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Department B E (Civil)

Department

Subject Waste water

Engineering

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Important

Q1

what is waste water Treatment plant and its importance why rectangular tank preferred over circular tank for removal of settleable solids during preliminary treatment.

Ans:

### waste water Treatment

waste water Treatment consist of applying known technology to improve or upgrade the quality of waste water.

OR:

waste water Treatment is a technique which convert harmful quality of water into health ful is called waste water Treatment.

Important

waste water Treatment involves collecting the waste water in centralized or decentralized location (waste water Treatment plants) and subjecting the waste

water to various treatment process.

## Importance of waste water Treatment:

The importance of waste water treatment plant are given below

→ The main importance of waste water treatment-plant is that to allow human industrial effluents to be disposed off without causing danger to human health or an acceptable damage to the natural environment.

① Another importance of waste water is that if the waste water is properly treated then it is very important resource and

important

can be used for various purposes including irrigation lawn watering, car washing flushing toilets and land scraping etc.

→ waste water treatment can also generate biogas as final product which is potential source of energy.

rectangular tank preferred over circular tank for removal of settleable solids during preliminary.

→ rectangular tank preferred over circular tank for removal of settleable solids because rectangular tank have greater possible ratio of  $\frac{\text{circumference}}{\text{area}}$  than circular

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In

- ② The rectangular tank have smaller capacity than the circular tank there for rectangular tank is preferred than circular tank.
- ③ The cost of rectangular tank is less than circular tank
- ④ also the design rectangular tank is easier than circular tank.

Q2

what is the difference between aerobic and anaerobic wastewater treatment?

Briefly describe activated sludge process with diagram.

Ans:

The difference of aerobic and anaerobic are given below.

aerobic waste water treatment	An aerobic waste water treatment
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① aerobic waste water treatment required oxygen	② Anaerobic waste water treatment do not required oxygen
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Important

in Purification water

in Purification of water.

(ii) low to medium strength wastewater (< 1000 PPM) eg municipal sewage, refinery, wastewater etc

(ii) medium to high strength wastewater (> 4000 PPM) food and beverage industry waste water.

(iii) Aerobic Treatment plant of waste water more often used in rural Area of small community where feasibility is not practical to implement

(iii) An aerobic Treatment of waste may be used to treat industrial waste water

(iv) Aerobic Treatment produce more sludge

(iv) An aerobic Treatment produce less sludge

Important

(v) in aerobic Treatment more cost required for removal sludge

(v) anaerobic Treatment required less cost for removal sludge.

The above ~~are~~ are difference of aerobic and anaerobic Treatment of waste.

## Activated Sludge Process.

→ micro-organisms responsible for treatment are maintained in liquid suspension by appropriate mixing method

→ main constituent of ASP are aeration tank in which oxygen is provided for the micro-organisms to grow. This aeration also helps to keep micro-organisms in suspension.

→ Aeration tank is ~~also~~ followed by clarifier/settler in which the micro-organisms form flocks and settled down at the bottom

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→ Formation of floc particles ranging in size from 50-200µm removed by gravity settling leaving relatively clear liquid as treated effluent

→ A part of settled bio flocs are recycled back to the aeration tank to maintain certain amount of micro-organisms in the system for the efficient operation of the system. This is known as Recycled Activated Sludge (RAS)

→ Remaining settled bio flocs are removed from the system and term as Wasted Activated Sludge (WAS)

→ ADS involves production of activated mass of micro organisms capable of stabilizing waste under aerobic condition

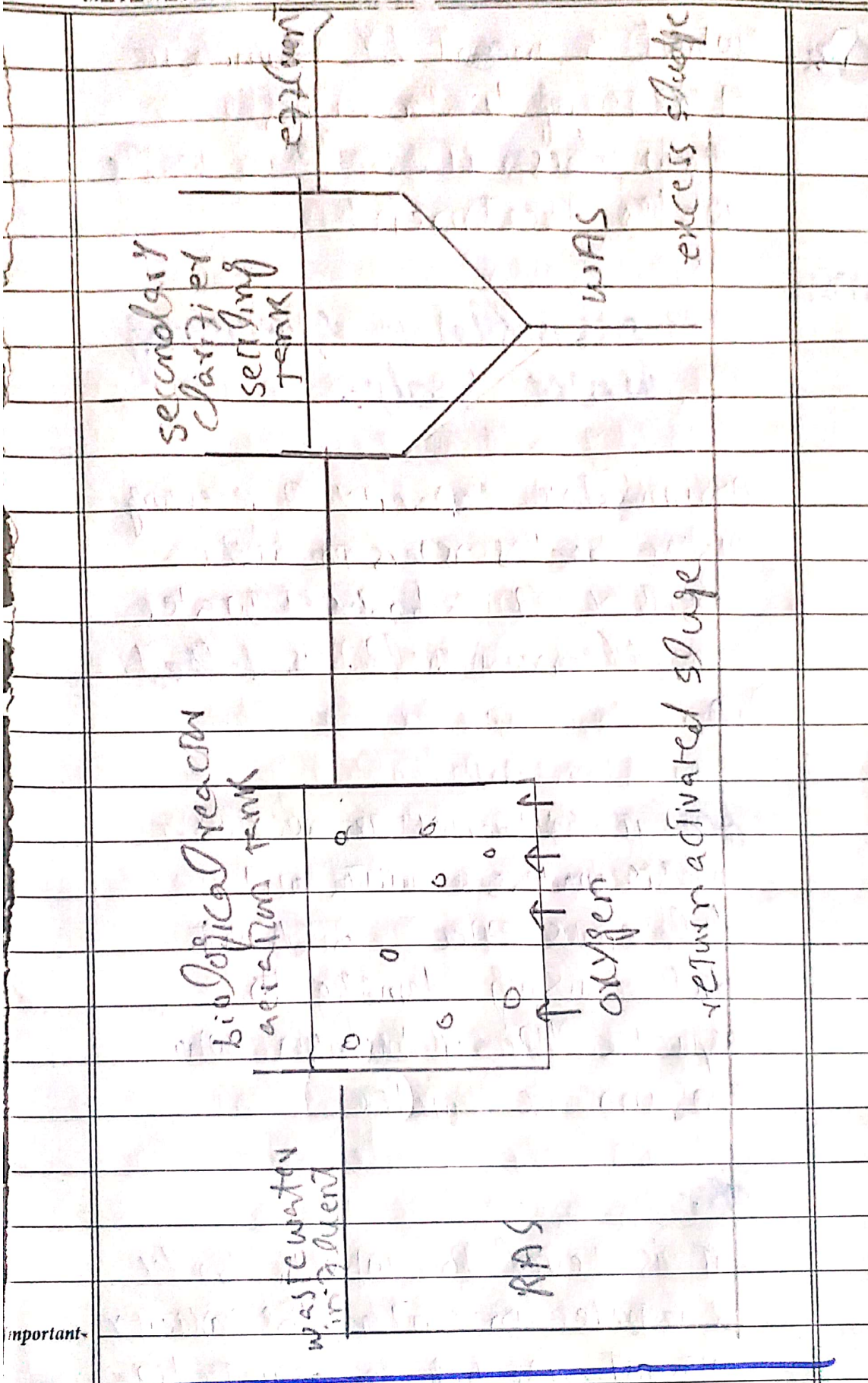


→ An aeration tank contact time is provided for mixing and aerating influent waste water with microbial suspension generally referred to mixed liquor suspended solids (MLSS)

→ Typically 99% of suspended solids and up to 90% of dissolved organics are removed by activated sludge process.

→ The main drawback associated with APS is its high electricity consumption particularly for aeration.

~~We~~ draw the diagram of APS in upcoming page.



important

Q31:

What is meant by Assimilative  
of receiving water bodies.

How does it help in waste  
water treatment

ANS:

**Assimilative of receiving  
water body:**

Assimilative capacity of receiving  
water bodies refers to the  
ability of a body of water  
to cleanse itself. is called  
A

**OR:** its capacity to receive  
waste waters with out  
deteriorous effect and with  
out causing damage to  
aquatic life or human who  
consume the water.

**OR:-**

it is level to which body  
of nature to control the toxicity  
without affecting the aquatic life.

Important

In

## helping waste water by Assimilative Capacity.

Physical forces of helping  
Assimilative capacity of  
receiving bodies of water  
are given below

### ① Dilution:

Dilution is the process of  
~~the~~ reduction/reducing the  
concentration of pollutant in  
receiving water bodies usually  
simply by mixing with more  
quantity of water

in this topic explain Assimilative  
Capacity help large quantity  
clean water mixed with  
small quantity of waste  
so concentration of pollutant  
are reduced

important

## ② Dispersion:

It in this topic it is explain that the area of receiving water bodies are more then they dispersed over water and concentration of ~~pollu~~ pollutant are become less so ASSIMILATIVE helps waste water Treatment.

③ Land Treatment can be defined as the potential for the removal of contamination of water from waste water through various means including the application of methods. Plant uptake, soil retention, leaching and groundwater attention so that the resulting surplus of ~~contaminated~~ contaminants.

it do not create an adverse environmental effect

#### ④ Sun light:

Sunlight facilitates biological decomposition of pollutants and kills pathogens by ultraviolet radiation.

#### ⑤ Temperature

The temperature plays an important role in the assimilative capacity of receiving water bodies. Increase in temperature will increase the biological decomposition of organic and thus assimilative capacity will improve. Increase in temperature also causes to increase the dilution process and thus increase the assimilative capacity.

#### ⑥

Flow velocity is also critical to the assimilative capacity of receiving water bodies. Higher the flow velocity will encourage quick dilution and dispersion of pollutant.

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Q4

Briefly describe sludge management and its advantages in waste water engineering.

### Sludge management:

Sludge management consist of following steps

- ① Primary operation
- ② Thickening
- ③ ~~Stabilizing~~ Stabilization
- ④ Dewatering
- ⑤ Heat drying.

#### ① Primary operation:

The process include

① Screening → it include removal of fibrous material.

② Grinding → it include particle size reduction

- ③ **De gritting:** it include removal of sand or other inorganic
- ④ **blending** → it include making the sludge homogeneous
- ⑤ **Storage:** it ensures flow equalization in the system

## ② Sludge Thickening:

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

→ volume reduction of approximately 30-80% can be reached with sludge thickening

→ various methods of sludge thickening are

- ① Gravity thickening
- ② Flotation thickening
- ③ Rotatory drum thickening.



### ③ sludge sludge stabilization

sludge stabilization is under taken to reduce pathogen eliminate offensive odour minimize production of sulphur gas.

method of stabilization are

- ① Alkaline stabilization
- ② Anaerobic Digestion.

### ④ Dewatering:

Dewatering is under taken to reduce the moisture content of sludge

compared to thermal (evaporative process) for water reduction mechanical dewatering is often ~~selected~~ selected due to its low energy requirement.

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

(5) it involves the application of heat to evaporate water and to reduce the moisture content of solids

**Advantages** of this method is to reduce product transportation costs. improve storage capability and marketing marketability

### Direct drying

direct drying involves the wastewater solids come into contact with hot gases which ~~evaporation~~ which cause evaporation of moisture. Dryers such as rotary dryers and fluidized bed dryer are used.

## its advantages in waste water engineering:

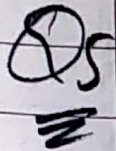
- ① it can be used for one house hold upto a huge plant
- ② it remove organic particle from water
- ③ it can achieved oxidation deoxidation
- ④ biological nitrification without adding chemicals
- ⑤ biological Phosphorous Removal
- ⑥ Solids/Liquid separation
- ⑦ Stabilization.
- ⑧ Capable of removal of 97% of suspended solids

Important

~~⑨~~



the most widely used waste water treatment plant.



## Environmental Impact Assessment

A formal process to predict the environmental consequences of human development activities and to plan appropriate measures to eliminate or reduce adverse effect and to enhance positive effect.

OR:

the process of identifying, predicting, evaluating and mitigating the physical, biophysical, social, and other relevant effect of development proposals prior to major decision

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being taken and commitment  
made made

**OR:**

A Technique and a process by which information about environmental effect of a project is collected both by developer and from other source and taken into account by the planning authority for in forming the judgment on whether the development should proceed.

**my opinion:**

According my opinion I ~~could~~ should ~~sele~~ considered the following parameters.

① Environmental benetiter should be maximum and water life should be protected

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- ② I should ensure that the development is according to national Quality standards.
- ③ The project should not conflict with govt-policies
- ④ It should be ensure that the waste water treatment plant do not pollute air of the locality
- ⑤ Also the noise pollution should not affect if the plant of treatment is ~~pollu~~ in populated Area.
- ⑥ affect water body greenery and energy consumption which affect the environment should be controlled.
- ⑦ it ~~do not affect~~ should be constructed in populated area b/c where waste water QUANTITY are maximum.

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