Our Environment

Objective Section (1 mark each)

Q. 1. Several factories were pouring their wastes in rivers A and B. Water samples were collected from these two rivers. It was observed that sample collected from river A was acidic while that of river B was basic. The factories located near A and B are: [CBSE OD, Set 1, 2020]

(a) Soaps and detergents factories near A and alcohol distillery near B.

(b) Soaps and detergents factories near B and alcohol distillery near A.

(c) Lead storage battery manufacturing factories near A and soaps and detergents factories near B.

(d) Lead storage bettery manufacturing factories near B and soaps and detergents factories near A.

Ans. **(c)** Lead storage battery manufacturing factories near A and soaps and detergents factories near B.

Q. 2. Human body is made up of five important components, of which water is the main component. Food as well as potable water are essential for every human being. The food is obtained from plants through agriculture. Pesticides are being used extensively for a high yield in the fields. These pesticides are absorbed by the plants from the soil along with water and minerals and from the water bodies these pesticides are taken up by the aquatic animals and plants. As these chemicals are not biodegradable, they get accumulated progressively at each trophic level. The maximum concentration of these chemicals gets accumulated in our bodies and greatly affects the health of our mind and body. [CBSE Delhi, Set 1, 2020]

(a) Why is the maximum concentration of pesticides found in human beings?

(b) Give one method which could be applied to reduce our intake of pesticides through food to some extent.

(c) Various steps in a food chain represent:

(i) Food Web

(ii) Trophic level

(iii) Ecosystem

(iv) Biomagnification

(d) With regard to various food chains operating in an ecosystem, man is a:

(i) Consumer

(ii) Producer

(iii) Producer and consumer

(iv) Producer and decomposer

Ans. **(a)** As human beings occupy the top level in any food chain, the maximum concentration of these chemicals get accumulated in our bodies. This phenomenon is known as biological magnification.

(b) By using non-toxic methods for controlling insects in the home and garden and by washing fruits and vegetables before eating.

(c) (ii) Trophic level

(d) (i) Consumer

Q. 3. In an ecosystem, 10% of energy available for transfer from one trophic level to the next is in the form of: [CBSE Delhi, Set 2, 2020]

(a) heat energy

(b) chemical energy

(c) mechanical energy

(d) light energy

Ans. **(b)** chemical energy

Q. 4. Soil fertility is determined by its ability to: [CBSE Delhi, Set 2, 2020]

(a) decay organic matter

(b) hold organic matter

(c) hold water

(d) support life

Ans. **(d)** support life

Very Short Answer Type Questions (1 mark each)

Q. 1. In the following food chain, 100 J of energy is available to the lion. How much energy was available to the producer?

Plant → Dear → Lion

[CBSE OD, Term 2, Set 1, 2017]

Ans. Plant → Dear → Lion

According to 10% law,

10% of x = 100

x = 1000 J in deer.

10 % of y = 1000

y = 10,000 J in Plant.

Q. 2. In the following food chain, plants provide 500 J of energy to rats. How much energy will be available to hawks from snakes?

Plants → Rats → Snakes → Hawks

[CBSE OD, Term 2, Set 2, 2017]

Ans. 500 J of energy is available to the rats thus according to 10% law, 50 J energy will be available to snakes and 5 J energy will be available to hawk.

Q. 3. In the following food chain, 20,000 J of energy was available to the plants. How much energy would be available to man in this chain?

Plants → Sheep → Man

[CBSE OD, Term 2, Set 3, 2017]

Ans. In the given food chain, according to 10% law,

Plants	→	Sheep	→	Man
20,000 J		2000 J		200 J

Amount of energy available to the man is 200 J.

Q. 4. What is an ecosystem?

[CBSE Delhi, Term 2, Set 1, 2017]

Ans. An ecosystem is a self sustaining system where biotic and abiotic organisms of various communities interact with each other. Ponds, forests, grasslands etc., are a few examples of ecosystem.

Q. 5. Why is forest considered a natural ecosystem?

[CBSE Delhi, Term 2, Set 2, 2017]

Ans. Forests are considered as natural ecosystem because of the following reasons:

(i) They have species of plants and animals that grow without human intervention.

(ii) All these species interact with each other and are interdependent on each other.

(iii) These are naturally sustainable.

Q. 6. The depletion of ozone layer is a cause of concern. Why?

[CBSE OD, Term 2, Set 1, 2016]

Ans. Ozone layer prevents UV rays from the sun to penetrate down the earth, due to ozone depletion. UV rays strike the earth surface and cause health hazards like skin cancer.

Q. 7. Write one negative effect, on the environment, of affluent life style of few persons of a society.

[CBSE OD, Term 2, Set 2, 2016]

Ans. Affluent lifestyle results in:

(i) Generation of excessive waste materials.

(ii) Excessive use of natural resources like coal and petroleum which causes pollution.

(iii) Use of excessive non-biodegradable material in packaging.

Q. 8. In a food chain of frog, grass, insect and snake, assign trophic level to frog.

[CBSE OD, Term 2, Set 3, 2016]

Ans. Grass—Insect—Frog—Snake.

Frog will be at 3rd trophic level.

Q. 9. List two natural ecosystems.

[CBSE Delhi, Term 2, Set 1, 2016]

Ans. Forest, Pond.

Q. 10. List two biotic components of a biosphere.

[CBSE Delhi, Term 2, Set 2, 2016]

Ans. Producers, consumers and decomposers are the biotic components of biosphere.

Q. 11. Why are green plants called producers?

[CBSE Delhi, Term 2, Set 3, 2016]

Ans. Green plants are called producers because they prepare their own food by photosynthesis using solar energy.

Q. 12. What will be the amount of energy available to the organisms of the 2nd trophic level of a food chain, if the energy available at the first trophic level is 10,000 joules?

[CBSE OD, Term 2, Set 1, 2015]

Ans. 1000 J.

Q. 13. The first trophic level in a food chain is always a green plant. Why?

[CBSE OD, Term 2, Set 2, 2015]

Ans. Green plants are the primary producers as they trap the energy from the sunlight.

Q. 14. Which of the following are always at second trophic level of food chains?

Carnivores, Autotrophs, Herbivores.

[CBSE OD, Term 2, Set 3, 2015]

Ans. Herbivores

Q. 15. What is the function of ozone in the upper atmosphere?

[CBSE Delhi, Term 2, Set 1, 2015]

Ans. It protects the earth from the harmful ultraviolet rays (UV) of the sun.

Q. 16. Why should biodegradable and non-biodegradable wastes be discarded in two separate dustbins?

[CBSE OD, Term 2, Set 3, 2015]

Ans. So that the time and energy required in segregation may be saved and waste may be disposed off quickly.

Short Answer Type Questions-I (3 marks each)

Q. 1. (a) From the following group of organisms create a food chain which is the most advantageous for Human beings in terms of energy.

Hawk, Rat, Cereal plant, Goat, Snake, Human Being

(b) State the possible disadvantage if the cereal plant is growing in soil rich in pesticides.

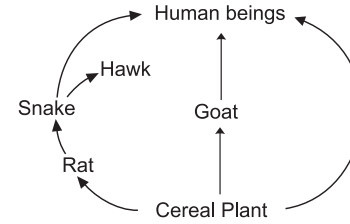
(c) Construct a food web using the organisms mentioned above.

[CBSE OD, Set 1, 2020]

Ans. (a) Cereal Plant – Human Being

(b) If cereal plants are grown in soil rich in pesticides, it can pose a potential risk to humans and other life forms and can result in unwanted side effects to the environment. Pesticides are lethal to non-targeted species also. Over 98% of sprayed insecticides and 95% of herbicides reach a destination other than their target species, because they are sprayed or spread across entire agricultural fields. The extensive use of pesticides in agricultural production can degrade and damage the community of micro-organisms living in the soil, particularly when these chemicals are overused or misused as chemical compounds build up in the soil.

(c)



Q. 2. (a) Write two harmful effects of using plastic bags on the environment. Suggest alternatives to the usage of plastic bags.

(b) List any two practices that can be followed to dispose off the waste produced in our homes.

[CBSE OD, Set 1, 2020]

Ans. (a) The harmful effects of plastics on the environment are:

(i) Plastics lead to air pollution when it burn.

(ii) When plastic artifacts enter the drainage and sewage system, they block the pipes and the drains causing water logging.

Alternatives to the usage of plastic bags are:

(i) We can reduce the use of plastic bags by carrying jute bags and paper bags to carry items from the market.

(ii) We can reduce the use of plastic containers for the storing of food and other items and also use more durable materials like metal boxes.

(iii) We can avoid using take away food containers.

(b) The practices that can be followed at our homes to dispose off wastes are:

(i) We can use discarded bottles and jars to store food items and water.

(ii) We can use broken artifacts and create something new with our own creativity, for e.g., discarded water bottles can be used as containers for craft, decorative items etc.

Q. 3. (a) Define ecosystem.

(b) Autotrophs are at the first level of food chain. Give reason.

(c) In a food chain of frogs, grass, insects and snakes assign trophic level to frogs. To which category of consumers do they belong to?

[CBSE OD, Set 2, 2020]

Ans. (a) An ecosystem consists of biotic components comprising living organisms and abiotic components comprising physical factors like temperature, rainfall, wind, soil and minerals.

(b) The autotrophs or the producers are at the first trophic level because they prepare their own food by using the solar energy and in turn makes it available for hetero trophs or the consumers, since they depend on them for their food.

(c) In a grassland food chain, the initial organisms are grass. They are producers which produces food using solar energy. Insects are primary consumers. Who eat plants. They are called herbivores. Frogs are secondary consumers. Who eat insects. They are called carnivores. Snake are tertiary consumers. They are carnivores and eat frogs.

Thus, the correct answer is **'Grass > Insect > Frog > Snake.'**

The grass occupies the first trophic level which consists of producers. The second trophic level consist of primary consumers which is Insect and the Frog is assigned the Third trophic level of food chain consisting of secondary consumers.

Q. 4. (a) Explain the role of UV radiation in producing ozone layer.

(b) Mention the reaction involved.

(c) Why is excessive use of CFCs a cause of concern?

[CBSE OD, Set 2, 2020]

Ans. (a) Ozone at the higher levels of the atmosphere is a product of UV radiation acting on oxygen (O_2) molecule. The higher energy UV radiations split apart some molecular oxygen (O_2) into free oxygen (O) atoms. These atoms then combine with the molecular oxygen to form ozone.

(b)

$$O_2 \xrightarrow{\text{UV}} O^{\bullet} + O^{\bullet}$$

$$O^{\bullet} + O_2 \longrightarrow O_3$$

Ozone

(c) The use of the chemicals such as CFCs damages the ozone layer and leads to its depletion. At the higher levels of the atmosphere, ozone performs an essential function, it shields the surface of the earth from ultraviolet (UV) radiation from the Sun. This radiation is highly damaging to organisms, since it is known to cause skin cancer in human beings.

Q. 5. Write the essential function performed by ozone at the higher levels of the Earth's atmosphere. How is it produced? Name the synthetic chemicals mainly responsible for the drop of amount of ozone in the atmosphere. How can the use of these chemicals be reduced?

[CBSE OD, Set 1, 2019]

Ans. Ozone layer absorbs most of the harmful ultraviolet radiations from the sun to the earth. It is formed high up in the atmosphere by the action of ultraviolet radiation on oxygen gas. Chlorofluorocarbons are the synthetic chemicals responsible for the drop of amount of ozone in the atmosphere.

$$O_2 \xrightarrow{UV} O^{\bullet} + O^{\bullet}$$

$$O^{\bullet} + O_2 \longrightarrow O_3$$

The use of these chemicals can be reduced by:

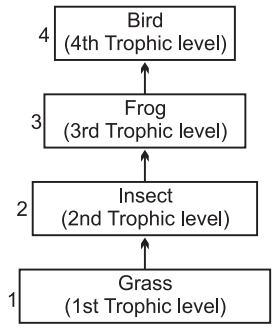
(i) Replacement of chlorofluorocarbons with hydrochlorofluorocarbons because it breaks down more quickly.

(ii) Safe disposal of old appliances such as refrigerators and freezers.

Q. 6. Define a food chain. Design a terrestrial food chain of four trophic levels. If a pollutant enters at the producer level, the organisms of which trophic level will have the maximum concentration of the pollutant in their bodies? What is this phenomenon called?

[CBSE OD, Set 3, 2019]

Ans. It is the sequence of arrangement of living organism in a community in which one organism consumes another organism to transfer food energy.

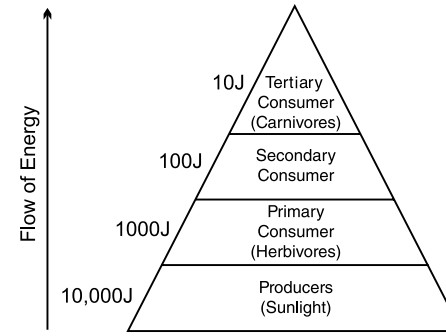


Grass ⟶ Insect ⟶ Frog ⟶ Bird

The organism at higher trophic level will have the maximum concentration of pollutants. This phenomenon is called biological magnification.

Q. 7. Define an ecosystem. Draw a block diagram to show the flow of energy in an ecosystem. [CBSE Delhi, Set 1, 2019]

Ans. Ecosystem refers to the interaction of all the biotic and abiotic components present in a particular area. Energy flows across the trophic levels following the 10% law. Only 10% of the energy available to a trophic level is passed on to the next trophic level.



(i) For example 10,000 J energy is available to producer.

(ii) Then 1000 J energy will be available to primary consumer.

(iii) 100 J energy will be available to secondary consumer.

(iv) 10 J energy will be available to tertiary consumers.

Q. 8. How can we help in reducing the problem of waste disposal? Suggest any three methods. [CBSE Delhi, Set 1, 2019]

Ans. The three methods by which we can reduce the problem of waste disposal are:

(i) Adopting the 3R approach i.e;–Reduce, Reuse, Recycle.

(ii) Segregation of waste into biodegradable and non-biodegradable waste.

(iii) Conversion of waste into useful components like biogas and then using compost as a fertiliser.

Q. 9. What is a food chain? Why is the flow of energy in an ecosystem unidirectional? Explain briefly. [CBSE, 2019]

14. (1) Food Chain is a sequence of organisms in which one consumes the other to transfer energy.

for eg.

Grass (Producer) $\xrightarrow{10\%}$ (90%) House (Herbivore) $\xrightarrow{10\%}$ (90%) Lion (Carnivore).

(2) The flow of energy in an ecosystem is always unidirectional as they cannot convert back the energy consumed or lost in environment.

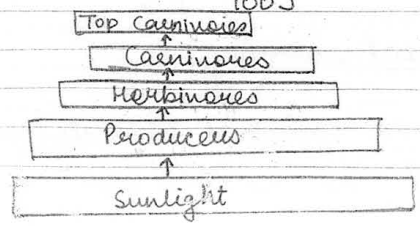
(3) For example, plants cannot convert back the chemical energy into solar energy.

(4) Since they move progressively from one trophic level to the other, the energy content goes on decreasing according to 10% law.

(5) They do not have that much energy to reverse the flow even if they want to.

for eg.

Plant (Producer) 1000 J $\xrightarrow{10\%}$ (90%) Cow (herbivore) 100 J $\xrightarrow{10\%}$ (90%) Tiger (Carnivore) 10 J



← Flow of energy in ecosystem

Q. 10. Students in a school listened to news read in the morning assembly that the mountains of garbage in Delhi, suddenly exploded and various vehicles got buried under it. Several people were also injured and there was traffic jam all around. In the brain storming session the teacher also discussed this issue and asked the students to find out a solution to the problem of garbage. Finally they arrived at two main points—one is self management of the garbage we produce and second is to generate less garbage at individual level.

(a) Suggest two measures to manage the garbage we produce.

(b) As an individual what can we do to generate the least garbage? Give two points.

(c) List two values the teacher instilled in his students in this episode.**

[CBSE, 2018]

Answer : 14

(a) (i) For managing garbage, first we must segregate it into biodegrable & non biodegradable substances. Biodegradable substances like vegetable peels, domestic waste, animal excreta, cow dung etc. must be converted into manure. This not only helps in enriched growth of plants but also prevents dumping of it in open, production of foul smell etc.

(ii) For non-biodegradable substances, we must further segregate as recyclable & non-recyclable. All recyclable metals, plastic, glass must be sent to different factories which after proper cleaning, process them in new products.

(iii) For rest over garbage, practices like filling it in landfills which can be converted into playground for children or incineration at places with proper management for it can be done.

(b) As an individual,

(i) One must follow the policy of 'reduce'. We should try to switch of lights when unnecessary for our resources & for garbage, try using same sheet of blank paper not used from other side, try making registers with utilising all the pages to reduce our demand for fresh copies, reducing usage of plastic disposable cups.

(ii) We must follow the policy of 'reuse'. Using jam bottles, milk cartons, packaging boxes, ketchup bottles is a good way to use resources already once used.

Ans. **(a)** **(i)** Segregate the garbage produced into biodegradable and non-biodegradable waste.

(ii) Stop using plastic bags instead of it more of cotton and jute bags should be used.

(b) **(i)** We should generate less garbage as much as possible.

(ii) Recycling and reuse of materials should be adopted in order to minimise the waste.

(c) Answer is not given due to change in the present syllabus.

Q. 11. You have been selected to talk on "Ozone layer and its protection" in the school assembly on 'Environment Day.'

(a) Why should ozone layer be protected to save the environment?

(b) List any two ways that you would stress in your talk to bring in awareness amongst your fellow friends that would also help in protection of ozone layer as well as the environment.

[CBSE Delhi, Term 2, Set 1, 2017]

Ans. **(a)** Ozone layer is a rich zone of ozone found in upper atmosphere. It helps in shielding the earth from the harmful UV radiations. If ozone layer gets depleted, UV radiations can directly reach the earth's surface and drastically affect the life on earth. For instance, UV radiations coming from sun cause skin cancer. So, it is very important to protect the ozone layer so as to save our environment.

(b) Some of the ways to protect and stop the depletion of the ozone layer include not buying products in aerosol cans, maintaining air-conditioning filters and units. In order to halt the depletion of the ozone layer, countries around the world have banned the use of chlorofluorocarbons and other ozone depleting substances. These compounds produce chlorine and bromine atoms high in the atmosphere, and these atoms react with ozone and destroy it. By reducing the use of fluoroscent lights, by minimising the use of vehicles to limit the emission of harmful gases that cause damage to the ozone layer, we can contribute to its protection.

Q. 12. Give reason to justify the following:

(a) The existence of decomposers is essential in a biosphere.

(b) Flow of energy in a food chain is unidirectional.

[CBSE Delhi, Term 2, Set 1, 2016]

Ans. **(a)** The existence of decomposers is essential in a biosphere because they breakdown complex organic substances into simple inorganic substance that can be absorbed by the plants. Thus, decomposers:

(i) Replenish the soil naturally.

(ii) Helps in reusing the biodegradable waste.

(b) In a food chain the energy moves progressively through the various trophic levels, it is no longer available to the previous level and the energy trapped by the autotrophs does not flows back. Thus flow of energy is unidirectional.

Q. 13. You have been appointed as the 'eco club incharge' of your school. You have to take care of the maintenance and conservation of the environment.

(i) Suggest any three ways by which you will carry on your duties.

(ii) Write any three qualities that you would like your school mates to develop for environment conservation.

[CBSE, Term 1, Set 1, 2016]

Ans. **(i)** Three ways towards conservation of environment are:

(a) Reduce the use of fossil fuels.

(b) Reuse non-biodegradable things.

(c) Recycle the resources to avoid wastage.

(ii) **(a)** Awareness

(b) Empathy

(c) Concern for environment

Q. 14. The activities of man had adverse effects on all forms of living organisms in the biosphere. Unlimited exploitation of nature by man disturbed the delicate ecological balance between the living

and non-living components of the biosphere. The unfavourable conditions created by man himself threatened the survival not only of himself but also of the entire living organisms on the mother earth. One of your classmates is an active member of 'Eco club' of your school which is creating environmental awareness amongst the school students, spreading the same in the society and also working hard for preventing environmental degradation of the surroundings.

(a) Why is it necessary to conserve our environment?

(b) State the importance of green and blue dustbins in the safe disposal of the household waste.

(c) List two values exhibited by your classmate who is an active member of Eco club of your school.**

[CBSE OD, Term 2, Set 1, 2016]

Ans. **(a)** It is necessary to conserve environment for protecting atmosphere and living habitat from degradation.

(b) Green dustbin is used for biodegradable wastes and blue dustbin is used for non-biodegradable waste.

(c) Answer is not given due to change in present syllabus.

Q. 15. Differentiate between biodegradable and non-biodegradable substances with the help of one example each. List two changes in habit that people must adopt to dispose non-biodegradable waste, for saving the environment.

[CBSE OD, Term 2, Set 1, 2015]

Ans.

Biodegradable substance	**Non-biodegradable substances**
Can be broken down into simpler substances by nature *e.g.,* Vegetable peels.	Cannot be broken down into simpler substances by nature. *e.g.,* Plastic or Glass.

Changes in habit:

(i) Use of separate dustbins for biodegradable and non-biodegradable waste.

(ii) Reusing of things such as polybags.

(iii) Recycle of waste.

(iv) Use of carry bags.

Q. 16. What is an ecosystem? List its two main components. We do not clean natural ponds or lakes but an aquarium needs to be cleaned regularly. Why is it so? Explain.

[CBSE OD, Term 2, Set 2, 2015]

Ans. All the interacting organisms in an area together with the non-living constituents of the environment form an ecosystem. The two main components of ecosystem are biotic and abiotic. An aquarium needs to be cleaned regularly due to lack of decomposer that can clean naturally by decomposing organic compounds.

Q. 17. After the examinations Rakesh with his friends went on a picnic to a nearby park. All friends carried cooked food packed in plastic bags or plastic cans. After eating the food some friends collected the leftover food and plastic bags etc., planned to dispose them off by burning. Rakesh immediately checked them and suggested to segregate the leftover food and peels of fruits from the plastic materials and respectively dispose them off separately in the green and red dustbins placed in the corner of the park.

(a) In your opinion, is burning plastic an eco-friendly method of waste disposal? Why? State the advantage of method suggested by Rakesh.

(b) How can we contribute in maintaining the parks and roads neat and clean?

[CBSE Delhi, Term 2, Set 1, 2015]

Ans. **(a)** No, it causes pollution. Segregation of wastes into biodegradable and non-biodegradable wastes at the initial stage of disposal saves time and energy.

(b) Parks and roads can be maintained neat and clean by using dustbin for putting wastes.