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I-D ⇒ 7671

Section ⇒ 'B'

Paper ⇒ Final Term.

Exam ⇒ ~~Final Term~~ Waste Water Engineering.

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IQRA NATIONL UNIVERSITY:.

QNo:1

Ans: **Wastewater treatment:-** 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 treatment involves collecting the wastewater in a centralized or decentralized location (Wastewater Treatment plant) and subjecting the wastewater to various treatment processes.

* Wastewater if properly treated, is an important resource and can be used for various purposes including irrigation, law watering, car washing, flushing toilets and landscaping etc.

Importance of Wastewater:- The major aim of wastewater treatment is to removes as much of the supended

solids as possible before the remaining water, called effluent, is discharged bac to the environment. As solid materia decays, it uses up oxygen, which is needed by the plants and animals living in the water.

QNO #2

Ans:- Aerobic Wastewater treatment:-

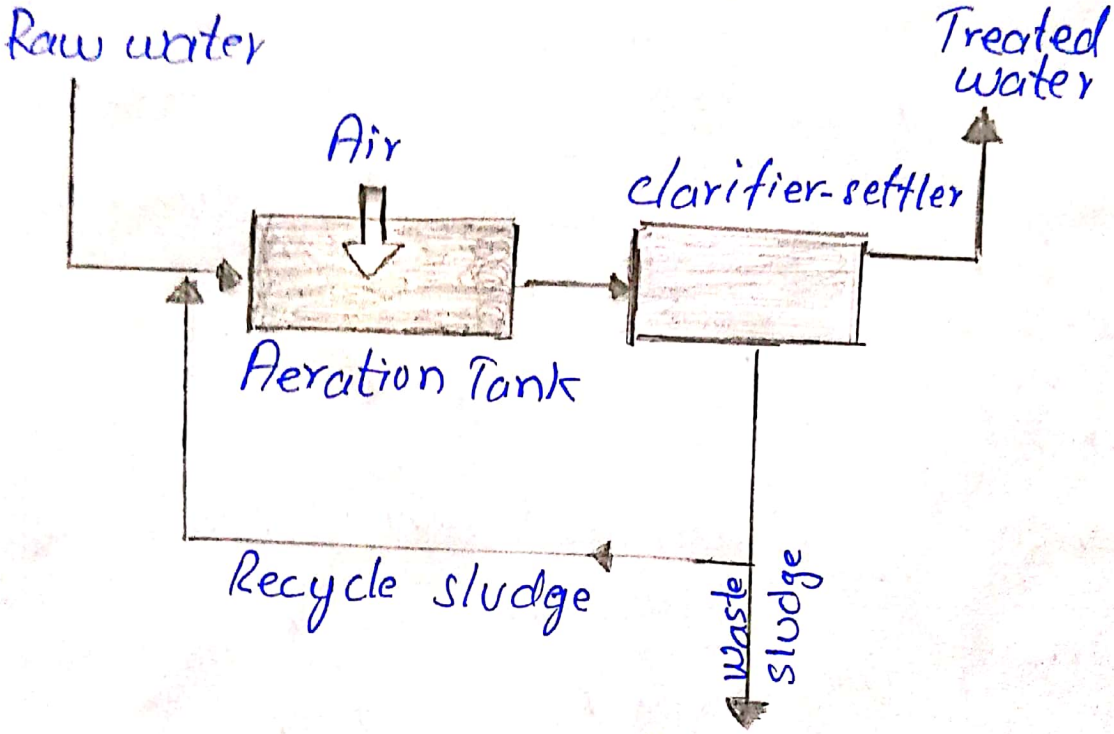
* Aerobic processes use bactena that require oxygen, so air is circulated throughout the treatment tank These aerobic bactena than break down the waste within the wastewatey
* Some systems utilize a pretreatment stage prior to the main treatment to reduce the chance of clogging the system.
* Electricity is required for system operation.

Anaerobic Wastewater Treatments-

- Anaerobic bacteria transform organic matter in the wastewater into biogas that contains large amounts of methane gas and carbon dioxide.
- Energy-efficient process
- often used to treat industrial waste water that contains high levels of organic matter in warm temperatures
- It can be useed as a pretreatment prior to aerobic municipal wastewater treatment.
- Activated sludge process: The activated sludge process is the brological process by which non-settle able substance occuring in dissolved and colloidal form are converted into settle able sludge

which is removed from the liquid carrier (water).

Diagram of activated sludge process:



Q NO # 3

Ans:- **Assimilative capacity of receiving water bodies:** Assimilative capacity of receiving water bodies refers to the ability of a body of water to cleanse itself; its capacity to receive waste waters without deleterious effect and

without causing damages 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 sueams still it has impurities / pollutants that need to removed or make them less effective so that the receiving water bodies may not become unsuitable for use or cause demage to the aquatic life.

Q: How does it help in wastewater Treatment:?

Ans: When wastewater or contaminated water meets freesh water or natural water bodies, then because of the

assimilative capacity of natural water bodies two processes are done on the contaminated water, one delusion and second dispersion, in delusion when contminated water mets greater amount of fresh water than the concentration of contaminated watey meets greater amount of desrees, while in dispersion the contaminated water disperse on a greater area and its concentration gets low. And because of these 2 processes assimilative capacity treats wastewater.

Q=No # 4

Ans:-

ludge mangement:

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

= Primery operation:

This process Includes:

i) Grinding: It Includes particles size reduction

ii) Greening: It Includes removal of fibrous material

iii) egrittings: It Includes removal of Sand or other Inorganic material.

iv) Storage: It ensures flow equalization in the system.

v) Blending: It Include making the studge homegenous.

* Sludge Thickening: sludge Thickening is undertaken to Increase percentage of solid content in sludge by removing a portion of liquid fraction.

⇒ Volume reeluction of approximately 30.80% can be reached with sludge thickening.

⇒ Various methods of sludge thickening are

* Gravity thickening.
* Flotation thickening.
* Rotatory abom thickening.

3. sludge stabilization: sludge stabilizations to make reduce pathogens, eliminate offensive odors, minimize production of usable gas (methane)

⇒ Methods of stabilization are:

i) Alkaline stabilization
ii) Anerabic Digestion

i Alkaline stabilization :- Lime is added to untreated sludge, to raise the pH to 12 or higher

⇒ Retards microbial reaction, Materials such as cement kiln dost, fly ash are useed Instead of live.

Anarobic Digestion: A biological process that uses bacteria in an oxygen free environment.

⇒ These bacteria converts Volatile solid into carbon dioxide methan and ammonia.

Dewatering: Dewatering is undertakers to reduce the distur content of sludge

⇒ Compared to thermal (evaparative proces) for water reduction, mechanical dewatering is often selected due to its low energy requirement.

⇒ Centifugation is the methad used for separating liquids of different densities thickning slurries.

Heat Drying:- It involves the application of heat to evaporate water and to reduce the moisture content of biaslide.

Advantages of this method is to reduce product ransporation costs, Improve storage capabity, and marketability.

⇒ Direct drying Inwoles the wastewater solid come into contact with hot gases, which cause exporation of mistur, Dryers such as rotary dryers and fluidized bed drgers are used.

Advantages:- High treatment effiziences possible for BOD, COD, TSS, N, P

⇒ High flexibility in operating conditions

⇒ ponibility of producing electric energy from biogas.

→ low land requirement of CAS, somewhat high land requirement for EA.

→ High effluent quality

1) Biochemical oxygen demand.

The BOD is the amount of oxygen consumed by aerobic micorganisms to break down the organic matter present in the wastewater.

2) chemical oxygen demand.

The COD is an attematic measure of the amount of organic matter. The amount oxygen used up by a strong oxidizing agent is measured

3) Total suspended solid (TSS).

The TSS is mesured to Indicate The amount by mass of the suspendid particle.

Q# 5:-

Ans:-

Enviromental Impact Assesment (EIA)

A techngue and a process by which Information about envorimental effects of a Reject is collected, both by the developer and from other sources and taken into account by the Planing Authenty informing the fudgement on water the develpment should Proceed

OR.

The Process of identify, Predicting evaluating and mitigattion The biophysical social and other relevent affects of developent proposal Prior and major decision being taken and comitments made.

→ The Most Important Parameters to be considered for a newey proposed overtewater treatment ~~then~~ teant.

Total kjehdahl Nitrogen (TKN)

wastewater Usually contain high levels of konitrogen containing compounds The nitrogen exist mostly is in free forms organism nitrogen ammunia and reduced nitrogens.

End of paper.