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7720
Section B
Wastewater Engineering
Final Assignment.

Question No 1

Wastewater Treatment!

Wastewater treatment consists of applying know technology to improve or upgrade the quality of water a wastewater.

=> Wastewater treatment involves collecting the wastewater in a centralized or decentralized location (Wastewater treatment plant) and subjecting the wastewater to various treatment processes.

=> Important of Wastewater Treatment

—:• The Principal bejective of wastewater treatment is generally in allow human and industrial effluents to a be disposed off without causing danger to human health or unacceptable damage to the natural environment.

—:• wastewater if properly treated, is an important resource and can be use for various purposes including irrigation, lawn watering, car washing, flushing toilets and

and landscaping etc.

- Wastewater treatment can also generate biogas as final product which is a potential source of energy.

We Prefer Rectangular tanks because rectangular clarifies typically require less land than circular clarifiers for similar surface area. The reduction becomes even more significant in a multiple-unite 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 simpler and less expensive pipe work layout and pumping requirment as compared to circular clarifiers where the pipes require a more complicated layout pattern and perhaps a separate 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 system utilize a pretreatment stage prior to the main treatment to reduce the change of clogging the system.
- Electricity is required for system operation

ANAROBIC Wastewater Treatment-:

- Anaerobic bacteria transform organic matter in the wastewater into biogas that contains large amount of methane gas & carbondioxide
- Energy - efficiat Process-
- Often used to treat industrial wastewater that contains high levels of organic matter in warm temprature.

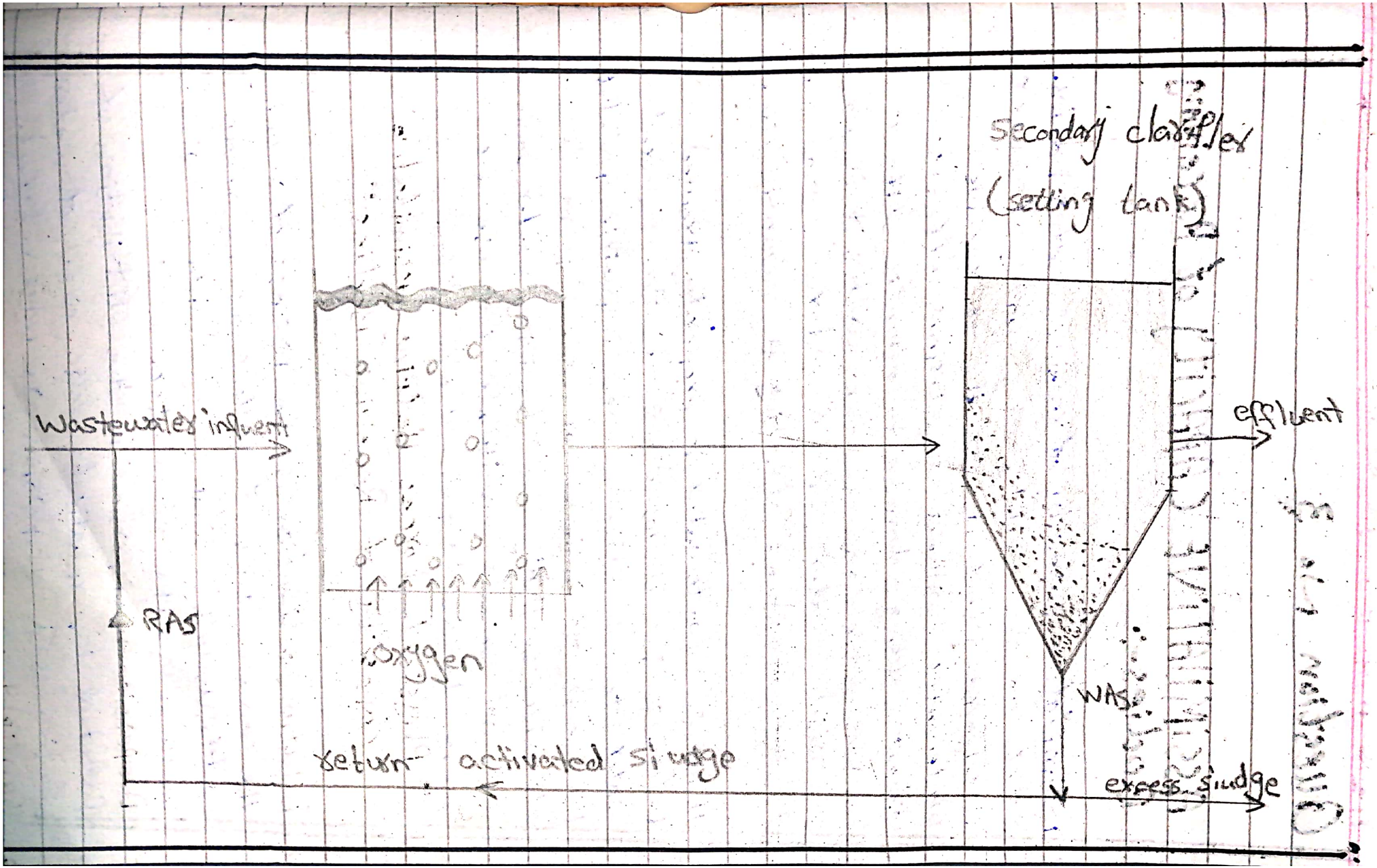
It can be used as a Pretreatment prior to aerobic muncipal wastewater treatment.

ACTIVATED SLUDGE PROCESS

- Process for treading sewage or industrial waste water using aeration and biological force composed of bacteria & protozoa.
- 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 substance.
- Aeration stage, where aerobic bacteria digest biological wastes –
- setting stage allows undigested solids, 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.



Question No 3:

ASSIMILATIVE CAPACITY of Receiving Bodies:-

⇒ Assimilative capacity of receiving water bodies, refers to the ability of a body of water to cleanse itself, its capacity to receive wastewater without deleterious effects and without 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/pollutant the need to removed or make them less effective so that the receiving water bodies may not become unsuitable for use or cause damge to the aquatic life.

"Physical Forces Helping Assimilative capascity of Receiving Bodies"

(1) Dilution:- dilution is the process of reducing the concentration of pollutants in receiving water, usually simply by mixing with more quantity of water.

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

3 Sunlight:- sunlight facilitates biological

decomposition of Pollutants and kills pathogens by ultravioulet radiation (UV)

⇒ 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 increase the assimilative capacity.

⇒ 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 effects of UV radiation from sunlight which helps to kill the Pathogens, decreases with increase in depth.

Question No Q 4

Sludge refers to the residual, semi-solid material left from, municipal wastewater or industrial wastewater treatment process. Sustainable sludge handling/Managing may be defined as a socially acceptable, cost-effective method that meets the requirement of efficient recycling of resources while ensuring that harmful substance are not transferred to humans or the environment i-e water, air or soil.

Advantages of sludge handling/ Managing in wastewater engineering

As wastewater engineering is directly related to enviroment sludge management is approach towards a better enviroment. Residual wastes from hospitals, research facilities and other industries can be hazardous to our heath and the environment. These harmful element may require thermal treatment to control the spread of diseases or toxins. sewage sludge incineration reduce volume (up to 90%) and weight (up to 75%) and breaks down dangerous substance such as Pathogens and toxic chemicals. Flue gases from exhaust pipes must 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 problem in sludge management every year new techniques and professional/experts are emerges in waste water engineering industry to face the challenge and finding the solution.

Question No 5 -:

EIA -:

is environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternative, evaluation of preventive, migratory and compensatory measures, formulation of environmental management and arrangement and framing of recommendation as such other components as may be prescribed.

Pakistan Environmental Protection Act, 1997

or

A formal process to predict the environment 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 the newly proposed wast water treatment plant.

Environmental Damage should be minimum such as do not effect water body greency and energy consumption which

effect the environment should be maximum and water life should be Protected. Ensure that Dedelopment is according to:
National Quality standards (NEQs)
The project should not conflict with Govt. Policies:
International obligations should be strictly followed
Most treatment Plants have Primary treatment (Physical removal of floatable and settle able solids) and secondry treatment.
(the biological removal of dissalved solids.)
Some other treatment Plants have tertiary treatment option. The Purpose of tertiary treatment is to Provide a final treatent stage to raise the effluent quality before it is discharged to the receiving environment (sea, rivers, lake, ground, etc)
More than one treatment Process may be used at any treatment Plant.