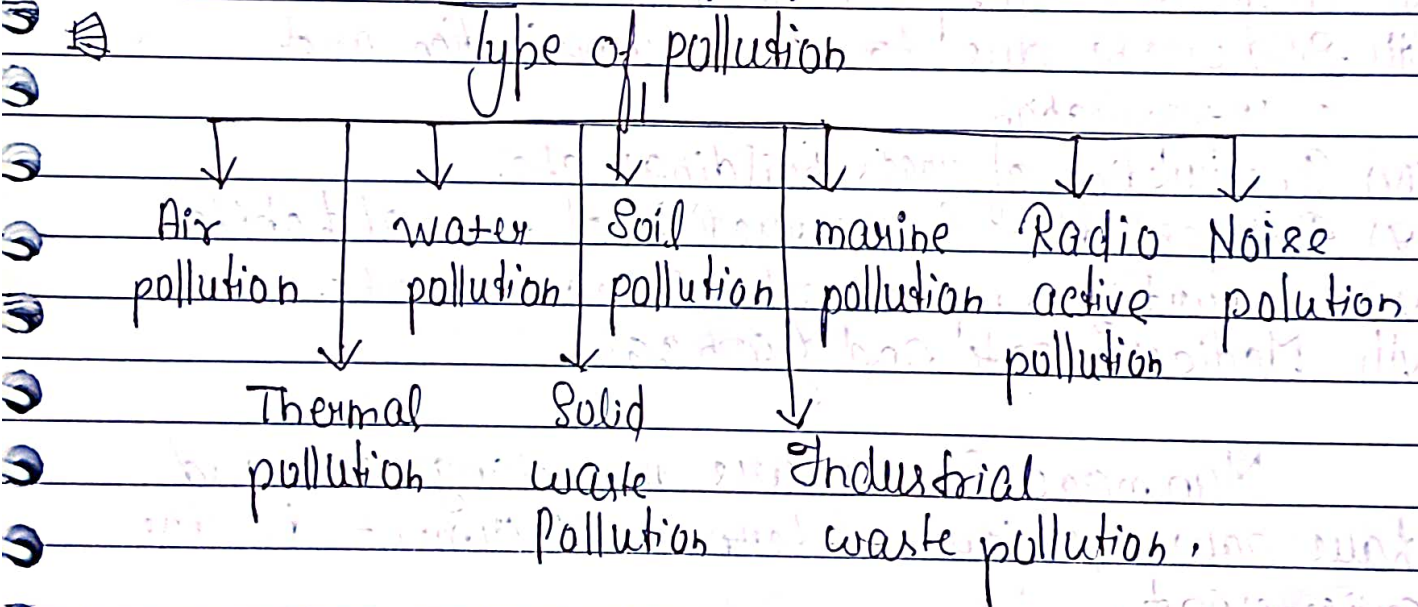


→ Pollution → "Pollution is defined as an undesirable change in chemical, physical and biological characteristics of air, water and soils which create health hazard to living organisms and harmful effects the life. pollution is caused by the pollutants"

Pollutants may be defined as the substance that create pollution. It may be solid, liquid or gaseous.

⇒ Different types of Pollution and their Sources :-

There are several kinds of pollution. may among that are the following -



Pollutions are caused mainly due to following reasons.

### 1.) Natural Sources:-

- (i) Smoke and trace gases produced from forest fires.
- (ii) Dust from storms, from dust storms.
- (iii) Gases released from volcanic & volcanic eruptions.
- (iv) Volcanic ash.
- (v) Gases released from the decay of organic matter.

### 2) Man Made Sources:-

- (i) Smoke and dust particles from industries.
- (ii) Smoke and dust particles from automobile exhaust.
- (iii) Solid waste due to over-urbanization and over-population.
- (iv) Construction of roads buildings etc.
- (v) Deforestation & destruction of natural habitat.
- (vi) Fertilizers, pesticides, insecticides etc.
- (vii) Medical waste and garbage.

Man made sources are more dangerous and have caused serious detrimental to the environment.

→ Different types of environmental pollutants:-

Some pollutants that are responsible for different kinds of pollution are listed below -

1) Gases → Ex → carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>) and Halogens

2) Metals → Ex → Mercury, Lead, Iron, Zinc etc.

3) Acid droplets → Ex → Sulphuric acid, nitric acid etc.

4) Agro chemical → Ex → pesticides, fertilizers etc.

5) Noise → Ex →

6) Solid wastes → Ex → Industrial and garbage

→ Water pollution ←

Water pollution may be defined as the presence of impurities and other substance in water in such a quantity that lowers its quality, makes unfit for use and becomes a health hazard.

The water quality for human consumption should be pure. Water should conform to the water quality standards set for

Human consumption. There are -

- 1) It should be ~~endless~~ odorless
- 2) It should be free of pathogenic organism
- 3) It should be free of suspended solid and turbidity
- 4) The pH value should be 7
- 5) It should be free of toxic substances that may have serious long term effects

→ Causes of water pollution →

major sources of water pollution are the following -

1) Sewage and Sewage and other waste.

2) Industrial effluents

3) Agriculture discharge

4) Industrial waste

1) Sewage and other waste :-

Sewage is the water-borne waste derive from domestic residence, animal and food processing plants; It includes human excreta, paper, clothes, soap detergents etc.

They constitute a major proportion of water pollutants.

There is uncontrolled dumping of waste of rural areas, towns and cities into ponds, lakes, streams or rivers, due to exhaustion of sewage and other waste in these bodies,

then not able to recycle them and their self regulatory capability is lost.

phosphate are the major ingredients of most detergents. They favor luxuriant growth of algae which

2) Industrial effluents :- form water blooms, blooms.

these excessive algal growth also consume most of the available oxygen from water. This decrease in oxygen level.

2) Industrial effluents :-

A wide variety of inorganic and organic pollutants remain present in effluents from steel industries, paper and pulp mills, dyeing and finishing textiles etc. These include oils, greases, plastic, metallic waste, sores, dyes etc. many of these are not readily susceptible to degradation and thus cause serious pollution that increase the hardness of water.

3) Agriculture discharges :-

Modern agriculture rely heavily on synthetic chemical which include different types of fertilizers, pesticides. These chemicals along with waste are washed off land through erosion, irrigation, rainfall etc. reaching into the rivers, lakes, streams etc. where they disturb the natural eco system.

#### 4) Industrial waste:-

Waste water from manufacturing or chemical processes in industries contribute to water pollution. Industrial waste may be toxic or reactive. If in properly manage this waste can cause dangerous health and environmental consequences.

#### → Effects of water pollution:-

- (i) Industrial effluents containing poisonous chemicals which kill aquatic organisms and may reach human body through contaminated food such as - sp. fishes.
- (ii) phosphorus and nitrates from fertilizers and detergent, contaminate the surface water. when they act as a nutrient and promote the ~~the~~ growth of the oxygen consuming algi which reduce the dissolved oxygen level of water.
- (iii) Water born diseases like - typhoid, dysentery, cholera are the predominant health ~~hazard~~ hazards arising from drinking contaminated water.

(iv) oil pollutants have been known to be responsible for the death of many water birds and species.

(v) → control measures for water pollution →

waste water treatment is an essential necessity to secure the water resources. Main aim of this treatment is to remove contaminants. Various measures adopted for waste water treatment are listed below -

(1) Pretreatment :-

a) ~~sp~~ Screening of large material such as bottle caps, water tanks etc.

b) Comminutor is a mechanical device that has cutting edge that reduce solid to smaller particles.

c) The water passes through the ~~Green~~ Grit chamber where the smaller solid material are removed.

2) Primary treatments :-

After pretreatment the water pump into <sup>Sedimentation</sup> Segmentation tank, here particles are further removed.

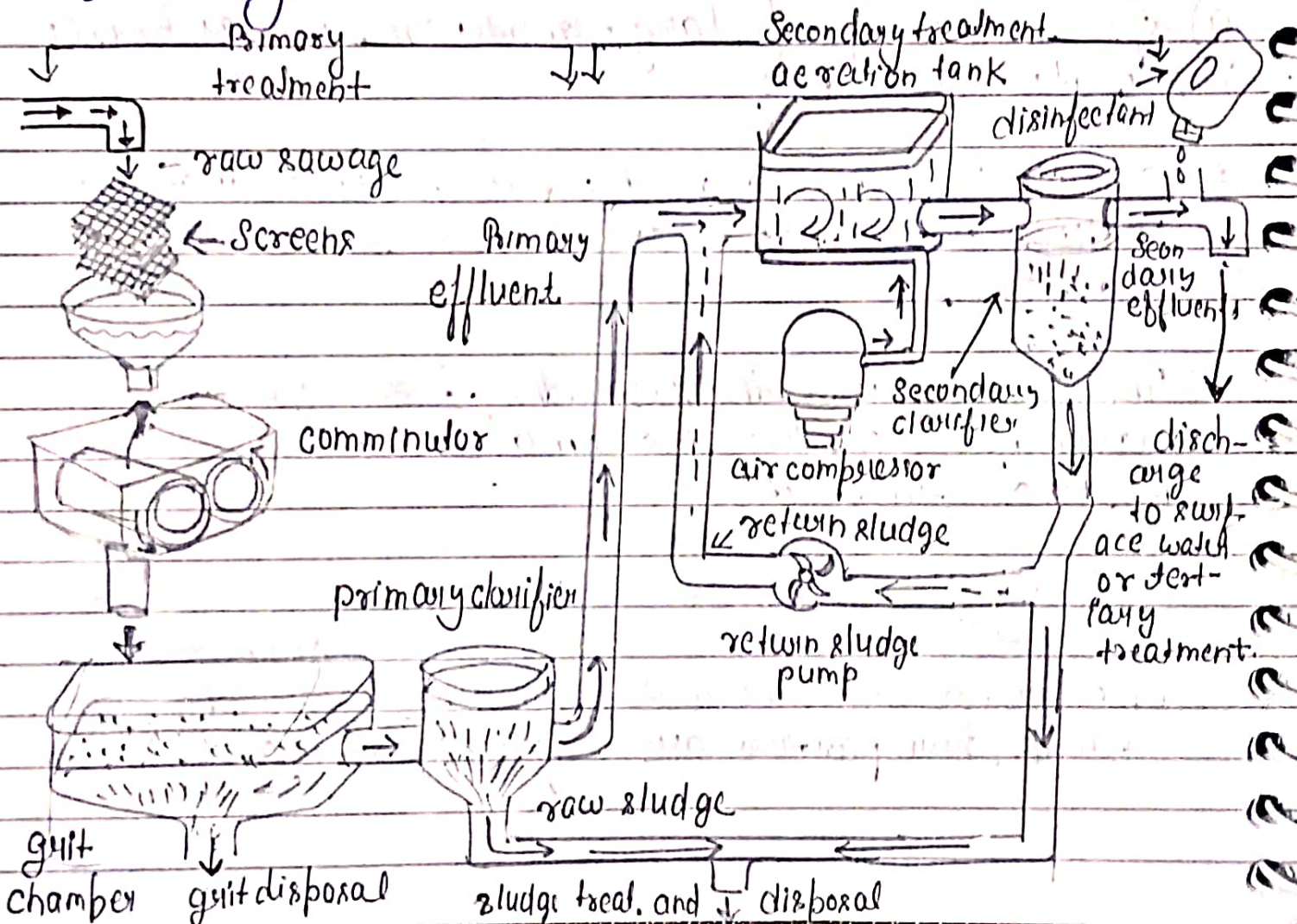
The water stay here for a while so that all particles settle on the floor of the tank.

(ii) Secondary Treatment:-

Primary effluent is passed into large aeration tank, aerated bacteria grow vigorously due to this (BOD (Biochemical oxygen demand) of effluent & reduce.

(+) Tertiary Treatments:-

Once the BOD is reduced as per it passed into settling tank and filtered. after filtration water goes into chlorination tank.





## Noise Pollution

The unwanted sound in the atmosphere is called noise pollution.

Noise is expressed in terms of the unit called decibel (dB) noise level can range from 0 to 120 decibel (dB) noise beyond decibel causes physical discomfort.

### ⇒ Sources of noise pollution ⇐

- 1) Various industries such as textile mills, printing presses, make a noise pollution.
- 2) Transport vehicles like - trains, trucks, buses etc. also cause noise pollution.
- 3) Domestic appliances such as - cooler, washing machine, grinder, vacuum cleaner, geyser, etc. are the sources of noise pollution.
- 4) Entertaining equipment like - TV, radio, also contribute to noise pollution.
- 5) Operation such as blasting construction work, etc. and use of crackers on festival occasion also contribute to noise pollution.

### ⇒ Effects of noise pollution ⇐

- 1) Noise can cause temporary or permanent hearing loss.
- 2) Noise interferes the communication of human beings.

- 3) It causes anxiety & stress.
- 4) Damage to ~~hand~~ brain due to prolonged noise pollution.
- 5) It causes emotional disturbance.
- 6) It reduces the work efficiency.

### Control of noise pollution:-

- 1) Proper lubrication and Maintenance of the machines can reduce the noise.
- 2) There should be silence zone around the residential area and hospitals.
- 3) Using silencers to control noise from auto-mobiles.
- 4) workers should be use ~~e-ear~~ earplug and earmuffs.
- 5) Noise production industries should be located away from the human settlements.

## -: Air pollution :-

Air pollution is the excessive concentration of foreign matter in the air which adversely affects the human beings, animals, plants and their environment.

air pollution take place through the pollutants of gas, solid and liquid particle of both organic and inorganic chemicals.

## -: Types of air pollutants :-

Air pollutants can be classified into two parts

- 1) Primary pollutants
- 2) Secondary pollutants.

1) Primary pollutants - These are emitted directly into the atmosphere. common sources of primary pollutants include power station, Industrial plants and road transport

2) Secondary Pollutants - These type of pollutants are form in the air as the result of chemical reactions occurring between primary pollutants.

## -: Causes of air pollution :-

The principle cause of air pollution are divide into the following two parts = / types -

- 1) Natural causes
- 2) Manmade causes.

## 1) Natural causes :->

(i) Natural disasters such as cyclones, earthquake, volcanic eruption cause suspension of dust particle and ash in air and cause of air pollution.

(ii) Air pollution may also be caused by other natural factors such as forest fires etc.

(iii) Various gases are also released into atmosphere as a result of natural processes for example methane gas is released in natural gas fields due to decay of organic matter and smoke and carbon monoxide are emitted during forest fires.

## 2) Manmade causes :->

Human beings are the major contributors to air pollution some of the man made cause of air pollution are following below -

### (i) Automobiles :-

a) The rapid increase in population, the number of automobiles on the road has also increases.

b) These automobiles may transportation easy and convenient but also emit dangerous pollutions such as carbon mono oxide, carbon di-oxide, Sulphur di-oxide etc.

### (ii) Agriculture activities :-

- (a) The excessive use of fertilizers and pesticides cause the environmental damage.
- (b) These chemicals cause air pollution when sprayed. They also travel large distance by air and hence cause air pollution.

### (iii) Disposal of garbage :-

All types of biodegradable and non-biodegradable waste material produce smoke when burnt and hence cause air pollution.

### (iv) Nuclear explosions :-

- (a) A nuclear explosion causes air pollution across the large area.
- (b) It releases huge amount of pollutants including many harmful chemicals and dust particles into the atmosphere.
- (c) Huge amount of radioactive materials which cause great damage on health.

### (v) Industrial wastage :-

- (a) different industries produce air pollution in different manner depending on the processes involved.
- (b) Petroleum refineries emit large amount of hydrocarbons, Industries such as iron,

Steel mills, paper mills and cement plants release huge amount of different types of particulates into the atmosphere.

### Effects of air pollution :-

Air pollution affects everyone; Human beings, plants, animals, materials. It also affects the beauty of nature and the climate. A brief account of all these effects is as follows -

→ Effect on human beings →

- (i) Irritation of eye, nose and throat
- (ii) Irritation of respiratory system.
- (iii) Radio active fallout has somatic and genetic effects on future generation
- (iv) Mercury from combustion of fossil fuels and plants, nerve, brain, kidney etc.
- (v) Lead particulate from automobile exhaust cause lead poisoning resulting in convulsions delirium.

→ Effects on plants →

Spraying of pesticides and other agriculture practices cause exposure of the plants to a large number of air pollutants.

They adversely affect their growth and metabolism by destroying chlorophyll and disrupting photosynthesis for example →

- (i) Nitrogen di oxide ( $\text{NO}_2$ ) cause premature leaf fall and reduced growth of plants.
- (ii) Sulphur di-oxide bleaches the leaf surface and causes loss of chlorophyll and yellowing the leaf.
- (iii) PAN (Peroxy acyl nitrate) damage leafy vegetables causing severe premature and decolourisation.

→ effects on materials: →

Materials are affected by air pollutants due to the following reasons -

- (i) chemical attack
- (ii) corrosion
- (iii) Deposition and removal of materials.

The damage caused is in the following manner -

- (i) Sulphur di-oxide, acid rain damage the building materials.
- (ii) paper brittle and leather this integruation by sulphur di-oxide and acid gases
- (iii) ozone, sulphur di-oxide, nitrogen di-oxide deteriorate and reduce the tensile strength of textile.

→ effects on animals :->

when the animals feed on the particulate coated plants they get affected with arsenic poisoning. let poisoning effect is bronchitis and lack of appetite in pet animals.

-: Control of air pollution :-

- (i) The forest cover should be protected. forest cover is essential for maintaining the quality of air. preabsorb carbon-di-oxide and release oxygen.
- (ii) Cheap devices for controlling air pollution should be developed.
- (iii) forest fire should be checked adequate preventive measures should be adopted to protect the forest.
- (iv) In Industries there should be arrangement for pollution control
- (v) Electric engine should be used instead of diesel engine
- (vi) Green belts should be created. Such areas should be developed around denfif



areas should be polluted. strict restriction for establishment of large buildings and industries along the green belts areas.

### :- Soil pollution :-

Soil pollution may be defined as the contamination caused by chemicals and other substances resulting in loss of the productivity of soil.

Organic manure, chemicals, fertilizer, Insecticides, radioactive wastage, discarded food, wastage of clothes, paper, leather goods, etc.

mainly contribute to soil pollution.

### :- Sources of soil pollution :-

Soil pollution is caused due to following main reasons:-

(i) Chemicals like iron, lead, mercury, copper, zinc etc. are present in industrial wastage and reach the soil either directly with water indirectly through air.

(ii) Organic insecticides like DDT (Dichlorodiphenyl trichloroethane), Benzyl hexachloride are used.

again soil borne pests they accumulate in the soil as they degrade very slowly by soil and water bacteria they have a very deleterious effects on the plants growth and reduce the size of fruits.

(iii) Radio active wastage from mining and nuclear processes may reach the soil via water. from the soil they reach the plants and then into the grazing animals which ultimately reaches man. through milk and meat etc. resulting in retarded in milk and meat abnormal growth of man.

∴ Effects of Soil pollution :-

The effects of soil pollution are listed below -

- (i) Water mixed with human excreta sewage kills the microorganism and reduce the fertility of soil.
- (ii) Urban solid wastage such as rubbish rubbish, broken articles obstruct the public passage.
- (iii) Pesticides seep gradually through the soil and contaminate the under ground drinking water storage.

(iv) Fluorides ~~also~~ absorb by alkaline soils reach to cereal crops on consumption which cause fluorosis.

(v) Garbage, sludge and dead animal create bad odour which cause chronic diseases.

### -: Control of Soil pollution :-

The pollution of soil controlled by adopting the following means -

- (i) By minimizing the generation of solid wasteage
- (ii) By reusing and recycling of solid wasteage such as paper, metal parts and glass, articles
- (iii) By employing proper disposal methods.
- (iv) By treating heavy metals and toxic founds in wasteage liquid pollutente.
- (v) By minimising the use of ~~artificial~~ artificial fertilizer and increasing the use of biological fertilizer.
- (vi) Soil erosion should be prevented.
- (vii) By reducing wind erosion by growing vegetation cover.

## -: Solid waste pollution :-

The waste material which have been rejected for further use and which can neither be actively escape into the atmosphere nor can be transported by water are called solid waste.

## -: Types of waste materials :-

following are the waste materials -

### (1) Domestic waste :-

Domestic garbage refers to house hold wastage and include paper, plastic, glass pieces, metal objects etc.

### (2) Industrial waste :-

wastage discharge from paper, and pulp industries, oil refineries, chemical industries etc are the types of industrial waste.

These wastage may contain harmful chemical such as mercury (Hg) and cyanide (CN)

(3) Commercial waste :-  
x — x — x — x

It includes paper, fibers, plastic, packing material etc. that are generated as waste in almost all industries.

(4) Mining waste :-  
x — x — x

Mining activities result in generation of a lot of waste materials such as - substances that are removed to get to the useful minerals.

(5) Radio-active waste :-  
x — x — x — x — x

For a nuclear explosions, nuclear testing use of radio active substances in medical and scientific research and generate sizable amount of radio active waste.

(6) Hospital waste :-  
x — x — x — x

Hospital waste include disposable needle, syringes, blades, human excreta etc.

## -: effects of Solid waste pollution :-

following are the various health and environmental hazard of solid waste -

- (1) Flys and mosquitoes breed on choked drains and gully pits through solid wastage there flys and mosquitoes then condomenate clean food and water. It turned clean likes - diarrhoea, Malaria, dengue.
- (2) Stray animals and scavengers incayed the roadside garbage dumps it ~~is~~ reserved in harming the aesthetic beauty on surrounding.
- (3) Bad odour pollute the air as a result of decomposition organic solid waste
- (4) Rats living in solid waste dumping sites rapidly multiply in numbers and may cause disease.
- (5) E-waste is either burn so it can have harmful effects on the environment.

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-: Selection criteria of disposal sites :-

- (1) It is important to insure that sufficient land area is available for disposal of solid waste for a reasonable period of time.
- (2) Extreme care is necessary in the operation of the land fill so that it is environmentally acceptable with respect to noise and odour.
- (3) It is important that the cover material should be available at or near the land fill sites.