

## Chapter: Environmental Issues

### Exercise

**Question 1. What are the various constituents of domestic sewage? Discuss the effects of sewage discharge on a river.**

**Answer:**

Domestic sewage is the waste that originates from the kitchen, toilet, laundry, and lots of other sources. It has impurities such as the suspended solid in which sand, salt, clay comes, colloidal material in which fecal matter, bacteria, plastic, and cloth fiber comes, dissolved materials such as nitrate, phosphate, calcium, sodium, ammonia, and microbes that cause different diseases. When the organic waste from the sewage enters the water bodies, it is a food source for the microorganisms. Due to this, there is an increase in the population of these microorganisms inside the water body. For their metabolism, they utilize most of the dissolved oxygen. Due to this, there was an increase in the levels of Biological oxygen demand (BOD) in river water and this resulted in the death of aquatic organisms. Additionally, the nutrients present in the water lead to the growth of planktonic algae, which can cause the algal bloom. This results in the deterioration of water quality and fish mortality.

**Question 2. List all the wastes that you generate, at home, school, or during your Trips to other places, could you very easily reduce them? Which would be difficult or rather impossible to reduce?**

**Answer:**

The household wastes contain plastic bags, paper napkins, toiletries, kitchen wastes, domestic sewage, glass, etc. The school's waste contains waste papers, plastics, vegetable and fruit peels, food wrappers, sewage, etc. The wastes generated from the trips or picnics consist of plastic, waste papers, vegetable and fruit peels, disposable cups, paper plates, spoons, etc. The wastes can indeed be easily reduced by the judicious use of the materials mentioned above. It is possible to reduce the wastage of paper by writing on both sides of the paper and by using recycled paper. The plastic and glass waste can also be reduced by recycling them and by re-using them. Substituting plastic bags with biodegradable jute bags can also help reduce the wastes generated at home, school, or during trips. Domestic sewage can also be reduced by optimizing the use of water while bathing, cooking, and during other household activities. The non-biodegradable wastes for example plastic, metal, broken glass, etc. are quite difficult to decompose since microorganisms cannot decompose them.

**Question 3: Discuss the causes and effects of global warming. What measures need to be taken to control global warming?**

**Answer:**

Global warming can be defined as an increase in the average temperature of the Earth's surface. The major causes of global warming are: Global warming occurs as a result of the increased concentration of greenhouse gases in the atmosphere. Greenhouse gases include carbon dioxide, methane, and water vapors. The solar radiations released back by the Earth are trapped by these gases. This helps to keep the planet warm and therefore it helps in human survival. When there is an increase in the number of greenhouse gases, this will lead to an excessive increase in the Earth's temperature

which can lead to global warming. Global warming takes place due to industrialization, the burning of fossil fuels, and majorly due to deforestation.

The effects of global warming are: Global warming is an increase in the average temperature of the Earth's surface. It has been observed that in the past three decades, the average temperature of the Earth has increased by almost 0.6°C. Due to this the natural water cycle has been disturbed and results in changes in the pattern of the rainfall. The change can also be seen in the amount of rainwater. The control measures for the prevention of global warming:

- Reduce the use of fossil fuels.
- More use of biofuels.
- The improvement in energy efficiency.
- Extra use of renewable sources of energy such as the CNG.
- Reforestation is a must.
- More recycling of the materials.

**Question 4: Match the items given in columns A and B:**

Column A		Column B	
(a)	Catalytic converter	(i)	Particulate matter
(b)	Electrostatic precipitator	(ii)	Carbon monoxide and nitrogen oxides
(c)	Earmuffs	(iii)	High noise level
(d)	Landfills	(iv)	Solid wastes

**Answer:**

Column A		Column B (Answer)	
(a)	Catalytic converter	(ii)	Carbon monoxide and nitrogen oxides
(b)	Electrostatic precipitator	(i)	Particulate matter
(c)	Earmuffs	(iii)	High noise level
(d)	Landfills	(iv)	Solid wastes

**Question 5:**

**Write critical notes on the following:**

- Eutrophication**
- Biological magnification**
- Groundwater depletion and ways for its replenishment**

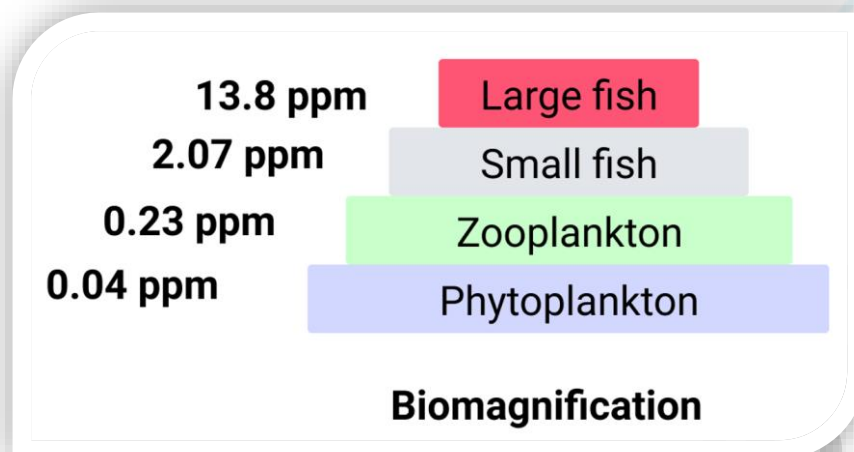
**Answer:**

(a) Eutrophication: This is the aging process that takes place naturally; this is a process of a lake caused due to nutrient enrichment. This process takes place by the runoff of nutrients such as animal wastes, fertilizers, and sewage from land which causes an increase in the fertility of the lake. Due to this, there is a tremendous increase in the primary productivity in the ecosystem. This increases the growth of algae, resulting in algal blooms. The decomposition of these algae depletes the supply of oxygen which leads to the death of other aquatic animal life.

(b) Biological magnification: To protect crops from several diseases and pests, a large number of pesticides can be used. This pesticide reaches the soil and is absorbed by the plants with water and minerals from the soil. Because of the rain, these chemicals can also be entered into the water sources and the body of aquatic plants and animals. Due to this, the chemicals enter the food chain. Because these chemicals cannot be decomposed, they keep on accumulating at each trophic level. The maximum concentration is accumulated at the top of the carnivore's level. This increase in the

concentration of pollutants or harmful chemicals with an increase in the trophic level is known as biological magnification.

For example, The high DDT concentrations are there inside a pond. The producers have a 0.04 ppm concentration of DDT. Just because many types of phytoplankton are eaten by the zooplanktons which are the consumers, the concentration of DDT in the bodies of zooplankton is 0.23 ppm. The small fishes that feed on zooplanktons accumulate more DDT in their body. Hence the large fish that feed on several small fish contains the highest concentration of DDT.



(c) Groundwater depletion and ways for its replenishment: There has been a rise in the groundwater level in recent years. The main sources of water supply are rapidly diminishing each year due to the increase in the population and also due to water pollution. For the required demand of water, the water is withdrawn from the water bodies such as ponds, rivers, etc. Due to this the source of groundwater is depleting. This is due to the amount of groundwater being drawn for human use being more than the amount replaced by rainfall. The lack of vegetation cover is also one of the results of very small amounts of water seeping through the ground. An increase in water pollution is also one of the factors that have reduced the availability of groundwater.

The measures for replenishing the groundwater are as follows:

- The prevention of the overexploitation of groundwater.
- To optimize the water use and to reduce the water demand.
- Rainwater harvesting.
- The prevention of deforestation and plantation of more and more trees.

**Question 6: Why does the ozone hole form over Antarctica? How will enhanced ultraviolet Radiations affect us?**

**Answer:**

The ozone hole is highly prominent in the region of Antarctica. It is due to an increased concentration of chlorine in the atmosphere.

The chlorine is mainly released from chlorofluorocarbons (CFCs) and is widely used as a refrigerant. The CFCs migrate from the troposphere to the stratosphere, where they are released by the chlorine atoms by the action of UV rays on them. The release of the Chlorine atoms results in the conversion of ozone into molecular oxygen. A single atom of chlorine can destroy around 10,000 molecules of the ozone and causes ozone depletion.

Due to the formation of the ozone hole, there is an increase in the concentration of the UV - B radiation on the Earth's surface. The UV -B results in the damage of DNA and activates the process

of skin aging. It is also responsible for darkening and skin cancer. The high levels of UV –B causes corneal cataract in human beings.

**Question 7: Discuss the role of women and communities in the protection and conservation of forests.**

**Answer:**

The vital role played by the women and communities in the field of environmental conservation movements are as follows:

- The case study of the Bishnoi community: The Bishnoi community which is there in Rajasthan works by believing in the concept of living peacefully with nature. In the year 1731, the king of Jodhpur ordered his ministers to arrange the wood for the construction of his new palace. So the minister and their workers went to the village called Bishnoi. There a Bishnoi woman named Amrita Devi along with her daughter and hundreds of other Bishnoi villagers showed the courage to come forward and stop them from cutting trees. They lost their lives at the hands of soldiers of the king while protesting against the tree cutting. This step taken by the villagers forced the king to give up the idea of cutting the trees.
- Chipko movement: This movement was started in 1974 in the Garhwal region of the Himalayas. During this movement, the women from the village stepped forward and stopped the contractors from deforestation by embracing them.

**Question 8: What measures, as an individual, would you take to reduce environmental pollution?**

**Answer:**

The following are the initiatives that can be taken to prevent environmental pollution:

- Following are the measures for the prevention of Air pollution.
  - Planting more and more trees.
  - By using clean and renewable energy sources such as the CNG and the bio-fuels.
  - By reducing the use of fossil fuels.
  - By using catalytic converters in automobiles.
- Following are the measures for the prevention of water pollution
  - By optimizing the usage of water.
  - By using kitchen wastewater in gardening and other household purposes.
- Following are the measures for the prevention of noise pollution
  - By avoiding burning crackers during the festival like Diwali.
  - By planting more and more trees.
- Following are the measures for decreasing solid waste generation
  - By segregating waste.
  - By recycling and reusing plastic and paper also by reducing the usage of plastics.
  - By composting the biodegradable kitchen waste.

**Question 9: Discuss briefly the following:**

- a. Radioactive wastes**
- b. Defunct ships and e-wastes**

**c. Municipal solid wastes**

**Answer:**

a. Radioactive wastes: The radioactive wastes are generated during the process of generating nuclear energy from the radioactive materials. Nuclear waste is rich in radioactive materials that generate a large number of ionizing radiations such as gamma rays. This ray causes mutation inside the organisms, which may result in skin cancer. If a high dosage is taken these rays can be lethal. The safe disposal of radioactive wastes is a very big challenge. It is recommended that the nuclear wastes should be stored after the pre-treatment in suitable shielded containers, which should then be buried inside the rocks.

b. Defunct ships and e-wastes: The defunct ships are the dead ships that are no longer able to be used. Such ships are broken down for scrap in countries such as India and Pakistan. From these ships, various toxicants originate such as asbestos, lead, mercury, etc. Therefore they contribute to the solid wastes that are hazardous to the health.

The e-wastes or the electronic wastes generally include electronic goods such as computers etc. These wastes are rich in metals such as copper, iron, silicon, gold, etc. These metals are highly toxic and can result in serious health hazards. The people of developing countries are involved in the recycling process of these metals and hence they get exposed to the toxic substances which are present in these wastes.

c. Municipal solid wastes: The municipal solid wastes are generated from the schools, offices, homes, and stores. These are rich in glass, metal, paper waste, food, rubber, leather, and textiles. The open dumps of the municipal wastes serve as a breeding ground for flies, mosquitoes, and other disease-causing microbes. Therefore it is necessary to dispose of municipal solid waste properly to prevent the spreading of such diseases. For the safe disposal of solid wastes the methods of sanitary landfills and incineration are responsible.

**Question 10: What initiatives were taken for reducing vehicular air pollution in Delhi? Has air quality improved in Delhi?**

**Answer:**

Delhi city has been categorized as the fourth most polluted city in the world in a list of around 41 cities. The burning of fossil fuels has added to the pollution of air in the city of Delhi.

Various steps have been taken to improve the quality of air.

The introduction of CNG (Compressed Natural Gas): By the order of the supreme court of India, CNG-powered vehicles were introduced at the end of the year 2006 for reducing the levels of pollution in Delhi. The CNG is a clean fuel that produces very little amount of unburnt particles.

The initiatives that have to be taken are as follows:

- By phasing out the old vehicles.
- By using unleaded petrol.
- By using the low-sulfur petrol and diesel.
- The usage of catalytic converters.
- The application of stringent pollution-level norms for vehicles.
- By the implementation of Bharat stage I, which is equivalent to euro II norms in the vehicles of major Indian cities.

With the introduction of CNG-powered vehicles, there is an improvement in Delhi's air quality, which has led to a substantial fall in the level of CO<sub>2</sub> as well as in the level of SO<sub>2</sub>. Whereas the problem of suspended particulate matter (SPM) and respiratory suspended particulate matter (RSPM) still need to be solved.

**Question 11: Discuss briefly the following:**

- (a) Greenhouse gases
- (b) Catalytic converter
- (c) Ultraviolet B

**Answer:**

- **Greenhouse gases:** The greenhouse effect is an overall increase in the average temperature of the Earth because of the presence of greenhouse gases. The greenhouse gases mainly include carbon dioxide, methane, and water vapors. When the solar radiation reaches the Earth, some of these are absorbed. These absorbed radiations are released again into the atmosphere. The greenhouse gases present in the atmosphere are responsible for trapping these radiations. This helps to keep the planet warm and hence it helps in human survival. The increase in the number of greenhouse gases can result in an excessive increase in the temperature of Earth by causing global warming.
- **Catalytic converter:** The catalytic converters are the devices fitted in automobiles for the reduction in vehicular pollution. These devices contain expensive metals such as platinum, palladium, and rhodium that also act as catalysts. When the discharge from vehicles passes through the catalytic converter, there is a conversion of the unburnt hydrocarbons into carbon dioxide and water. The carbon monoxide and nitric oxide which are released by the catalytic converters are then converted into carbon dioxide and nitrogen gas.
- **Ultraviolet-B:** The ultraviolet-B is electromagnetic radiation that has a shorter wavelength than visible light. These are the harmful radiations that originate from sunlight and penetrate through the ozone hole from the surface of the earth. These are responsible for many health hazards in humans. The UV –B damages the DNA and activates the process of skin aging. It is also responsible for skin darkening and skin cancer.