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ID # 7767

SECTION # A

Subject waste water

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Q NO # 01 (1)

WASTEWATER TREATMENT :-

Wastewater is used water. It includes substances such as human waste, food scraps, oils, soaps and chemicals. In homes, this includes water from sinks, showers, bathtubs, toilets, washing machines and dish washers. Businesses and industries also contribute their share of used water that must be cleaned.

IMPORTANCE:-

Essential for life. Clean water is one of the most important natural resources on the planet. Wastewater, which is basically used water, is also a valuable resource, especially with

recurring droughts and water shortages in many areas of the world. However, wastewater contains many harmful substances and cannot be released back into the environment until it is treated thus, the importance of wastewater treatment is two to restore the water supply and to protect the planet from toxins.

Why Rectangular tanks are preferred over circular :-

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 ³ less short
circuiting and more sludge
settling composed to the centre-
-feed / peripheral overflow circular
clarifiers In addition, flow distributio
among several clarifiers is
usually more even and often
requires less head loss for
rectangular clarifiers.

QNO402

Aerobic Treatment | Anaerobic Treatment

Application Low to medium strength wastewater (< 1000 ppm) eg municipal sewage refinery wastewater etc

• Medium to high strength wastewater (> 4000 ppm) eg food and beverage industry wastewater.

• Capital Investment Relatively high

• Capital Investment Relatively low with pay back

• Energy Consumption Relatively high

Energy Consumption Relatively high

• Foot-print Relatively ~~big~~ Large

• Foot-print Relatively Small and Compact

• Net Sludge Yield Relatively high

• Net Sludge Yield Relatively low

• Post-treatment typically direct discharge

• Post-treatment typically Required to fulfill wastewater standard discharge requirement

Example Technologies

• Activated Sludge process
Trickling Filter and Rotating Biological Contractor

• Anaerobic Digestors
Continuous Stirred Tank Reactor Sequencing Batch Reactor, upflow Anaerobic Sludge blanket.

Activated SLUDGE PROCESS:-

- Process for treating sewage or industry wastewater using aeration and a biological floc composed of bacteria and protozoa.
- Is a biological process that can be used for oxidizing carbonaceous biological matter oxidizing nitrogenous matter (NH_3 & N_2) removing nutrients (N & P)
- Aeration methods - diffused aeration surface aerators and pure oxygen aeration
- The sludge blanket is measured from the bottom of the clarifier
- The sludge volume index is the volume of settled sludge in mm occupied by 1 gram of dry sludge solids. After 30 minutes of settling in a 1000 ml graduated cylinder.

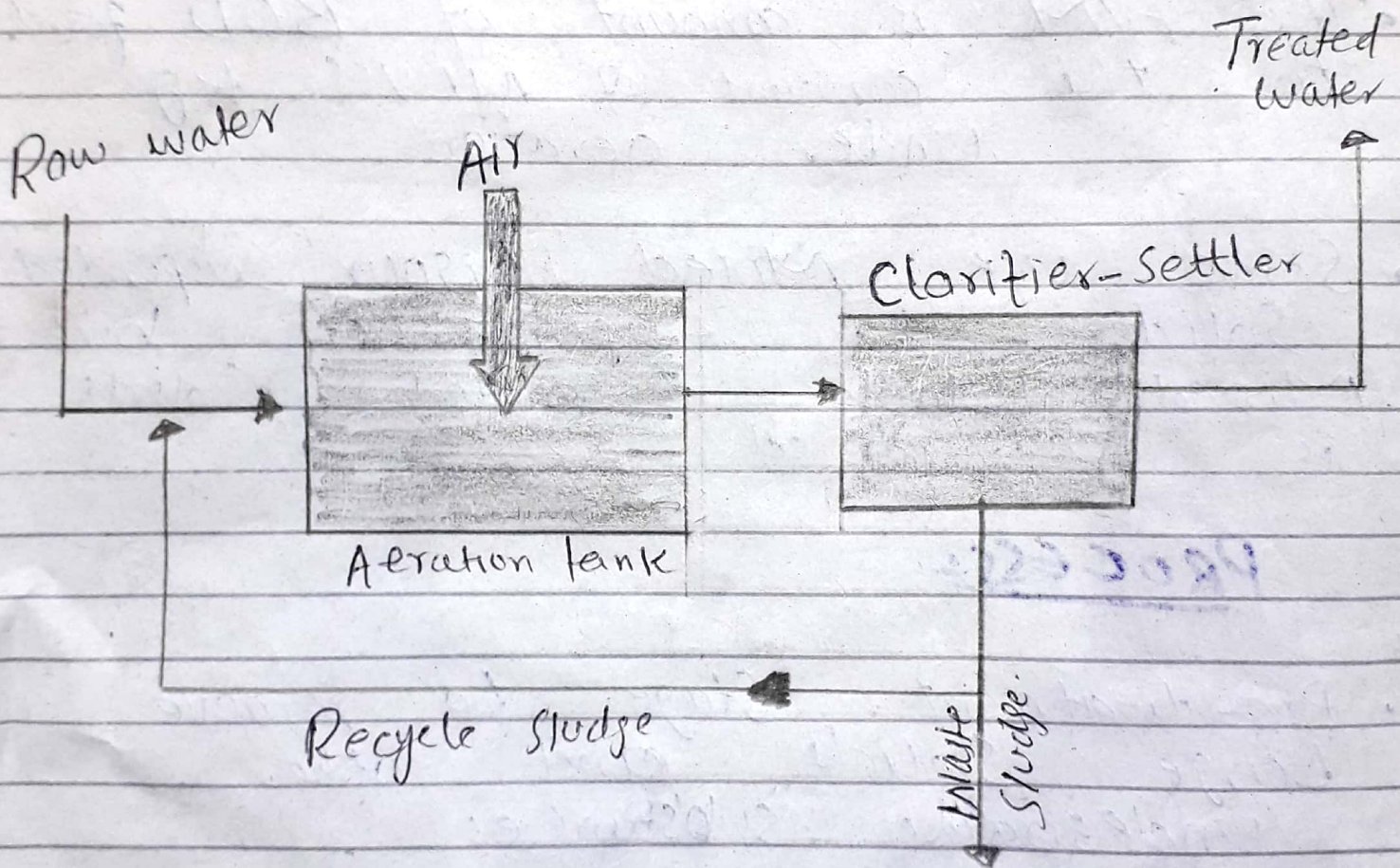
- The Mean Cell Residence Time is the total mass (kg) of mixed liquor suspended solids in the aeration tank and clarifier divided by the mass flow rate (kg/day) of MLSS effluent.
- The F/M is amount of BOD fed to the amount of MLVSS kg under aeration.
- Some use Mixed Liquor Suspended Solids for aeration but Mixed Volatile Suspended Solids is considered.

PROCESS:-

- Pre-treatment stage to remove large solids and other undesirable substances.
- Aeration stage, where aerobic bacteria digest biological wastes.
- Settling stage allows undigested solids to settle from a sludge that must be periodically removed from the system.

- Disinfecting Stage, where chlorine or similar disinfectant is mixed with water, to produce an antiseptic output.

ACTIVATED SLUDGE PROCESS.



Q NO # 03

(1)

ASSIMILATIVE CAPACITY:-

Assimilative capacity can be defined as the amount of wastewater that can be disposed of in the water body and it can be safely stabilized while maintaining the desired water quality.

Since a certain amount of wastewater can be discharged into a receiving water body, it may be highly un-economical to outflow the wastewater discharge. However excessive discharge will impair the stream water quality.

Assimilative capacity help in²
waste water treatment

1) Temperature:-

Temperature plays an 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 increases the assimilative capacity.

Assimilative capacity help in wastewater treatments

• When wastewater or contaminated water meets fresh water or natural water bodies then

because of the assimilative capacity of natural water

bodies two processes are done

on the contaminated water one

dilution and second dispersion

In dilution when contaminated water meets greater amount of fresh water than then the

concentration of contaminated

water ~~bacteria~~ decreases, 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 waste water.

Q NO # 04

ANS = Sludge Management =

Step 1 Sludge Thickening :-

The first step in the sewage sludge treatment plan is called thickening. In this step the sewage sludge is thickened in a gravity thickener to reduce its overall volume, thus enabling the easy handling of the sludge.

Step 2 - Sludge Digestion :-

After a massing all the solids from the sewage sludge begins the sludge digestion process.

RAT

this is biological process in which the organic solids. present in the are decomposed into stable substance. This process also helps reduce the Total mass of solids.

Step # 3

Dewatering:-

After retrieving useful gases and other by product the remaining sludge is then dewatered before final disposal. In most cases dewatered sludge usually contain a significant amount of water as much as 70% in spite of its solidified state. Therefore, it is important to dry and dewater the sludge before hand.

Step 4:

Disposal:

Once the sludge has been effectively dewatered. It can be buried underground in a sanitary landfill or can be used as a fertilizer depending on its chemical composition. In cases where the sludge is too toxic to be reused or burned. You can simply incinerate the sludge and convert it into ash.

ADVANTAGES:

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

Q NO H 05

Definition OF EIA

Environmental Impact Assessment is defined as an activity designed to identify the impact on the biogeophysical environment, on man and on well-being of legislative proposal projects, policies operational procedures and to interpret and communicate information.

OR

EIA is a process of evaluating the likely environmental impacts of a proposed project or development - taking into account inter-related socio-economic, cultural and human health impacts both beneficial and adverse.

Parameter to be Considered while Conducting EIA for Newly Proposed Wastewater Treatment Plant :-

Although leg. and practice vary around the world, the fundamental components of an EIA would necessarily the following stages-

- Screening to determine which projects or developments requires a full or partial impact assessment study
- Scoping to identify which potential impacts are relevant to assess (based on legislative requirement international conventions expert knowledge and public involvement)

to identify alternative solutions that avoid, mitigate or compensate adverse impacts on biodiversity (including the option of not proceeding with the development finding alternative designs or sites which avoid the impacts incorporating safeguards in the design project or providing compensation for adverse impacts) and finally, to derive terms of reference for the impact assessment

- Assessment and evaluation of impacts and development of alternatives to predict and identify the likely environmental impacts of a proposal project or development including the detailed elaboration of alternatives

- Reporting the environmental Impact Statement or EIA report including an environmental management plan (EMP) and a non technical Summary for the general audience.
- Reporting (EIS) based on the terms of reference (Scoping) participation

→ Construction phase :

- Construction of the the access roads and main collector
- Construction of the Siphon structure across the River Vardar
- Preparatory work at the location of the WWTP and excavation work
- Transport and disposal of surplus excavated material.
- Disposal of construction waste
- Installation of the equipment