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Section

"A"

Subject

waste water

Submitted

To

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Q No 1:-

What is wastewater treatment and its importance? Why rectangular tank are preferred over circular tank for removal of settleable solid during preliminary treatment?

Ans:- Wastewater treatment is a process used to remove contaminants from wastewater 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. Wastewater is used for other purpose that why we called it water reclamation.

Importance :-

The major aim of wastewater treatment is to remove as much of the suspended solid as possible before the remaining

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water called effluent is discharged back to the environment. As solid material decay, it uses of oxygen which is needed by the plant and animal living in the water.

* Rectangular tanks are preferred over circular tank for removal of settleable solid during preliminary treatment because the shape of the rectangular clarifier provide a longer path for the wastewater flow and the suspended solid to travel and subsequently longer detention time which warrant less short circuiting and more sludge setting compared to the centre-feed (peripheral overflow distribution) clarifier. In addition flow distribution among several clarifier is usually more and often require less head loss for rectangular clarifiers.

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Clarifier Hydraulics :-

The shape of the rectangular clarifier provide a longer path of the wastewater flow and the suspended solid to travel and subsequently longer detention time which warrant less short circuiting and more sludge settling compared to the center.

Feed overflow circular clarifier In addition flow distribution among several clarifier is usually more even often require less head loss for rectangular clarifiers.

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Q No 2

Ans:- AEROBIC Wastewater treatment :-

* Aerobic process use bacteria that require oxygen, so air is circulated throughout the treatment tank.

② These aerobic bacteria then break down the waste within the wastewater.

Some system utilize a pretreatment stage prior to the main treatment to reduce the chance of clogging the system.

electricity is required for system operation.

An aerobic wastewater treatment :-

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Anaerobic bacteria transform organic matter in the wastewater into biogas that contain large amount of methane gas and carbon dioxide.

② Energy-efficient process.

③ often used to treat industrial wastewater that contains high level of organic matter in warm temperature.

④ it can be used a pretreatment prior to aerobic municipal wastewater treatment.

Activated sludge process:

Process of treating sewage or industrial wastewater using aeration and biological floc composed of bacteria and protozoa.

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* Is a biological process that can be used for oxidizing carbonaceous biological matter oxidizing nitrogenous matter (NH_3 and N_2) removing nutrient (N and P)

creation matter method - diffuse aeration, surface aerator (Cones) and pure oxygen aeration

Activated sludge process:-

The sludge blanket is measured from the bottom of the clarifier.

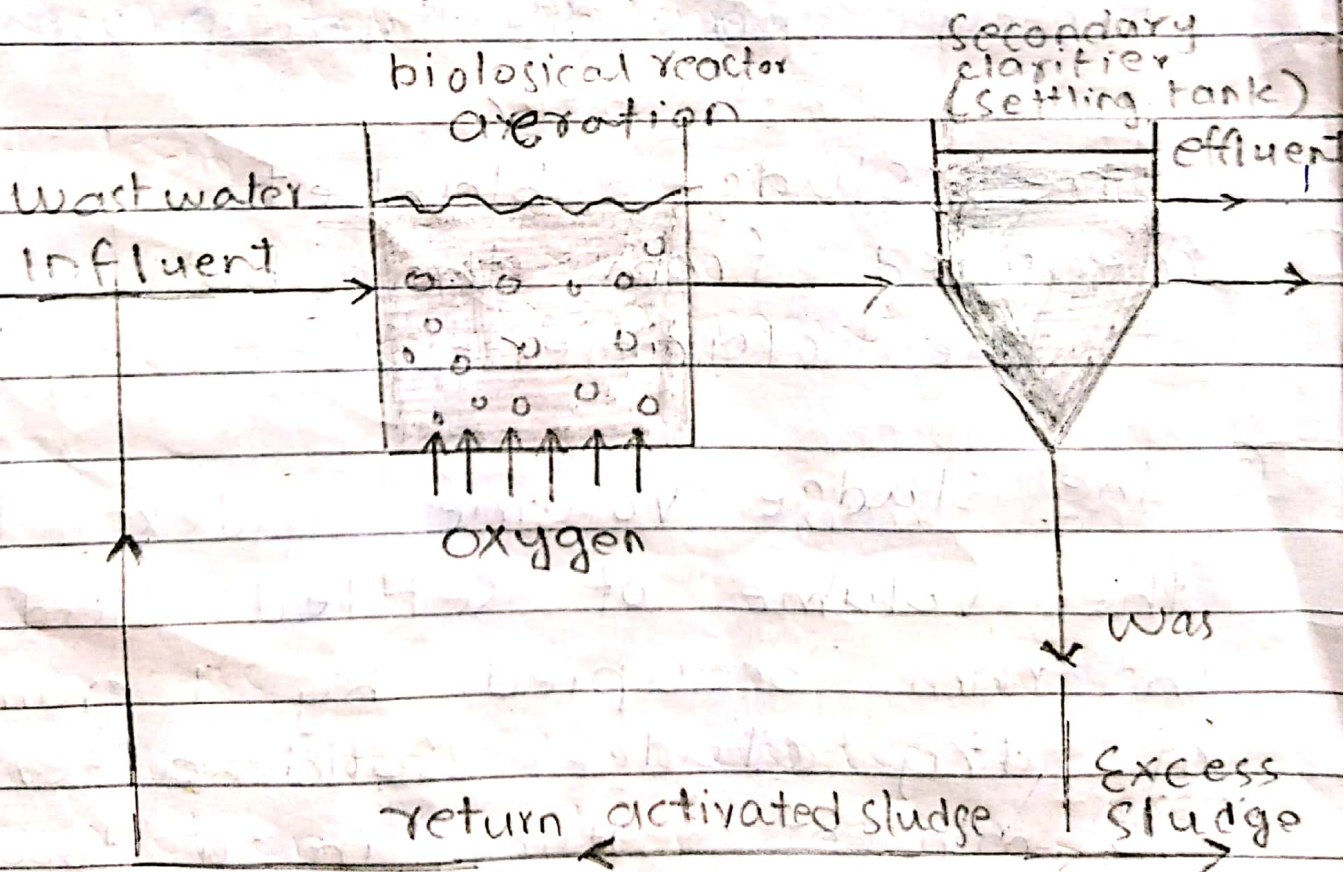
② The sludge volume index is the volume of settled sludge in mm occupied by 1 gram of dry sludge solid after 30 min of settling in a 1000 ml graduated cylinder.

The mean cell residence time is the total mass (lbs) of

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mixed liquid suspended solid in the aerator and clarifier divided by the mass flow rate of MLSS effluent.

Some use mixed liquor suspended solid for expedience but mixed liquor volatile suspended solid is considered more accurate for the measure of microorganism.



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Q No 3:-

Answer :-

Assimilative Capacity of receiving water bodies refer to the ability of a body of water to cleanse itself. It capacity to receive wastewater without deleterious effect and without causing damage to aquatic life or human who consume the water. It is level to which water body or nature control the life toxicity without affecting the aquatic

Although wastewater is properly treated before it is disposed of to the natural water stream still it has impurities pollutant that need to removed or make them less effective so that the receiving water bodies may not become unsuitable for use or cause damage to aquatic life.

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(4) Dilution:-

Dilution is the process of reducing the concentration of pollutants in receiving water, usually simply by mixing with or more quantity of water.

(2) Sunlight:-

Sunlight facilitates biological decomposition of pollutant and kill pathogen by ultraviolet radiation (UV)

(3) Dispersion:-

Dispersion is the distribution of pollutant in relatively large area of water. Dilution and dispersion are inter-related.

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Q No 4

Ans :- Sludge treatment:-
Sludge treatment is the processes used to manage and dispose of sewage sludge produced during waste water and drinking water treatment.

Sludge is mostly water with lesser amount of solid material removed from liquid sewage.

Physical and chemical characteristics in sludge

Treatment process :-

Thickening — Gravity and Floatation
Digestion — Aerobic — Anaerobic
Mechanical — Dewatering — Vacuum filtration — centrifugation.

Sludge disposal :-

many options are available.

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- Incineration of sludge is an option that is becoming less attractive because of the high cost of building and operating incinerators plus the creation of air pollution and need to landfill the ash.

Advantages of sludge treatment :-

- it reduces pathogen and volume to be disposed.
- ② it protect wild life.
- ③ it protect aquatic life and also prevent disease.
- ④ it sustainable management of organic waste.
- ⑤ Reduction of odors and disease causing agents.
- ⑥ it producing bio gas.

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Q No 5

Ans:- Environmental Impact Assessment :-

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

Parameters :- wastewater contain a large number of contaminants and they are categorised as physical chemical and biological contaminant. different parameter have been established from experience and theory to define such characteristics.

1) Biochemical oxygen demand :-

Bod is the amount of oxygen consumed by aerobic micro-organism

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to break down the organic matter present in the wastewater. it is actual measured parameter and is an indication of the amount of organic matter consumed within 5 day as from testing.

Chemical oxygen demand :-

it is the alternative measure of the amount of organic matter. the amount of oxygen used by a strong oxidising agent is measured. This value is of greater importance where evaluating wastewater from industries.

total suspended solid :-

total suspended solid is measured to indicate the amount by mass of fine suspended particle. effluent discharge in the water.

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Course must contain low level of TSS since TSS cause turbidity affecting the amount of aquatic plant and also cause visual pollution.

total kjeldahl nitrogen :-

In/ater usually contain high level of nitrogen containing compounds.

The nitrogen exist mostly in free form.

- * organic nitrogen
- * Ammonia
- * Reduced nitrogen

The TKN value hence indicate the amount of nitrogen of all these 3 form.

it is useful in monitoring the plant.