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Q NO: 1

ANSWER:-

Waste Water treatment:-

The major aim of wastewater treatment is to remove as much of suspended solids as possible before the remaining water, called effluent, is discharged back to the environment. As solid material decays, it uses up oxygen, which is needed by the plants and and animals living in water.

"Primary treatment" removes about 60% of suspended solids from wastewater. This treatment also involves aerating (stirring up) the waste water, to put oxygen back in. Secondary treatment removes more than 90% percent of suspended solids.

Importance:-

There are alot of good reasons why keeping our water clean is an important priority.

Fisheries:-

Clean water is critical to plants and animals that lives in water. This is important to fishing industries.

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sport fishing enthusiasts, and future generations.

Wildlife Habitats:- Our rivers and oceans water teem with life that depends on shoreline, beaches and marshes. They are critical habitats for hundreds of species of fish and other aquatic life. Migratory water birds use the areas for resting and feeding.

Recreation and quality of life:- Water is a great playground for all of us. The scenic and recreational values of our water are reasons many people choose to live where they do. Visitors are drawn to water activity such as swimming, fishing, boating and picknicing.

Health concerns:- if it is not properly clean water can carry disease since we live, work and play so close to water harmful bacteria have to be remove to make water safe.

The shape of rectangular clarifier provides a longer path for the waste water flow and suspended solids to travel and subsequently longer detention time which warrants less shorts circuiting and more sludge settling compared to the centre-feed/peripheral overflow circular clarifier. In addition flow distribution among several clarifier is usually more even and often requires less head loss for rectangular clarifier.

Q NO: 2.

ANSWER:-

Aerobic waste water treatment.	Anaerobic waste water treatment.
• Aerobic waste water treatment is a biological treatment process which uses an oxygen rich environment	• Anaerobic waste water treatment is a process where anaerobic organisms breakdown organic material in an oxygen absent environment.
• Bacteria involved in the aerobic waste water treatment are aerobes.	• Bacteria involved in the anaerobic waste water treatment are anaerobes.
• Air is circulated in aerobic waste water treatment tanks.	• Air is not circulated in anaerobic waste water treatment tanks.
• Aerobic waste water treatment does not produce methane and carbon dioxide.	• Anaerobic waste water treatment produces. methane and carbon dioxide.
• Aerobic waste water treatment requires energy. Hence they are less energy efficient.	• Anaerobic wastewater treatment is an energy efficient process.

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Examples

• Activated sludge method, trickling filter, rotating biological reactors, and oxidation ditch are examples of aerobic waste water treatment.	Anaerobic lagoons, septic tanks, and anaerobic digesters are examples of anaerobic waste water treatment.

Activated sludge process (ASP):-

* Microorganism 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-organism to grow. This aeration also helps to keep micro-organism in suspension.
* Aeration tank is followed by clarifier/settler in which the micro-organism form flocs and settled down at bottom.
* formation of floc particles, ranging in size from 50 to 200 μm, remove by gravity settling, leaving relatively clear liquid as treated effluent;
* A part of settled bioflocs are recycled back to the aeration tank to maintain certain amount of micro-organisms in the system for efficient operation of the systems. This is called as Recycled Activated Sludge (RAS).

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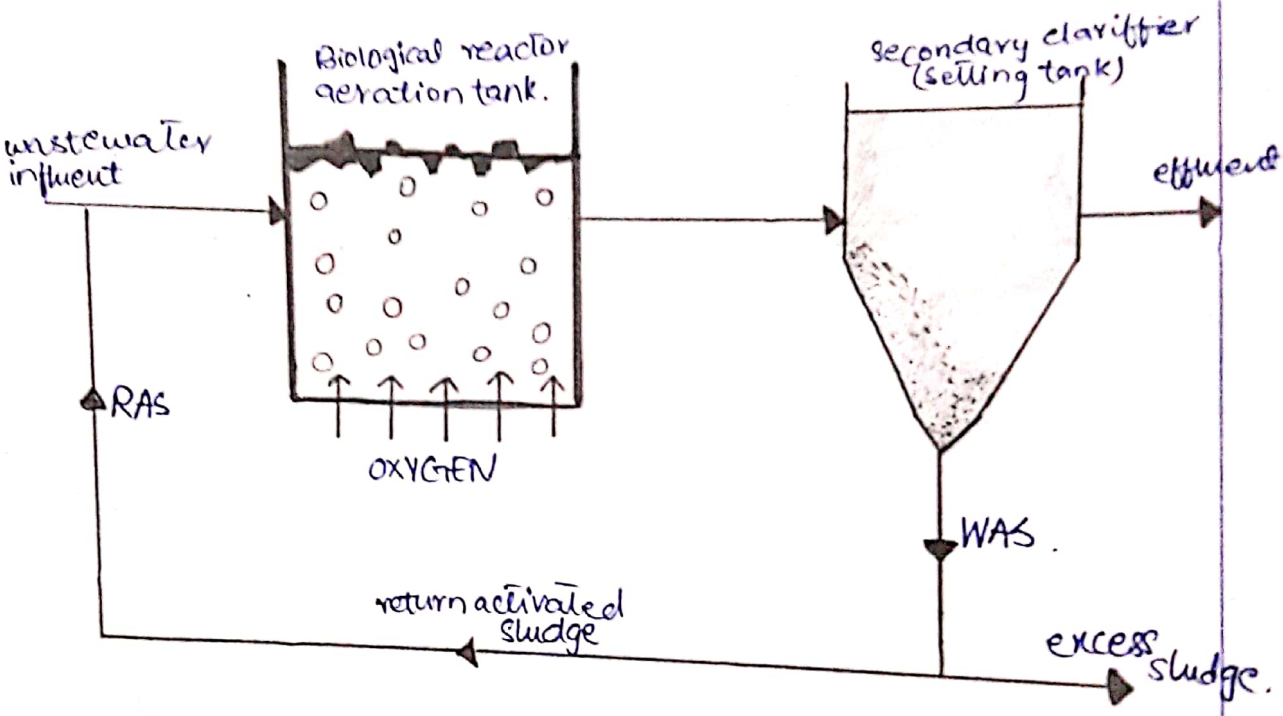
* Remaining settled bioflocs are removed from the system & and is termed as Wasted Activated sludge (WAS).



* APS involves production of activated mass of micro-organisms capable of stablizing & waste under aerobic condition.
* In 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 upto 90% of dissolved organics are removed by (ASP).
* The main drawback associated with APS is its high electricity consumption particularly for & aeration.

Q NO:3

ANSWER:-

Assimilative capacity of recieving bodies:-

* Assimilative capacity of recieving bodies refers to the ability of body of water to cleanse itself; its capacity to recieve waste waters without deletrious effects and without causing damage to aquatic life or humans who consume the water. It is level to which waterbody or nature control the toxicity without affecting the aquatic life.

* Although waste water is properly treated before it is disposed of to all the water natural streams still it has impurities/pollutants that need to removed or make them less effective so that the recieving water bodies may not become unsuitable for use or cause damage to aquatic life.

Assimilative Capacity of Recieving Bodies helps in waste water treatment through the following factors:-

1) **Temperature:-** Temperature play an important role in assimilative capacity of recieving water. Increase in temperature will increase the biological decomposition of organics and thus assimilative capacity will improve. Increase in

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also causes to increase the dilution process and thus increases the assimilative capacity.

2) **Flow velocity:-** Flow velocity is also critical to assimilative capacity of receiving water bodies. Higher the flow velocity will encourage quick dilution and dispersion of pollutants.

3) **Dissolved oxygen (DO):-** Rate of biological decomposition is directly related to the amount of dissolved oxygen. DO is repelenished by re-aeration. 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 to decrease dissolved oxygen in the water and thus it reduces the purification process. Also the effect of UV radiations from sunlight which helps to kill the pathogens, decrease with increase depth.

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 require much time for dilution and purification as compared to less pollutants present in the sewage.

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Thus assimilative capacity is not fixed quantity but rather it's a range depending not only on characteristics of pollutants but also depends on prevailing physical conditions of receiving water bodies.

Q NO:4

Answer:

Sludge Management:-

The sludge mangement process is as under:-

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

1) Primary Operation:-

This process include:

- Grinding: It includes particle size reduction.
- Screening: It includes removal of fibrous materials.
- Degritting:- It includes removal of sand or other inorganic materials.
- Blending: It includes making the sludge homogenous.
- Storage:- It ensures flow equalization in the system.

2) Sludge thickening:-

* Sludge thickening is undertaken to increase % of solid content in sludge by removing a portion of liquid fraction.
* Volume reduction of approximately 30-80 % can be reached with sludge thickening.
* Various method of sludge thickening are:
  - i Gravity thickening.
  - ii Flotation thickening
  - iii Rotatory drum thickening

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3) Sludge stablization:-

i) Anaerobic digestion:-

* A biological process that uses bacteria in an oxygen free environment.
* These bacteria convert volatile solids into CO_2, methane and ammonia.

4) Dewatering:-

* Dewatering is undertaken to reduce the moisture content of sludge.
* Compared to thermal (evaporation process) for water reduction, mechanical dewatering is often selected due to its loco energy requirment.
* Centrifugation is method used for seperating liquids of different densities, thickening slurries.

5) Heat Drying:-

* It involves the application of heat to evaporate water and to reduce the moisture content of biosolids.
* Advantage of this method is to reduce product transportation costs, improve storage capacity and marketability.
* Direct drying involves the wastewater solids come into contact with hot gases which cause evaporation of moisture. Dryers such as rotatry dryers and fluidized bed dryers are used.

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Advantages:-

- High treatment efficiencies possible for BOD, COD, TSS, N, P.
- High flexibility in operating condition.
- Possibility of producing electric energy from biogas.
- Low land requirement for CAS, somewhat higher land requirements for EA.
- High effluent quality.

QNO:5:-

ANSWER:-

Definition of EIA:-

EIA is defined as an ~~activ~~ activity designed to identify the impact on biogeophysical environment, on man and well-beings of legislative proposals, projects, policies, operation procedures and to communicate information.

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

EIA Methodology: for new assign engineer:-

Whenever a new development project is planned which is likely to affect environmental quality, it is necessary to carry out EIA.

1) The first step in EIA method is to determine whether the project under consideration

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follows the ~~jurisdiction~~ jurisdiction of the relevant acts and if so, wheather it is likely to create a significant environmental disruption.

2) if so, an EIA is undertaken and the environmental impact statment (EIS) is prepared.

3) In many countries, EIS is open to public scruting and is reviewed at public hearings.

4) Finally a political decision is taken. The development project may be (i) accepted or (ii) accepted with amendments or (iii) an alternative proposal is accepted or (iv) rejected.

THE END.