NCERT SOLUTIONS

CHAPTER - 16

ENVIRONMENTAL ISSUES

BIOLOGY CLASS 12

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Q1. What are the various constituents of domestic sewage? Discuss the effects of sewage discharge on a river.

Answer: Domestic sewage is the waste originating from the kitchen, toilet, laundry, and other sources. It contains impurities such as suspended solid (sand, salt, clay), colloidal material (fecal matter, bacteria, plastic and cloth fiber), dissolved materials (nitrate, phosphate, calcium, sodium, ammonia), and disease-causing microbes. When organic wastes from the sewage enter the water bodies, it serves as a food source for microorganisms such as algae and bacteria. As a result, the population of these microorganisms in the water body increases. Here, they utilize most of the dissolved oxygen for their metabolism. This results in an increase in the levels of Biological oxygen demand (BOD) in river water and results in the death of aquatic organisms. Also, the nutrients in the water lead to the growth of planktonic algal, causing algal bloom. This causes deterioration of water quality and fish mortality.

Q2. List all the wastes that you generate, at home, school or during your Trips to other places, could you very easily reduce? Which would be Difficult or rather impossible to reduce?

Answer:

- Wastes generated at home include plastic bags, paper napkins, toiletries, kitchen wastes (such as peelings of vegetables and fruits, tea leaves), domestic sewage, glass, etc.
- Wastes generated at schools include waste paper, plastics, vegetable and fruit peels, food wrappings, sewage etc.
- Wastes generated at trips or picnics include plastic, paper, vegetable and fruit peels, disposable cups, plates, spoons etc.
- Yes, wastes can be easily reduced by the judicious use of the above materials. Wastage of paper can be minimized by writing on both sides of the paper and by using recycled paper. Plastic and glass waste can also be reduced by recycling and reusing. Also, substituting plastic bags with biodegradable jute bags can reduce wastes generated at home, school, or during trips. Domestic sewage can be reduced by optimizing the use of water while bathing, cooking, and other household activities.
- Non- biodegradable wastes such as plastic, metal, broken glass, etc are difficult to decompose because micro-organisms do not have the ability to decompose them.

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

Answer: Increase in atmospheric concentration of greenhouse gases has resulted in a rise of atmospheric temperature by 0.6°C (global warming) in the 20th century. This has been confirmed by the intergovernmental panel on climate change (IPCC) in its reports of 1991 and 1992. This predictable change in the near future may affect climate, sea level, range of species distribution, food production as well as fisheries resources in the oceans.

Causes of global warming:

(i) Increase in concentration of greenhouse gases.
(ii) Increase of automobiles and use of fossil fuel.
(iii) Deforestation and change in land use.
(iv) CFC and aerosol emission from refrigerators and aeroplanes.
(v) Increased particulate matter in the lower atmosphere.

Effects of global warming:

(i) CO_2 fertilisation effect.

(ii)Many species of plants, being sensitive to temperature, will die with sudden rise in temperature and their place will be taken over by scrub vegetation.
(iii) Loss of biodiversity.
(iv) Rise in sea level.
(v) Possibilities of drought and floods.
(vi) Eruption of plant disease and pests.
(vii) Change in rainfall pattern.
Methods that can reduce the atmospheric concentration of greenhouses gases are
(i) Reducing the greenhouse gas emission by limiting the use of fossil fuels, and by developing alternative renewable sources of energy (wind energy, solar energy etc.)
(ii) Increasing the vegetation cover, mainly the forests, for photosynthetic utilization of CO2.
(iii) Minimizing the use of nitrogen fertilizers in agriculture for reducing N2O emissions.
(iv) Developing substitutes for chlorofluorocarbons.

Q4. Match the items given in column A and B:

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

Answer: (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

Q5. Write critical notes on the following:
(a) Eutrophication
(b) Biological magnification
(c) Groundwater depletion and ways for its replenishment
Answer: (a) Eutrophication: It is excessive growth of algae, plants and animals in water bodies due to the nutrient enrichment particularly with nitrogen and phosphorus. It is both natural and accelerated. It leads to loss of biodiversity and causes chemical accumulation in the food chain and ageing of the water body.
(b) Biological magnification: Increase in concentration of persistent chemicals at successive trophic levels is called eutrophication. This happens because a toxic substance accumulated by an organism can not be metabolized or excreted, and is thus passed onto the next trophic level, e.g., DDT.
(c) Groundwater depletion and replacement: Groundwater depletion, a term often defined as long term water level declines caused by sustained groundwater pumping, is a key issue associated with groundwater use. Many areas of India are experiencing groundwater depletion.
The most severe consequence of excessive groundwater pumping is that the water table, below which the ground is saturated – with water, can be lowered. If ground water level declines too far, then the well owner might have to deepen the well, drill a new well, or at least attempt to lower the pump.

Q6. Why do ozone holes form over Antarctica? How will enhanced ultraviolet Radiations affect us?

Answer: The ozone hole is more prominent over the region of Antarctica. It is formed due to an increased concentration of chlorine in the atmosphere.

Chlorine is mainly released from chlorofluorocarbons (CFC's) widely used as refrigerants. The CFC's magnate from the troposphere to the stratosphere, where they release chlorine atoms by the action of UV rays on them. The release of Chlorine atoms causes the conversion of ozone into molecular oxygen. One atom of chlorine can destroy around 10,000 molecules of ozone and causes ozone depletion.

The formation of the ozone hole will result in an increased concentration of UV - B radiation on the Earth's surface. UV −B damages DNA and activates the process of skin ageing. It also causes skin darkening and skin cancer. High levels of UV −B cause corneal cataract in human beings.

Q7. Discuss the role of women and communities in protection and conservation of forests.

Answer: Amrita Bishnoi Wildlife protection project The Bishnoi community is known for its peaceful coexistence with nature. It was in 1730 AD. Amrita Devi protested against the king's men's attempt to cut trees as it was prohibited in Bishnoi religion. It was a party of Maharaja Abhay Singhji, Ruler of Marwar (Jodhpur) state who wanted to fell green khejri trees. Amrita Devi fy her three daughters & more than 360 of other Bishnois lost their lives in saving trees & became martyrs. Later the 'Chipko' movement was started by Sunderlal Bahuguna and others to prevent the cutting of trees. The people showed enormous bravery in protecting trees from the axe of contractors by hugging them.

Q8. What measures, as an individual, would you take to reduce environmental pollution?

Answer: To reduce environmental pollution we should take following measures:

- Reducing use of CFC.
- Disposing off waste safely.
- Reducing use of polythene.
- Not disposing off waste in water bodies.
- Making automobiles pollution free.
- Prevention of noise pollution by using firecrackers/TV/musical instruments at permissible limits.
- Tree plantation in school, around residence.

Q9. Discuss briefly the following:

(a) Radioactive wastes

(b) Defunct ships and e-wastes

(c) Municipal solid wastes

Answer:

(a) Radioactive waste: Radioactive waste includes materials that are radioactive & for which there is no further practical use. These are generated by nuclear reactors, nuclear fallout, man made (refining and mining of platinum and thorium), natural radioactive waste and release of radiation in radiation therapy.

Increased risk of cancer, birth defects & infertility are few harmful effects caused by nuclear waste. So, nuclear waste is an extremely potent pollutant.

(b) Defunct ships & e-wastes: The dismantling of defunct ships is a technically complex process, which is potentially harmful to the environment & human health. Defunct i ships contain toxicants like asbestos, mercury, etc. The workers breaking the ships are not suitably protected and are exposed to toxic chemicals. The coastal areas in the vicinity of the ship-breaking yard also become polluted. At the international level, it is accepted that there is uncertainty about the relevant controls for the dismantling of such vessels & there is an urgent need to establish a specific enforceable control framework.
Electronic waste comprises irreparable computer and other electronic goods, generated by developed countries.
It is a valuable source of secondary raw materials, if treated properly, however if not treated properly it is the major source of toxins. Eventually recycling is the only solution for the treatment of e-wastes provided it is carried out in an environmentally friendly manner.

(c) Municipal solid wastes: These are commonly known as trash or garbage. It consists of everyday items such as product packaging, furniture, clothing, bottles, food scraps, newspapers.
appliances, paints, batteries etc. Source reduction, recycling and composting are several municipal social waste management practices. Source reduction involves altering the design, manufacture or use of products & materials to reduce the amount and toxicity of what gets thrown away. Recycling diverts items such as paper, glass, plastic & metals into new products. Composting decomposes organic waste such as food scraps & yard trimmings with microorganisms, producing a humus-like substance.

Q10. What initiatives were taken for reducing vehicular air pollution in Delhi? Has air quality improved in Delhi?

Answer: Delhi has been categorized as the fourth most polluted city of the world in a list of 41 cities. Burning of fossil fuels has added to the pollution of air in Delhi.
Various steps have been taken to improve the quality of air in Delhi.
(a) Introduction of CNG (Compressed Natural Gas):By the order of the supreme court of India, CNG-powered vehicles were introduced at the end of 2006 to reduce the levels of pollution in Delhi. CNG is a clean fuel that produces very little unburnt particles.
(b) Phasing out of old vehicles
(c) Use of unleaded petrol
(d) Use of low-sulphur petrol and diesel
(e) Use of catalytic converters
(f) Application of stringent pollution-level norms for vehicles
(g) Implementation of Bharat stage I, which is equivalent to euro II norms in vehicles of major Indian cities.

The introduction of CNG-powered vehicles has improved Delhi's air quality, which has led to a substantial fall in the level of CO2and SO2. However, the problem of suspended particulate matter (SPM) and respiratory suspended particulate matter (RSPM) still persists.

Q11. Discuss briefly the following:
(a) Greenhouse gases
(b) Catalytic converter
(c) Ultraviolet B

Answer:

(a) Greenhouse gases: Gases that trap the heat of the sun in the earth's atmosphere increasing atmospheric temperature effect are called greenhouse gases. CO2, CH4, N2O and CFC, cause greenhouse. In the absence of greenhouse gases, the temperature of earth would go down to -18°C. The net effect of higher GHGs will be disastrous, (i) Melting of polar ice caps and mountain snow caps resulting in rising sea level threatening submergence of many islands and coastal areas. Odd climate changes like El Nino. Increased floods and drought.

(b) Catalytic converter: Catalytic converters are used to reduce emission of poisonous gases like nitrogen oxides, carbon monoxide & un reacted hydrocarbons in automotive emission. It is made of platinum, palladium and rhodium and is used as a catalyst. It converts unburnt hydrocarbons into CO2. The only precaution required is not to use gasoline having lead as lead inactivates the catalysts of the converter.

(c) Ultraviolet B: Ultraviolet B is one of the three types of invisible light rays given off by the sun. Ultraviolet B penetrates the ozone layer in attenuated form & reaches earths. This is more over equator than poles due to thinning of the ozone shield over the equator. It causes skin cancer, reduces the rate of photosynthesis in phytoplanktons, and reduces diversity of aquatic ecosystems.

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