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Q1:-

Ans: **Waste water Treatment:-**

It is a process used to remove contiminats from wastewater or sewage and convert it into an effluent that can be returned to the water cycle with minimum impact on the Improument of enviroment or directly reused.

Importance:

water scarcity is the major problem that is faced all across the world. Although 2/3rd 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 That 97% of The total water is salty That is of no use to human and animals and remaining Three 3% is available as freshwater. The demand for fresh clean water delivered to our homes is over increasing day by day as more homes are being established.

Rectangular tank is Prefered over circular tank for removal of settable solids due to The following reasons:

⇒ The shape of The rectangular clarifiers Provides a longer path for The wastewater flow and The suspended solids to travel, and subsequently longer detention time which warrants less short circuiting and more sludge settling compared to The center-feed/ Peripheral overflow circular clarifiers. In addition, flow distribution among several clarifiers is usually more even and often requires for rectangular clarifiers.

Q2:-

Ans: Difference b/w Aerobic & Anaerobic wastewater Treatment:

Aerobic wastewater Treatment:-

Aerobic wastewater Treatment is a biological wastewater treatment Process which uses an oxygen rich environment.

Anaerobic wastewater Treatment:-

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

Bacteria:-

Bacteria involved The aerobic wastewater treatment are aerobes.

Bacteria involved The anaerobic wastewater treatment are anaerobic.

Air circulation:-

Air is circulated in aerobic waste water treatment tanks.

Air is not circulated in anaerobic wastewater treatment tanks.

Production of Biogas:-

Aerobic wastewater treatment does not Produce methane and carbon dioxide.

Anaerobic wastewater treatment Produces methane and carbon dioxide.

Energy Efficiency:-

Aerobic wastewater Treatment requires energy. Hence, They are less energy efficient.

Anaerobic wastewater treatment is an energy efficient Process.

Examples:-

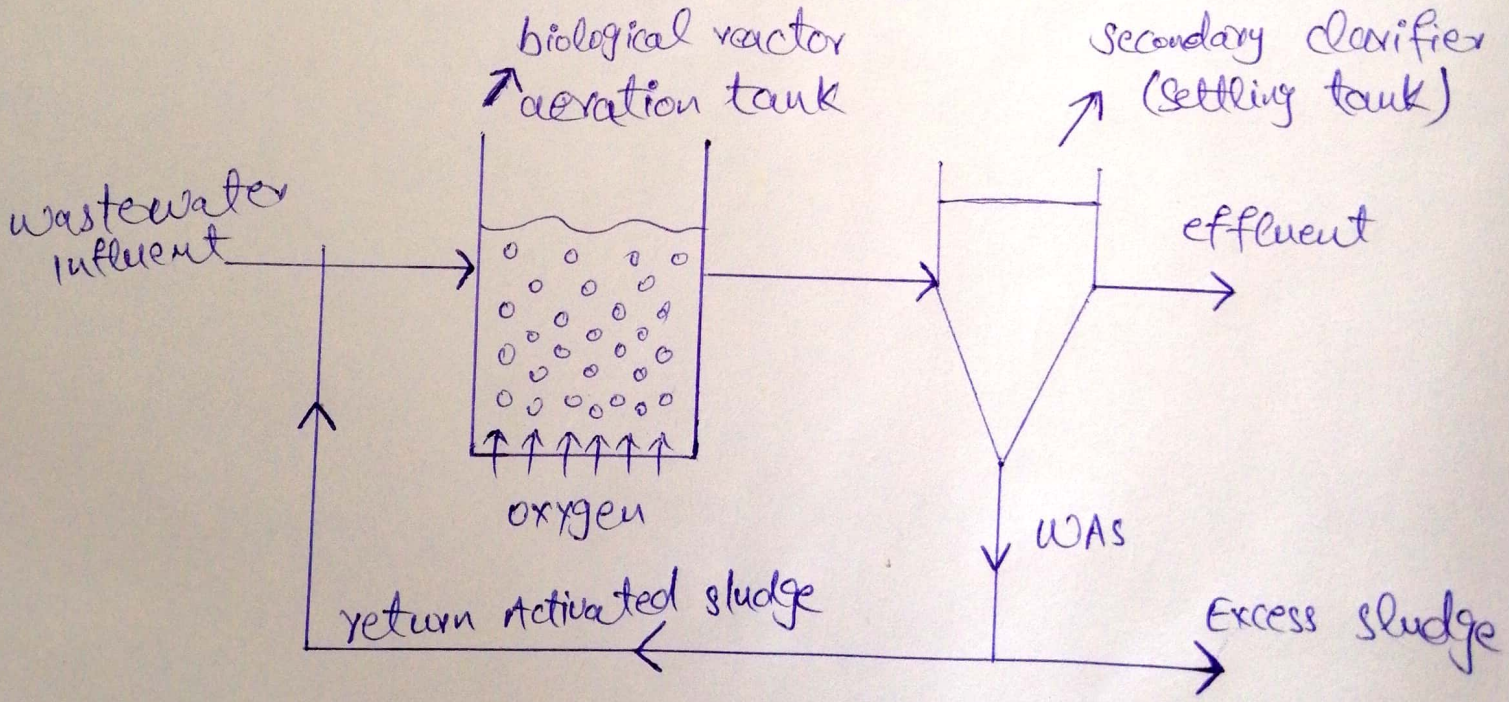
Activated sludge method, trickling filter, rotating biological reactors, and oxidation ditch are examples of aerobic wastewater treatment.

Anaerobic lagoons, septic tanks, and anaerobic digesters are example of anaerobic wastewater treatment.

Activated sludge Process:

→ Formation of floc Particles ranging in size from 50 to 200 µm, removed by gravity settling, leaving relatively clear liquid as treatment effluent.

→ Remaining settled bio flocs are removed from the system and is termed as wasted Activated sludge.



Q3:-

Ans: Assimilative capacity of Receiving Bodies:

→ Assimilative capacity of receiving water bodies refers to the ability of a body of water to cleanse itself; its capacity to receive wastewaters without deleterious effects and without causing 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.

→ Although wastewater is properly treated before it is disposed of to the natural water streams still it has impurities / pollutants that need to removed or make them less effictive

so That The receiving water bodies may not becomes unsuitable for use or cause damage to The aquatic life.

Assimilative capacity of Receving Bodies helps in wastewater treatment Through The following factors:

1) Temperature:

Temperature plays in important role in assimilative capacity of receiving water. Increase in temperature will increase The biological decomposition of organics and Thus assimilative capacity will improve. Increase in temperature also causes to increase The dilution Process and Thus increase The assimilative capacity.

2) Flow velocity:-

Flow velocity is also critical to assimilative capacity of receving water bodies. Higher The flow velocity will encourage quick dilution and dispersion of Pollutants.

3) Dissolved oxygen:-

Rate of biological decomposition is directy related to The amount of dissolved oxygen. DO is replenished by re-aeration. May be Provided by maintaining sufficient flowing velocity.

4) Depth of flowing water:

Assimilative capacity is indirectly related to the depth of receiving water bodies. Increase in depth causes the Purification Process.

5) Types and concentration of Pollutants:-

Types and concentration of Pollutants disposed off to the water greatly affect the assimilative capacity. Higher concentration of Pollutants requires much time for dilution and Purification as compared to less Pollutants Present in the sewage.

Q4:-

Ans: Sludge:

→ Sludge refers to the residual, semi-solid material left from, muncipal wastewater or industrial waste water treatment process.

→ Sustainable sludge handling may be defined as a socially 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.

Sludge Management Processes:-

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

1) Primary operations:-

→ **Grinding:** It includes Particles size reduction.

→ **Screening:** It includes removal of fibrous materials.

→ **Blending:-** It includes making the sludge homogenous.

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:-

→ Sludge Stabilization is undertaken to reduce Pathogens, eliminate offensive odors, minimize Production of usable gas (methane).

4) Dewatering:

→ Dewatering is undertaken to reduce the moisture content of sludge.

→ compared to Thermal (evaporative Processes) for water reduction, mechanical dewatering is often selected due to his low energy requirement.

5) Heat Drying:-

→ It involves the application of heat to evaporate water to reduce the mositure content of biosolids.

→ Advantage of this method is to reduce Product transportation costs, Improve storage capability, and marketability.

Advantages of sluge Management in wasteuater treatmeut aore The following:

1. The Product can be used as a fertilizer as it contains nitrogen, Phosphorus, Potassium, and microelements, and it improves soil Properties.
2. Utilizat of nutrients contained in The sludge, i.e; Phosphorus and nitrogen.
3. Utilization of organic substances contained in The sludge for improvement of The humus.
4. Soil improvement.
5. The cheapest disposal route Total destruction of organic matter and total mineralization of sewage sludge.

Q5:

Ans: EIA Definitions:

→ An enviromental study comprising collection of data, Prediction of qualitative & quantative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations & such other components as may be prescribed.

⇒ "The following parameters should be considered while conducting EIA for newly proposed water treatment plant"

→ Determine the scope of the environmental impact assessment (EIA) through a process of screening. EIA is mandatory for certain projects.

→ Identify during the assement the key issues to be examined imore details (scoping) during the assessment including the:

=> impacts to be assessed.

=> Alternatives to be examined.

→ Provide an Environmental statement on the EIA describing the proposed development. Include information on:

=> overall purpose & specific aims of the development.

=> Physical characteristics of the development.

=> Production Processes that will be involved.

=> Levels of waste and emissions likely to arise from the development.

=> Study the state of the Potentially affected environment in the absence of the Project to Provide a baseline against which the possible effects of the Project can be measured.

=> Make a distinction b/w the magnitude and significance of likely impacts.