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Paper :- Wastewater Engineering

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Question:- 01Ans:-Wastewater Treatment :-

It is a process used to remove contaminants from waste water or sewage and convert it into an effluent that can be returned to the water cycle with minimum impact on the environment or directly reused.

⇒ Importance :-

Water scarcity is the major problem that is faced all across the world. Although  $\frac{2}{3}$ rd of earth crust is made up of water but all this water is not available for drinking and for other human activities. It has been found out 97% of the total water is salty that is of no use to human and

animals and remaining three percent/ 3% is available as fresh water.

→ The demand for fresh clean water delivered to our homes is ever increasing day by day as more homes are being established.

⇒ Rectangular Tanks are Preferred

Because :-

- It has low cost of maintenance.
- It is also suitable for large capacity of waste water.



Question:- 02Ans:-Difference b/w anaerobic and aerobic water treatment:-Aerobic

• Aerobic wastewater treatment is a biological wastewater treatment process which uses oxygen rich environment.

• Bacteria involved the aerobic wastewater treatment are aerobic.

• Air circulation air is circulated in aerobic wastewater treatment tanks.

Anaerobic

• Anaerobic wastewater treatment is a process in where anaerobic organisms break down organic material in an oxygen absent environment.

• Bacteria involved the anaerobic wastewater treatment are anaerobes.

• Air is not circulated in anaerobic wastewater treatment tanks.

• Aerobic wastewater treatment does not produce methane and carbon dioxide.

• Anaerobic wastewater treatment produces methane and carbon dioxide.

• Aerobic wastewater treatment requires energy. Hence, they are less energy efficient.

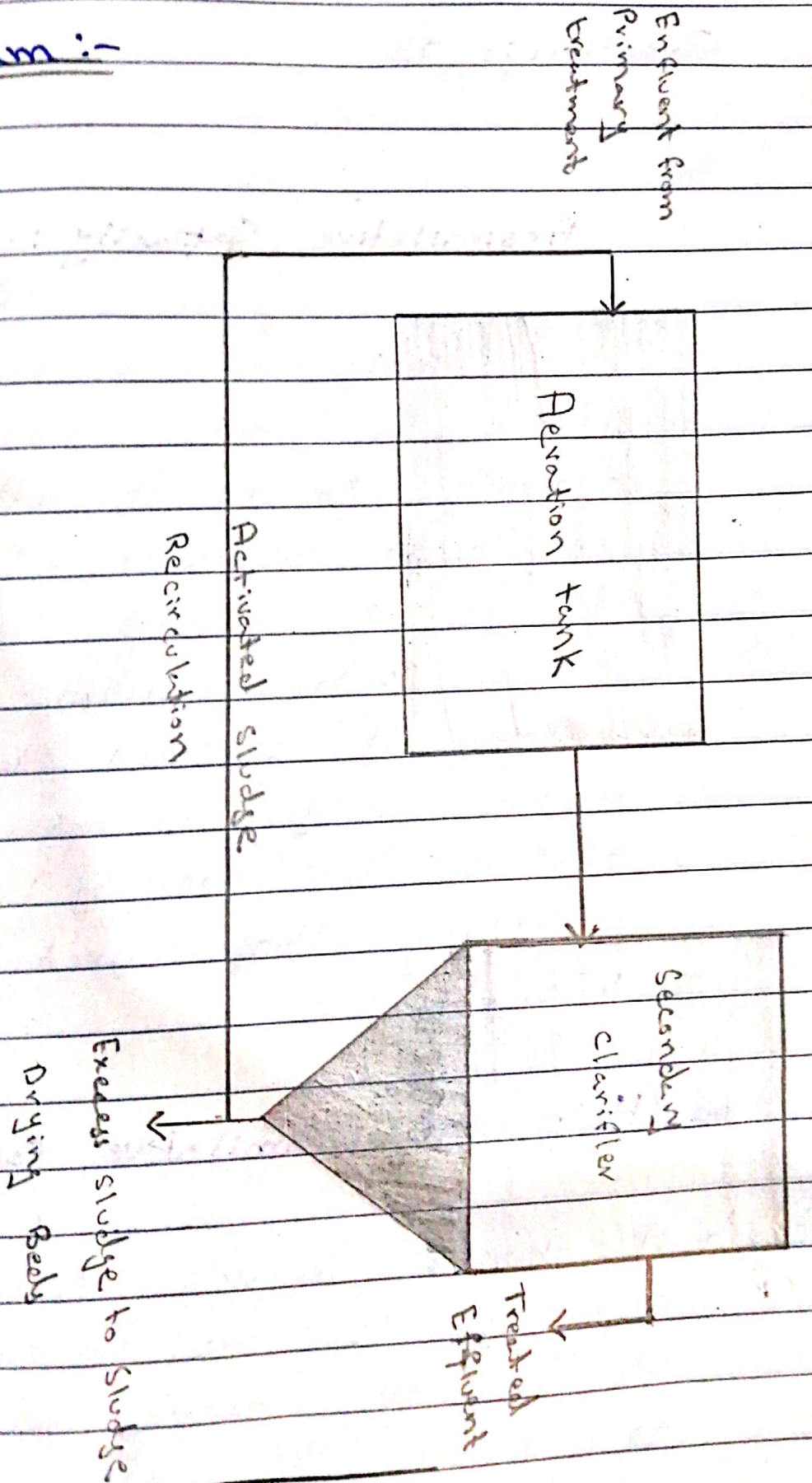
• Anaerobic wastewater treatment is an energy efficient process.

### ⇒ Activated Sludge :-

The process involves air or oxygen being introduced into a mixture of screened, and primary treated ~~sewage~~ sewage or industrial waste water (wastewater) combined with organisms to develop a biological floc which reduces the organic content of the sewage.



⇒ Diagram :-



Signature

Question:- 03

Ans:-

Assimilative Capacity :-

Refers to ability of a body of water to cleanse itself, its capacity to receive waste water or toxic substance without damage to aquatic life or humans who consume the water. It is level to which water body or nature control the toxicity without affecting the aquatic life.

⇒ Help of Assimilative Capacity :-

- A classic example of assimilative capacity is the ability of stream to accept modest amount of biodegradable waste.



- Bacteria in a stream utilize oxygen to degrade the organic matter present in such a waste causing the level of dissolve oxygen on the stream to fall; but decrease in dissolve oxygen cause additional.

- Oxygen to enter the stream to fall enter from atmosphere.

- A stream can assimilate a certain amount of waste and still maintain a dissolved oxygen level high enough to support a healthy population of fish and other aquatic organisms.



Question:- 04

Ans:-

Sludge Handling:-

Socially

a acceptable, cost-effective method that meets the requirement of efficient recycling of resources while ensuring that harmful substances are not transferred to humans or the environment i.e. water, air or soil.

Process of Sludge Handling:-

- 1) Primary operations.
- 2) Thickening.
- 3) Stabilization.
- 4) Dewatering.
- 5) Heat drying.

1) Primary Operation :-

This process includes:-

i) Grinding :-

It includes particles size reduction

ii) Screening :-

It includes removal of fibrous material.

iii) Degritting :-

It includes removal of sand or other inorganic material.

iv) Blanding :-

It includes making the sludge homogenous.

v) Storage :-

It ensures flow equilization in the system.



## 2) Sludge thickening :-

Sludge thickening is undertaken to increase percentage of solid content in sludge by removing a portion of liquid fraction.

Volume reduction of approximately 30%—80% can be reached with sludge thickening.

## 3) Sludge Stabilization :-

It is undertaken to reduce pathogens, eliminate offensive odors, minimize production of usable gas.

### Methods :-

- (i) Alkaline Stabilization
- (ii) Anaerobic Stabilization

#### 4) Dewatering:-

Is undertaken to reduce the moisture content of sludge.

Centrifugation is the method used for separating liquids of different densities, thickening slurries.

#### 5) Heat Drying:-

Apply heat to evaporate water and to reduce the moisture content of biosolids.

#### ⇒ Advantages:-

We can use sludge in a landfill or for agricultural use.

The sludge is very useful for agricultural use because it contains organic matter,



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nitrogen, phosphorus and potassium, soil improvement also occur.

Some of the advantageous uses are following:-

- i) Land scape irrigation
- ii) Agriculture use.
- iii) Ground water recharging.

Question :- 05:

Ans :-

Definition of EIA is

Environmental impact Assessment is defined as an activity designed to identify the impact on the biogeophysical environment, on man and well being of legislative proposals, projects, policies, operational procedures and to interpret and to communicate information.

• EIA is a systematic process of identifying future consequences of current or proposed action.



## ⇒ Parameters for New Wastewater Treatment Plant :-

- Water supply and quality
- Oxygen
- Nitrogenous Compounds
- Ph.
- Environmental Salinity
- Temp of water
- Density
- Noise, light and feeding etc.