

POLLUTION

(AIR AND WATER)

Pollution

Pollution can be defined as undesirable change in physical, chemical and biological properties of air, water and soil, which directly or indirectly affect human beings and other forms of life. Pollution causing agents or substances are called pollutants. Various Types of Pollution are

Air Pollution

- The air present in the atmosphere is mixture of gases. The major components of gases of air are oxygen (20%), nitrogen (70%) and carbon dioxide (0.32%).
- The pollution of air may be caused by natural process or by human activities.
 - (i) **Air Pollution Due to Natural Processes** The dust raised from ground during strong winds and storms, smoke from fire and fog, the decomposition of plant and animal remains and the pollen grains also contribute to air pollution.
 - (ii) **Air Pollution Due to Human Activities** Man burns fuels which produces smoke and industries release harmful gases in the atmosphere.
 - **Smog** It is fog like thick layer present in atmosphere. It is made up of smoke and fog. It contains oxides of nitrogen combined with other air pollutants and cause respiratory problems.
 - **CFCs** These are a kind of air pollutants known as chlorofluorocarbons (CFCs). These arise from refrigerators, air conditioners and aerosol sprays.
 - **SPM** These are Suspended Particulate Matter present in the air (particles smaller than 2.5 micron size).

This chapter deals with the pollution of air and water as well as their ill effects on plants and animals. The methods that can be used to prevent the pollution has also been discussed.

Effects of Air Pollution

Due to the two main acidic gases (sulphur dioxide and nitrogen dioxide) damage the historical monuments.

- (i) **ACID Rain** (a cause of damage to Taj Mahal) The pollutant like SO_2 and NO_2 when combine with rain water form H_2SO_4 and HNO_3 acids. They cause the damage to the marble of Taj Mahal. Thus causing its corrosion.
- (ii) **Ozone Hole** CFCs present in air go up in the atmosphere and react with O_3 gases and this causes hole there. This way protective ozone layer gets destroyed.
- (iii) **Effect on health** Many respiratory problems are caused due to air polluted with CO_2 , CO, SO_2 , NO_2 etc e.g. Asthma, Allergy etc.

Green House effect and global warming

The climate of earth facing regular changes due to the presence of green house gases and other air pollutants.

Green House Effect

The trapping of solar radiation by gases (CO_2 , NO_2 , water vapour, CH_4 etc.) present in earth's atmosphere which leads to increase the average temperature of earth is called green house effect.

It can be prevented by planting more trees, reducing air pollution, less use of fossil fuels etc.

Global Warming

Increase in green house gas concentration is atmosphere trap more solar radiation. Because of this there is increase in average global temperature (2.5° every year). This is called global warming. It causes polar ice melt and rise in sea level water in coastal areas.

Water Pollution

- Water is made up of two elements hydrogen and oxygen. A molecule of water contains two hydrogen atoms and one oxygen atom. The chemical formula of water is H_2O .
- Water exists in all the three physical states i.e. solid, liquid and gas.
- Water occurs in nature in the free state as well as in the combined state as a part of several salts and minerals. Water occurs in the oceans, lakes, rivers, springs and wells.
- Water occurs in the tissues of plants and animals.
- Rainwater, well water, river water, sea water are sources of water. The contamination of water by the addition of unwanted and harmful substances, is called water pollution. Whenever harmful substances such as sewage, toxic chemicals, silt, etc get mixed with water, the water becomes polluted. The substances that pollute water are called water pollutants.

Effects of Water Pollution

- The polluted water adversely affects plant and animal life. In humans it causes various infectious diseases like typhoid, dysentery, cholera, etc.
- The water pollution can be prevented by sewage treatment, less use of chemicals in agricultural practices preventing the throw of industrial effluent into water bodies.

Ganga Action Plan

- This action plan to recover the Ganga river came into existence in 1985 by Government of India. It is one of the ten most endangered rivers of the world. Cleaning works done under Ganga Action Plan (GAP) has improved the quality of water as well as plant and animal life existing in it.
- **Potable Water** Water which is suitable for drinking is called potable water.
- **Three R's** Reduce, Reuse and Recycle are the three concepts to reduce water pollution.

PRACTICE EXERCISE

1. Air is a mixture of various gases. One of the gases is 21% part of the air and is essential for the survival of human beings. This gas is
 - (a) nitrogen
 - (b) oxygen
 - (c) ozone
 - (d) argon
2. The components of air which are harmful to living beings are
 - (a) nitrogen and carbon dioxide
 - (b) dust and water vapour
 - (c) dust and smoke
 - (d) smoke and water vapour
3. Major pollution is caused by are
 - (a) animals
 - (b) man
 - (c) hydrogen gases
 - (d) None of these
4. At present, the concentration of CO_2 in the atmosphere is about
 - (a) 100 ppm
 - (b) 240 ppm
 - (c) 380 ppm
 - (d) 520 ppm
5. The main cause of pollution in metrocities is
 - (a) burning of fossil fuels
 - (b) water plants
 - (c) domestic products
 - (d) None of these
6. CFCs are responsible for
 - (a) ozone layer depletion
 - (b) deforestation
 - (c) acid rain
 - (d) None of these
7. Which of the following is not a greenhouse gas?
 - (a) Water vapour
 - (b) Carbon monoxide
 - (c) Methane
 - (d) Oxygen
8. Acid rain contains
 - (a) SO_2 and NO_2
 - (b) NO_3
 - (c) O_3
 - (d) CO
9. Which of the following gases does not cause acid rain?
 - (a) Sulphur dioxide
 - (b) Methane
 - (c) Nitrous oxide
 - (d) None of these
10. Taj Mahal marble is affected by
 - (a) SO_2
 - (b) O_2
 - (c) O_3
 - (d) None of these
11. Ozone hole rain is due to
 - (a) CO_2
 - (b) CO
 - (c) CFCs
 - (d) SO_2
12. Greenhouse effect is due to the presence of
 - (a) ozone layer in the atmosphere
 - (b) infrared light reaching the earth
 - (c) moisture layer in the atmosphere
 - (d) CO_2 layer in the atmosphere
13. A gradual increase in the average temperature of earth's atmosphere is known as
 - (a) acid rain
 - (b) global warming
 - (c) deforestation
 - (d) None of the above
14. Which one of the following is mainly responsible for greenhouse effect?
 - (a) SO_2
 - (b) CO_2
 - (c) CO
 - (d) O_2
15. Which one of the following pairs of gases are the major cause of greenhouse effect?
 - (a) CO_2 and CO
 - (b) CFCs and SO_2
 - (c) CO_2 and N_2O
 - (d) CO_2 and O_3
16. Greenhouse effect with respect to global climate refers to
 - (a) cooling and moist condition
 - (b) warming effect
 - (c) increase rainfall and greenery
 - (d) desertification

- 17.** Biological pollution in water is caused by
 (a) coal mines
 (b) domestic sewage and animal excreta
 (c) oil spills
 (d) chemicals like paint
- 18.** A pond contains clean water. Which of the following activities will produce least pollution of water?
 (a) Washing clothes in the pond
 (b) Bathing animals in the pond
 (c) Washing motor vehicles in the pond
 (d) Swimming in the pond
- 19.** The Ganga Action Plan was launched in the year
 (a) 1985
 (b) 1981
 (c) 2000
 (d) 1958
- 20.** The cause(s) of water pollution is/are
 throughling of
 (a) garbage in river
 (b) untreated sewage in river
 (c) dead bodies in river
 (d) All of the above

Answers

1	(b)	2	(c)	3	(b)	4	(c)	5	(a)	6	(a)	7	(d)	8	(a)	9	(b)	10	(a)
11	(c)	12	(d)	13	(b)	14	(b)	15	(c)	16	(b)	17	(b)	18	(d)	19	(a)	20	(d)