Hurraivah Kabir

7758

Section B

Waste water Engineering

Final Assignment

Question No 1:-

Waste Water Treatment:-

Wastewater treatment consist of applying known technology to improve or upgrade the quality of a waste water.

Waste water treatment involves collecting the waste water in a centralized or decentralized location and subjecting the waste water to various treatment process.

Importance of waste water Treatment:-

→ The principal objective of waste water treatment is generally to allow human & industrial effluents to be disposed off without causing danger to human health or unacceptable damage to the natural environment.

→ Waste water if properly treated, is an important resource & can be used for various purposes including irrigation, lawn watering, car washing, flushing toilets and landscaping etc.

→ Waste water treatment can also generate biogas as final product which is a potential source of energy.

We prefer Rectangular tanks because rectangular clarifiers typically require less land than circular clarifiers for a similar surface area. The reduction becomes even more significant in a multiple unit design, where common concrete walls are used between rectangular basins. The resulting land availability is a major advantage for treatment plant layout. Construction cost is also reduced as a result of the common concrete walls.

The even flow distribution configuration for rectangular clarifiers requires simple and less expensive pipe work layout and pumping requirement as compared to circular clarifier where the pipes require a more complicated layout pattern & perhaps a seperate pumping station as well.

Question No 2:-

AEROBIC WASTE WATER TREATMENT:-

- Aerobic processes use bacteria that require oxygen, so air is circulated throughout the treatment tank.
- These aerobic bacteria then break down the waste within the wastewater.
- 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.

ANAROBIC WASTE WATER TREATMENT:-

- Anaerobic bacteria transform organic matter in the wastewater into biogas that contains large amount of methane gas & carbondioxide.
- Energy - efficient process.
- Often used to treat industrial wastewater that contains high levels of organic matter in warm temperature.
- It can be used as a pretreatment prior to aerobic municipal waste water treatment.

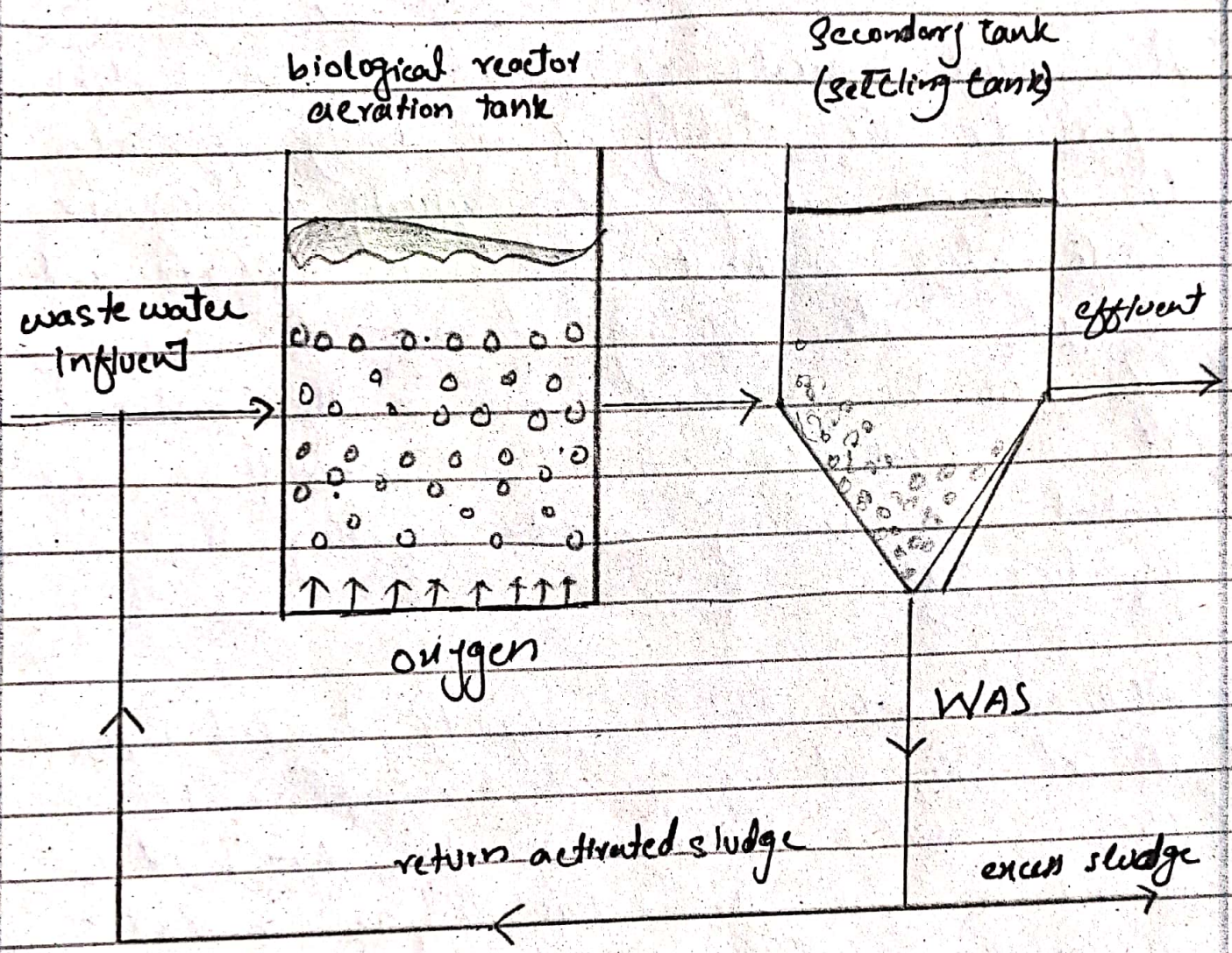
ACTIVATED SLUDGE PROCESS:-

* Process for treating sewage or industrial waste waters using aeration and biological floc composed of bacteria & protoza.
* It is 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 (Cones) and pure oxygen aeration.

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 forms 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 (ASP)



Question No 3

Assimilative Capacity Of Recieving Bodies:-

* Assimilative capacity of recieving water bodies refer to the ability of a body of water to cleanse itself. Its capacity to recieve wastewaters without deleterious effects and without water 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 that need to removed or make them less effective so that recieving water bodies may not become unsuitable for use damage to the aquatic life.

Physical Forces Helping Assimilative Capacity of Recieving Bodies.

1) Dilution:- Dilution is the process of reducing Concentration of pollutants in recieving water usually simply by mixing with more quantity of water.

2) Dispersion:- Dispersion is the distribution of pollutants in relativity large area of water. Dilution and dispersion are inter related.

3) Sunlight:- Sunlight facilitates biological decomposition of pollutants and kills pathogens by ultra violet radiation (UV).

4) Temprature:-

Increase in temprature will increase the biological decomposition of organic and thus assimilative capacity will improve. Increase in temprature also causes to increase the dilution process and thus increases the assimilative capacity.

5) Depth of flowing waters:-

Increase in depth causes to decrease dissolved oxygen in the water and thus it reduces the purifaction process. Also the effects of UV radiation from sunlight which helps to kill the pathogens, decreases with increase in depth.

Question No 4:-

Sludge refers to the residual, Semi-solid material left from municipal wastewater or industrial wastewater treatment processes.

Sustainable sludge handling may be defined as a socially acceptable, cost-effective method that meets the requirment of efficient recycling of resources while ensuring that harmful substances are not transfered to humans or the environment i-e water, air or soil.

Advantages of Sludge handling in wastewater engineering.

1) As wastewater engineering is directly related to enviroment sludge management is approach towards a better enviroment.

2) Residual wastes from hospitals, research facilities and other industries can be hazadeous to our health & enviroment. These harmful elemend may require thermal treatment to control the spread of disease. Sewage sludge incineration reduces volume (upto 90%) and weight (up to 75%) & breaks down dangerous substances as pathogens. Flues gases from exhaust pipes most be handled properly by utilizing a complex treatment system to prevent hazardous

emissions and ashes from contaminating the environment.

3) Due to excess of new problems in sludge management every year news techniques and professionals are emerges in waste water engineering industry to face the challenges and finding the solutions.

Question No 5

ENVIROMENTAL Impact Assessment (EIA):-

"The process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of development proposals prior to major decision being taken and commitments made."

(International Association of Impact Assessment 1999)

In Simple words.. EIA may be defined as

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

The following consideration should keep in mind while conducting EIA for newly proposed waste water treatment plant.

Enviromental damages should be minimum such as do not effect water body greenery and energy consumption which effect the enviroment should be controlled. Enviromental benefits should be maximum and water life should be protected.

Ensure that development is according to:

National Quality Standard (NEQ's)

The project should not conflict with Govt Polices.

International obligations should be Strictly followed:

Most treatment plants have primary treatment (physical removal of floatable and settle able solids) and secondary treatment (the biological removal of dissolved solids). Some other treatment plants have tertiary treatment option. The purpose of tertiary treatment is to provide a final treatment stage to raise the effluent quality before it is discharged to the recieving enviromant More than one treatment process may be used at any treatment plant.