

One-Liners' PDF Pollution & its Hazardous Effects

AIR, WATER & SOIL POLLUTION

Air or Atmosphere

- It is a homogeneous mixture of different gases.
- It has different density at different heights from sea level.
- It has several layers:
 1. Troposphere
 2. Stratosphere
 3. Mesosphere
 4. Thermosphere

Oxygen (O₂)

- It is obtained during photosynthesis.
- It is non-combustible, but help in combustion.
- It forms oxide with metals and non-metals.

Ozone (O₃)

- It is an allotrope of oxygen.
- It is used as insecticide, in purification of water to preserve food, to synthesis artificial silk and camphor and as a bleaching agent.

Nitrogen (N₂)

- It was discovered by Rutherford.
- It is a colourless, odourless, non-combustible, non-poisonous gas.
- It is lighter than air.
- Soil contains several pores filled with air. At the time of rain those pores get filled with water. That's why earthworm come at the surface to breath.

Carbon Dioxide (CO₂)

- It is used by plants for photosynthesis.
- It is 1.5 times heavier than water.
- It is used as a fire extinguisher.

Water

- It consists of two elements hydrogen and oxygen.
- It is a universal solvent and maintains the body temperature due to its high specific heat.

There are different types of water:

Soft Water

- Soft water is surface water that contains low concentrations of ions and in particular is low in ions of calcium and magnesium. Soft water naturally occurs where rainfall and the drainage basin of rivers are formed of hard, impervious and calcium-poor rocks. *Soft water easily lather with soap.*

Hard Water

- Hard water is water that has high mineral content (in contrast with "soft water"). Hard water is formed when water percolates through deposits of limestone and chalk which are largely made up of calcium and magnesium carbonates. *Hard water does not lather with soap.*

It is of two types

Temporary Hard Water

- It contains bicarbonate of calcium and magnesium.
- It is converted into soft water by boiling or by adding calculated quantity of calcium hydroxide.

Permanent Hard Water

- It contains sulphates and chlorides of calcium and magnesium.
- It is converted into soft water by adding sodium carbonate or zeolite.

Heavy Water

- It is deuterium oxide (D₂O).
- It is used as a moderator in nuclear reactor.



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Water Pollution

- It is due to the presence of sewage, algae, soluble salts etc. in water.
- It can also be due to metals.
- These causes following diseases

Metal Name	Name of the Disease
Mercury	Minamata Disease
Chromium & Arsenic	Cancer
Cadmium	Itai-Itai Disease

Soil Pollution

- It is alteration in soil.
- It is caused by pesticides like insecticides (e.g. DDT, BHC), herbicides, fungicides.

Pollutants

These substances contaminate the environment and of two types:

Primary Pollutant

- A primary pollutant is an air pollutant emitted directly from a source.
- E.g. Sulphur di-oxide(SO₂), Nitrogen dioxide(N₂O), Ammonia, Carbon Mono-oxide, etc.

Secondary Pollutant

- A secondary pollutant is not directly emitted as such, but forms when other pollutants (primary pollutants) react in the atmosphere.
- e.g. Ozone(O₃), PAN etc.

Carbon Monoxide(CO)

- It is formed by incomplete combustion.
- Carbon monoxide is a colorless, odorless, and tasteless gas that is slightly less dense than air.
- It is toxic to animals that use hemoglobin as an oxygen carrier when encountered in concentrations above 35ppm.

Sulphur dioxide

- It is highly toxic for both animals and plants
- It also causes eye and throat irritation and breathlessness
- Sulphur dioxide reduces the rate of formation of chloroplast and thus, causes chlorosis is highly corrosive and damage buildings, marbles (Taj Mahal) and textiles.
- SO₂ is oxidized to SO₃ which reacts with water to give remains suspended in the air as droplets or come down in the form of acid rain.

Oxides of nitrogen

- Oxides of Nitrogen is a colourless, odourless gas
- NO₂ is highly toxic for living tissues causes leaf fall
- It is a corrosive oxide and helps in the formation of smog

Hazardous Effects of Pollution

Green House Effect

- It is the heating of the Earth and its objects because of the trapping of IR radiations by carbon dioxide (CO₂), Methane (CH₃), NO, ozone(O₃), chlorofluorocarbons and water vapour.

Global Warming

- It is a result of increased concentration of Green-house gases
- It may result in melting ice caps, glaciers, spreading of several diseases like malaria, sleeping sickness etc.



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Acid Rain

- Acid rain has a pH of less than 5. It occurs due to oxides of nitrogen and Sulphur.
- pH of normal rainwater is 5.6
- It damages the building and other structures made up of limestone as marble, corrodes metal pipes

Particulates

- These are minute solid particles and liquid droplets dispersed in air. E.g. dusts, mists, smoke, fumes etc.

Diseases	Causes
Silicosis	Due to inhalation of free silica
Black lung disease	Found in workers of coal mines
Pneumoconiosis	Due to inhalation of coal dust
White lung disease	Found in textile workers
Byssinosis	Due to inhalation of cotton fibre dust

Smog

Smog is a type of severe air pollution.

It is a consequence of particulate pollution and is of two types:

1. Classical Smog

- It is also called **London Smog**
- It is reducing in nature. It is formed in cool humid climate when carbon soot particles combine with gaseous oxides of Sulphur.

2. Photochemical Smog

- It is called as **Los Angeles smog**
- It occurs in warm, dry and sunny climate by the action of sunlight on unsaturated hydrocarbons and nitrogen oxide.



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