ENVIRONMENTAL SCIENCE AND ENGINEERING

ASSIGNMENT-2

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CSE CYBERSECURITY AC
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PART-A.

1. Mention the physical and chemical parameters of quality of water.

Physical parameters include temperature, colour, odour, TSS, turbidity. and chemical parameters include pH, DO, BOD, COD, TDS, etc.

2. What is thermal pollution?

Thermal pollution is defined as the addition of excess of undesirable heat to water that makes it harmful to man, animal or aquatic life or otherwise causes significant departures from the normal activities of aquatic communities in water.

3. List the sources of Marine pollution.

The sources include dumping the wastes, oil pollution of marine water. Dumping of untreated wastes and sewage, plastic, etc pollute the water.

PART-B

4. Mention the causes, effects and control measures of water pollution.

Causes: 1. Infectious agents like bacteria, viruses, protozoa, parasitic worms that come from various human and animal wastes infect the water and transmit diseases.

2. Oxygen Demanding Wastes: This degradation consumes dissolved oxygen in water (DO). to oxidise sewage, animal feedlots, paper mills, waste etc. in water.

3. Inorganic chemicals: Water soluble inorganic chemicals like acids, lead, arsenic, selenium, NaCl, F^- found in soils from industrial effluents and household cleansers can destroy fresh water's drinkability and its use in irrigation fails. It can cause skin cancers, neck damage, nervous system damage, liver and kidney damage. It affects other aquatic life.

4. Organic chemicals: such as oil, gasoline, plastics, pesticides, detergents can damage human nervous system and harm fish and wild life.

5. Plant nutrients like nitrate, phosphate and ammonium can cause excessive growth of algae and other aquatic plants which die, decay and deplete DO. Nitrates in drinking water kill infants and children.
6. Sediments like soil and silt from land erosion can cause the reduction of photosynthesis and cloud water, disruption in aquatic food webs; It also contains pesticides, bacteria, and other harmful substances.
7. Radioactive materials from nuclear power plants, mining and processing of uranium and other ores cause genetic mutations, birth defects and some cancers.
8. Heat lowers DO levels and makes aquatic organisms more vulnerable to disease, parasites and toxic chemicals.

Control measures:

→ The administration of water pollution control should be in the bounds of state or central government.
→ The scientific techniques are necessary to be adopted for the environmental control of areas of rivers, ponds and streams.
→ Plants, trees, and forests control pollution and they act as natural air conditioners.
→ Forests in and around big cities and industrial establishments and nitric oxide pollutants to a greater extent from the atmosphere.
→ It is not advisable to discharge any type of water, either treated, partially treated or untreated into streams, rivers, lakes, ponds and reservoirs.

5. Write about one of the waste water treatment techniques, with a neat schematic diagram.

The main objective of waste water treatment are,
→ To convert harmful compounds into harmful compound.
→ To eliminate the offensive smell.
→ to remove the solid content of sewage.
→ To destroy the disease producing microorganism.

Treatment Process: → Preliminary Treatment:
In this treatment, course solids and suspended imparities are removed by passing the waste water through base and mesh screens.
→ Primary treatment: In this treatments, greater proportion

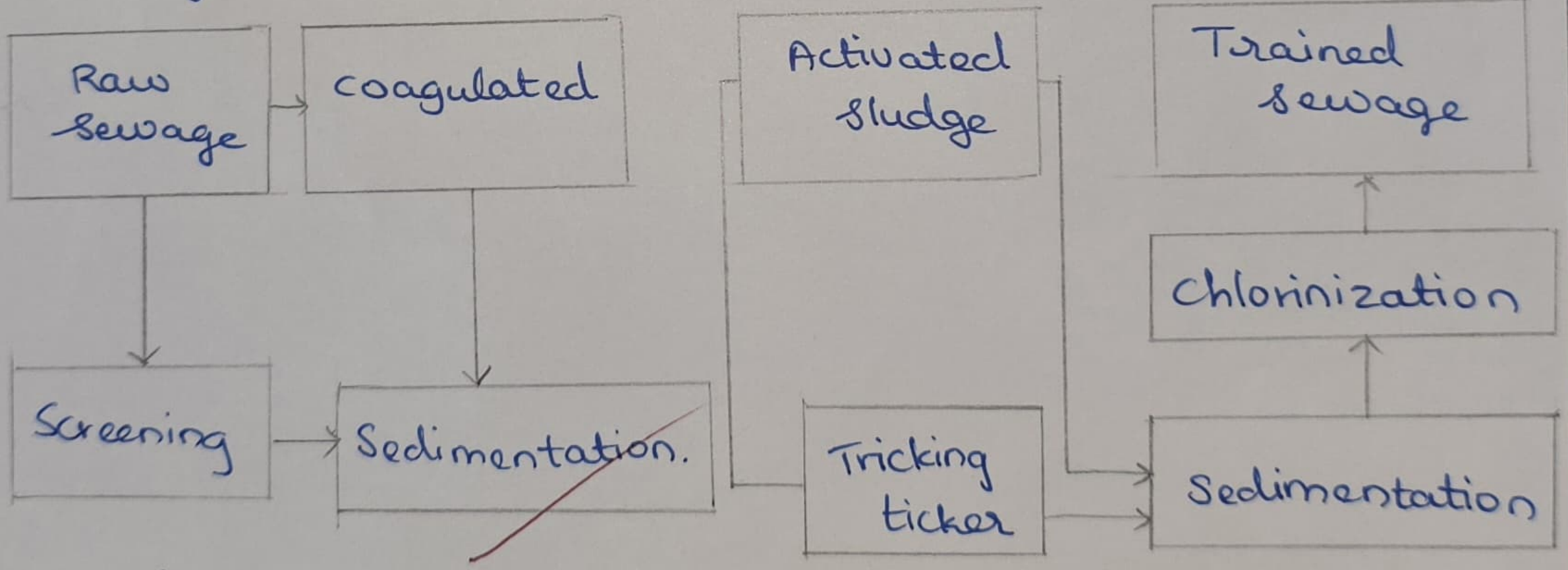
of the suspended inorganic and organic solids are removed from the liquid sewage by settling. In order to facilitate quick settling coagulants like alum, ferrous sulphate are added.

→ Tertiary treatment:

After the secondary treatment, the sewage effluent has lower BOP (25 ppm) which can be removed by the tertiary treatment process. In the tertiary, the effluent is introduced into a floculation tank, where lime is added to remove phosphate from the floculation tank the effluent is led to ammonia stripping tower.

Disposal:

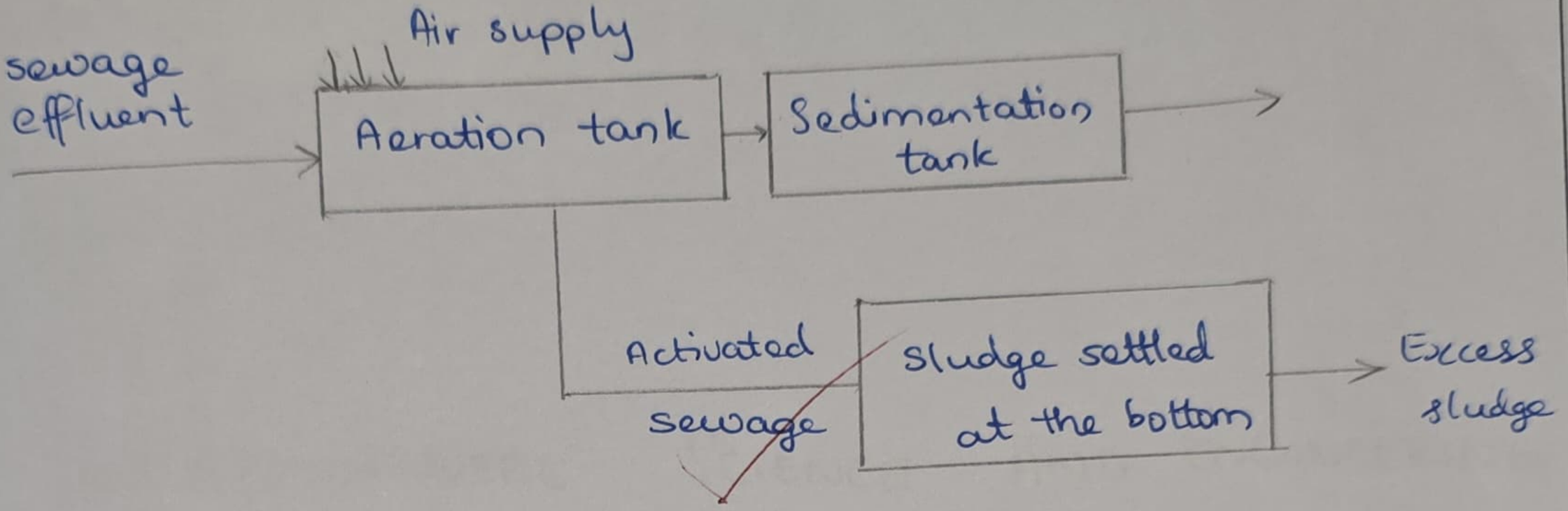
(i) Dumping into low-lying areas.
(ii) Bumping of sludge.
(iii) Dumping into low lying areas.
(iv) Dumping of the sea.
(v) Using it as low grade fertilizers.



$Al_2(SO_4)_3 + 6H_2O \longrightarrow 2Al(OH)_3 \downarrow + 3H_2SO_4$

In this treatment, biodegradable organic impurities are removed by aerobic bacteria. It removes upto 90% of the oxygen demanding wastes. This is done by trickling filter or activated sludge process. It is a circular tank and is filled with either course or crushed cock. Sewage is sprayed over this bed by means of slowly rotating arms.

Activated sludge is biologically active. Sewage and it has a large number of aerobic bacteria, which can easily oxidise the organic impurities. Under these conditions, organic impurities of the sewage get oxidised rapidly.



This process removes about 90-95 %. of BOD.