

POLLUTION – UG SEMESTER II NOTES

Definition of Pollution- Pollution is the **undesirable change** in the physical, chemical, or biological characteristics of the environment (air, water, soil, etc.) that can harm humans, animals, plants, and ecosystems.

Key points

- Caused by natural or human activities
- Leads to environmental damage
- Affects health and biodiversity

Types of Pollution

Environmental pollution is usually classified into:

1. **Air Pollution**
2. **Water Pollution**
3. **Soil/Land Pollution**
4. **Noise Pollution**
5. **Thermal Pollution**
6. **Nuclear/Radioactive Pollution**
7. **Plastic Pollution**
8. **Light Pollution** (additional)

3. Air Pollution

Definition: Presence of harmful substances in the air in concentrations that threaten the well-being of humans and the environment.

Major air pollutants

- Carbon monoxide (CO)
- Sulphur dioxide (SO₂)

- Nitrogen oxides (NO_x)
- Particulate matter (PM_{2.5}, PM₁₀)
- Ozone (O₃)
- Smoke, dust, fumes

Causes

- Vehicle emissions
- Industrial smoke
- Burning fossil fuels
- Agricultural burning
- Construction dust

Effects

- Respiratory diseases (asthma, bronchitis)
- Global warming
- Acid rain
- Ozone layer depletion
- Reduced visibility

Control measures

- Use of public transport
- Afforestation
- Pollution control devices (filters, scrubbers)
- Clean fuels (CNG, electric vehicles)

4. Water Pollution

Definition: Contamination of water bodies (rivers, lakes, oceans, groundwater) by harmful substances.

Causes

- Industrial waste
- Sewage discharge
- Agricultural run-off (fertilizers, pesticides)
- Oil spills
- Plastic dumping

Effects

- Water-borne diseases (cholera, typhoid)
- Eutrophication
- Destruction of aquatic life
- Shortage of drinking water

Control measures

- Sewage treatment plants (STPs)
- Ban on dumping industrial waste
- Rainwater harvesting
- Using organic farming methods

5. Soil/Land Pollution

Definition: Degradation of soil quality due to the presence of harmful chemicals or solid waste.

Causes

- Overuse of chemical fertilizers and pesticides
- Dumping of plastics, metals
- Mining
- Industrial waste

Effects

- Loss of soil fertility
- Groundwater pollution
- Reduced crop yield
- Harm to microorganisms

Control measures

- Organic farming
- Proper solid-waste management
- Recycling and reusing materials
- Planting vegetation

6. Noise Pollution

Definition: Unwanted or excessive sound that disturbs normal life and causes health problems.

Sources

- Traffic and vehicles
- Construction work
- Loudspeakers and music systems
- Airports and railways

Effects

- Hearing loss
- Stress and irritation
- Sleep disturbance
- Reduced work efficiency

Control measures

- Use of silencers

- Noise control laws
- Soundproof buildings
- Plantation along roads

7. Thermal Pollution

Definition

Heating of water bodies due to discharge of hot water from industries or power plants.

Effects

- Death of aquatic life
- Less dissolved oxygen in water
- Growth of harmful algae

Control

- Cooling towers
- Using recycled water
- Regulating industrial discharge temperatures

8. Radioactive Pollution

Definition: Release of radioactive substances into the environment.

Sources

- Nuclear power plants
- Medical radiation
- Atomic weapon testing

Effects

- Genetic mutations
- Cancer
- Soil and water contamination

Control

- Safe disposal of radioactive waste
- Strict monitoring in nuclear plants
- Use of protective equipment

9. Plastic Pollution

Definition

Accumulation of plastic materials in the environment causing harm to wildlife and ecosystems.

Effects

- Death of marine animals
- Microplastics entering the food chain
- Soil infertility

Control

- Ban on single-use plastics
- Recycling
- Biodegradable alternatives