Environmental Chemistry

1. Introduction of pollutants into the environment that causes undesirable changes and has harmful effects on plants, animals, and human beings is called environment pollution.

2. Pollutants are the waste materials, which cause pollution. They are of two types: biodegradable (food and garden waste, human waste) and non biodegradable (plastic, glass, heavy metals, etc.).

3. **Atmospheric pollution are of two types:**

1. Tropospheric pollution (Troposphere → lowest region of atmosphere)
2. Stratospheric pollution (Stratosphere → above the troposphere)

Tropospheric pollution

1. **Gaseous air pollutants** → Oxides of sulphur (SO_2), oxides of nitrogen (NO, NO_2), hydrocarbons, oxides of carbon (CO, CO_2)

CO binds to haemoglobin to form carboxyhaemoglobin, which is more stable than oxygen-haemoglobin complex. This may lead to death.

Greenhouse gases→CO_2 (main gas), methane, ozone, chlorofluorocarbon (CFCs), water vapours, nitrous oxide.

Oxides of sulphur and nitrogen combine with rain water to form acid rain (pH=5.6).

2. Particulate pollutants →Dust, mist, fumes, smoke, smog, etc.

Smog (the word derived from smoke and fog). It is of two types:

1) Classical smog (Also called reducing smog) 2) Photochemical smog (Also called oxidising smog)

Photochemical smog causes irritation of eyes, headache, chest pain, cough, difficulty in breathing, damage to plant life

and corrosion. It can be controlled by using catalytic converter in automobiles and by plantation of Pinus, Juniparus, Pyrus, etc.

Stratospheric pollution:

Ozone layer is depleted due to the excessive use of chlorofluorocarbons.

Effects of ozone layer depletion:

1. Skin cancer, cataract, damage to fish production
2. Increase of evaporation of water

3. Damage of paints and fibres
4. Harmful mutation of cells

Water pollution:

Causes:

1. Pathogens
2. Organic wastes: Biochemical Oxygen Demand (BOD) → Measure of the amount of organic material in water

   BOD of clean water → less than 5 ppm
   BOD of highly polluted water →17 ppm or more

3. Chemical pollutants

cess of fluoride, lead, sulphate, nitrate, some metals in drinking water is very harmful.

Soil pollution:

- Pesticides → Synthetic toxic chemicals used in agriculture to control damages caused by insects, rodents, weeds, and various crop diseases. E.g. DDT
- Herbicides →Chemicals used to control weeds. E.g.: Sodium chlorate ($NaClO_3$), sodium arsenite (Na_3AsO_3)

Domestic waste can be used as manure

Green Chemistry:

Green chemistry is a way to protect our environment from chemicals and wastes by utilizing the knowledge and principles of chemistry and other sciences.