $CO_2$ is burning of fossil fuels, volcanic eruptions and respiration process. Due to increased level of $CO_2$ in the atmosphere global atmospheric temperature during the past century has increased to 0.6%. It is called global warming, which results in melting of polar ice caps and rise in sea level, etc.

**33.** Ultimate source of energy is sun. Green plants (producers) produce food by using solar energy. This food is consumed by herbivores (primary consumers) to get energy. The energy is further transferred to next levels of consumers *i.e.*, secondary consumers and tertiary consumers. During transfer of energy, about 90% of it is wasted or consumed up in respiration and only 10% becomes part of the higher trophic level. The energy cannot be transferred from consumers to producers and even to the sun. Therefore, energy transfer is always unidirectional and non-cyclic accompanied by decrease in usable energy.

**34.** **(a)** The idea of ecological pyramids was developed by Charles Elton (1927). Thus ecological pyramids are often called as Eltonian pyramids. An ecological or Eltonian pyramid is a graphic representation of an ecological parameter like number of individuals present in various trophic levels of a food chain with producers forming the base and top carnivores the tip. Each trophic level represents a functional level. There are three types of ecological pyramids : (i) Pyramid of numbers, (ii) Pyramid of biomass and (iii) Pyramid of energy.

**(b)** Followings are some of the major adverse effects of biological magnification/biomagnification:

(i) DDT interferes with the egg-shell formation in many birds. The shells remain thin and break by bird's weight during incubation. Dieldrin is about 5 times more toxic than DDT when ingested and 40 times more poisonous when absorbed.

(ii) The chlorinated hydrocarbons are known to affect CNS (central nervous system), cause softening of brain, cerebral haemorrhage, cirrhosis of liver, hypertension, cancer, malformation of sex hormones, etc.

(iii) Biomagnification of mercury into fish through the food chain was responsible for large number of deaths due to Minamata disease in Japan.

(iv) Selenium accumulates in the plants growing on selenium-rich soils. Through food chain, such plants cause stunted growth, loss of appetite, gastro-intestinal disorders, etc., in the animals grazing on such plants.

**OR**

**(a)** Lion, tiger, leopard, whale - Top carnivore (Top trophic level)

Spider, cockroach, lizard, wolf, snake, toad, fish, crow, sparrow, crane, duck, peacock - Secondary consumers (III$^{rd}$ trophic level).

Crustaceans, grasshopper, deer, rat, squirrel, rabbit, elephant, goat - Primary consumer (II$^{nd}$ trophic level).

Phytoplankton, algae, *Hydrilla*, maize plant, *Nymphaea*, *Spirogyra* - Producers (I$^{st}$ trophic level).

**(b)** A straight line sequence of 'who eats whom' or eating and being eaten in an ecosystem is called a food chain. A network of cross connecting food chains involving producers, consumers and decomposers are termed as a food web.

**35.** The problem of waste disposal can be solved and reduced in the following manner:

(i) We should say no to plastic and other non-biodegradable materials and use disposable bags, plates and glasses made of paper and other materials of plant origin which are biodegradable.

(ii) All biodegradable domestic wastes should be dumped either in big pits specially dug up for this purpose or in low lying areas so that land reclamation could be brought about.

(iii) All non-biodegradable wastes such as metal, glass and plastic items should be segregated and handed over to authorities dealing with it. These items can be recycled.

**36.** **(a)** The amount of ozone in the atmosphere began to drop sharply in the 1980s. This decrease was linked to ozone depleting substances which react with ozone present in the stratosphere and destroy the same. The ozone layer is destroyed by aerosols (certain chemicals released into the air with force in the form of mist or vapour). Major aerosol pollutant present in jet plane emissions is chlorofluorocarbons. Chlorofluorocarbons (CFCs) are also widely used in refrigerators and in fire extinguishers. Other ozone depleting substances are nitrogen oxide, sulphur dioxide, halon, methyl chloroform, etc.

**(b)** Sometime back, use of *kulhads* (disposable cups made of clay) was suggested as an alternative of plastic cups. However, making of *kulhads* on such a large scale would have resulted in the loss of top fertile soil. Therefore, this proposal was set aside.

**OR**

Managing the solid wastes involves segregation and disposal of solid wastes in scientific way. Segregation involves separation of different types of waste materials. So that, these can be disposed off separately. After segregation the waste materials are transported to the site of disposal *via* big trolleys. The last step is disposal

which involves different methods. Some of them are as follows:

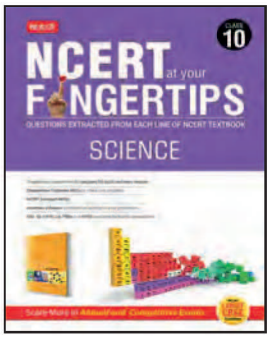
(i) Dumping : This is a conventional, inexpensive and widely used method of waste disposal in which solid wastes are dumped into low lying areas. This is known as land filling and such landfills can be used to develop parks. But it is not a good method as it creates pollution of different type.

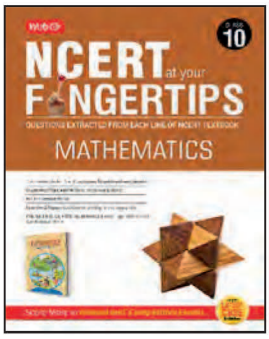
(ii) Composting : Conversion of biodegradable solid wastes like animal excreta, spoiled or left over food, vegetable and fruit peels, garden litter, etc., into manure is known as composting.

(iii) Incineration : It is the process of aerobic burning of the combustible constituents at a very high temperature (more than 1000°C), in the properly constructed hearth of furnaces. This is the ideal method for medical waste disposal.

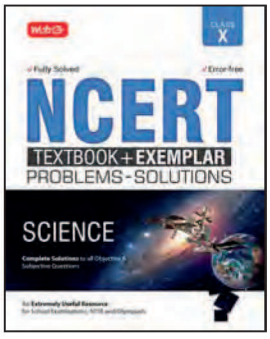
(iv) Pyrolysis : It is the combustion inside chambers in the absence of oxygen at a high temperature. Industrial gas and other useful substances are produced by this process.

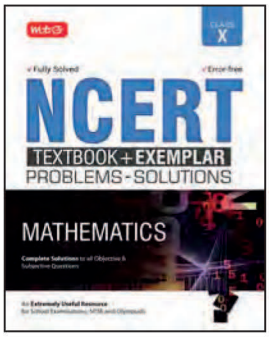
# BEST SELLING BOOKS FOR CLASS 10

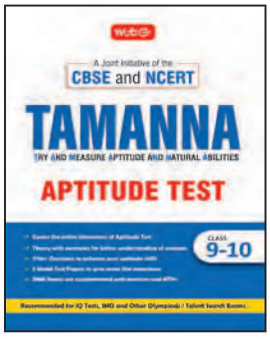


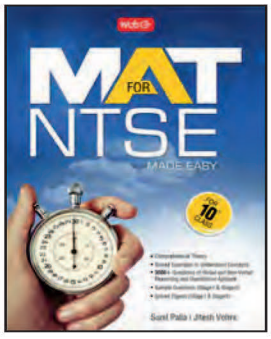



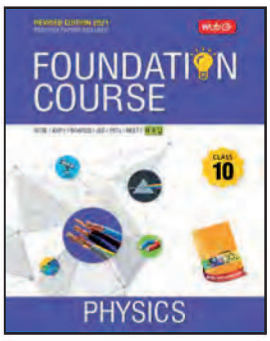


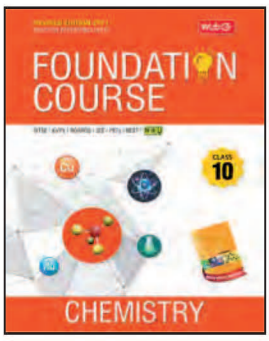



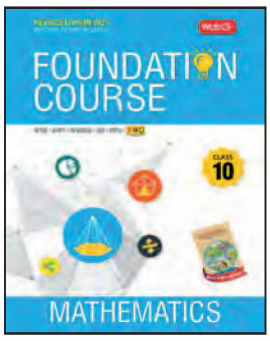



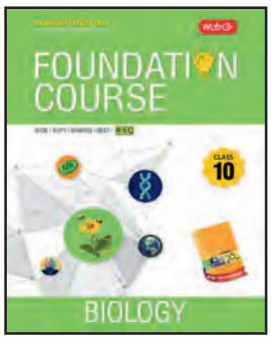



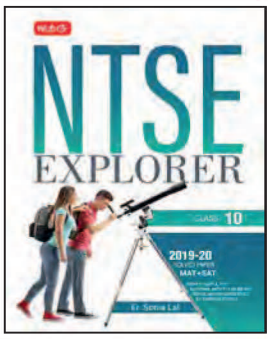



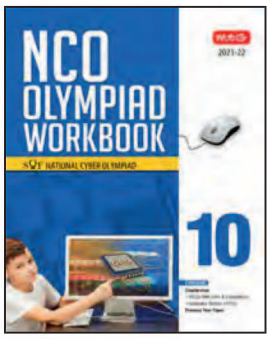



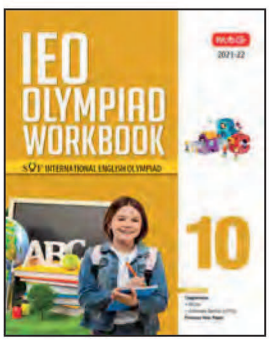



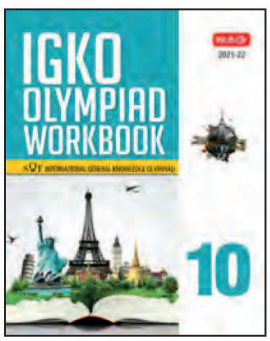



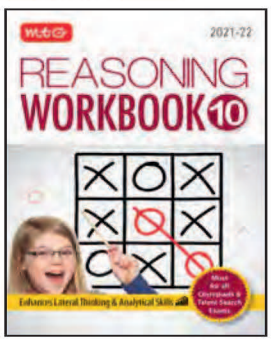




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