WASTEWATER ENGINEERING

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SECTION A

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PESHAWAR

Q=1.

Ans:-

In simple words waste water treatment involves collecting the waste water in a centralized location and subjecting the wastewater to various treatment processes. it consist of applying known tecnology to improve the quality of a waste water.

Importance:-

Basically wastewater treatment allow humans and other industrial effluents to be disposed off without causing

danger to human health or unacceptable damage to the natural environment.

→ When wastewater is properly treated, it can be used for various purposes like irrigation, lawn watering, car washing, flushing toilets and landscaping.

→ Wastewater can also be used to generate biogass a final product which is a potential source of energy.

Why rectangular tank are prefered over circular tanks. for removal of settleable solids during preliminary treatment.

Rectangular tanks are preferred on circular tanks because rectangular tanks has a large horizontal distance so settleble solids have great time to settle. great ammount of settleble solids settled and minimum solid goes from outlet.

Rectangular tank are easy to handle and

operate as compared to circular tank.

→ Even the flow distribution configuration for rectangular clarifiers requires simpler and less expensive pipework layout and pumping requirement as compared to circular.

→ Rectangular tank typically require less land than circular tank for a same surface area.

Q=2

Ans:

Aerobic waste water treatment:

1. Aerobic processes use bacteria that require oxygen so, air is circulated throughout the treatment tank.
2. These aerobic bacteria then break down the waste with in the waste water
3. Some system utilize a pretreatment stage prior to the main treatment to reduce the change of clogging the system.

4 Electricity is required for system operation.

Anaerobic waste water treatment

The process of waste water treatment in which Anaerobic bacteria transforms organic matter in the waste water in to biogas that contains large ammount of methane gas and carbon dioxide. this process is called anerobic waste water treatment.

As compare to Aerobic waste water treatment the anaerobic process is energy efficient

process.

3 The anaerobic waste water treatment often used to treat industrial waste water that contains high levels of organic matter in warm temperature.

4 It can be used as pretreatment prior to aerobic municipal waste water treatment

Activated sludge process

1 It is a process for treating sewage or industrial waste waters using aeration and a biological floc composed of bacteria and protozoa.

In this micro organism responseble for treatment are maintained in liquid suspension in appropriate mixing method.

Main constituents of ASP are

Aeration tank in which oxygen is provided for the micro organism to grow. This aeration also helps to keep micro organism in suspension

Aeration tank is followed by clarifer in which the micro organisms from floc and settled down at the bottom.

Formation of floc particle, ranging in size from 50 to 200 um.

removed by gravity settling, leaving relatively clear liquid as treatment effluent.

A part of settled bio floc are recycled back to the aeration tank to maintain centain amount of micro organism in the system for efficient operation of the system. This is known as Recycled Activated sludge.

Remaining settled bio flocs are removed from the system and is term as wasted activated sludge.

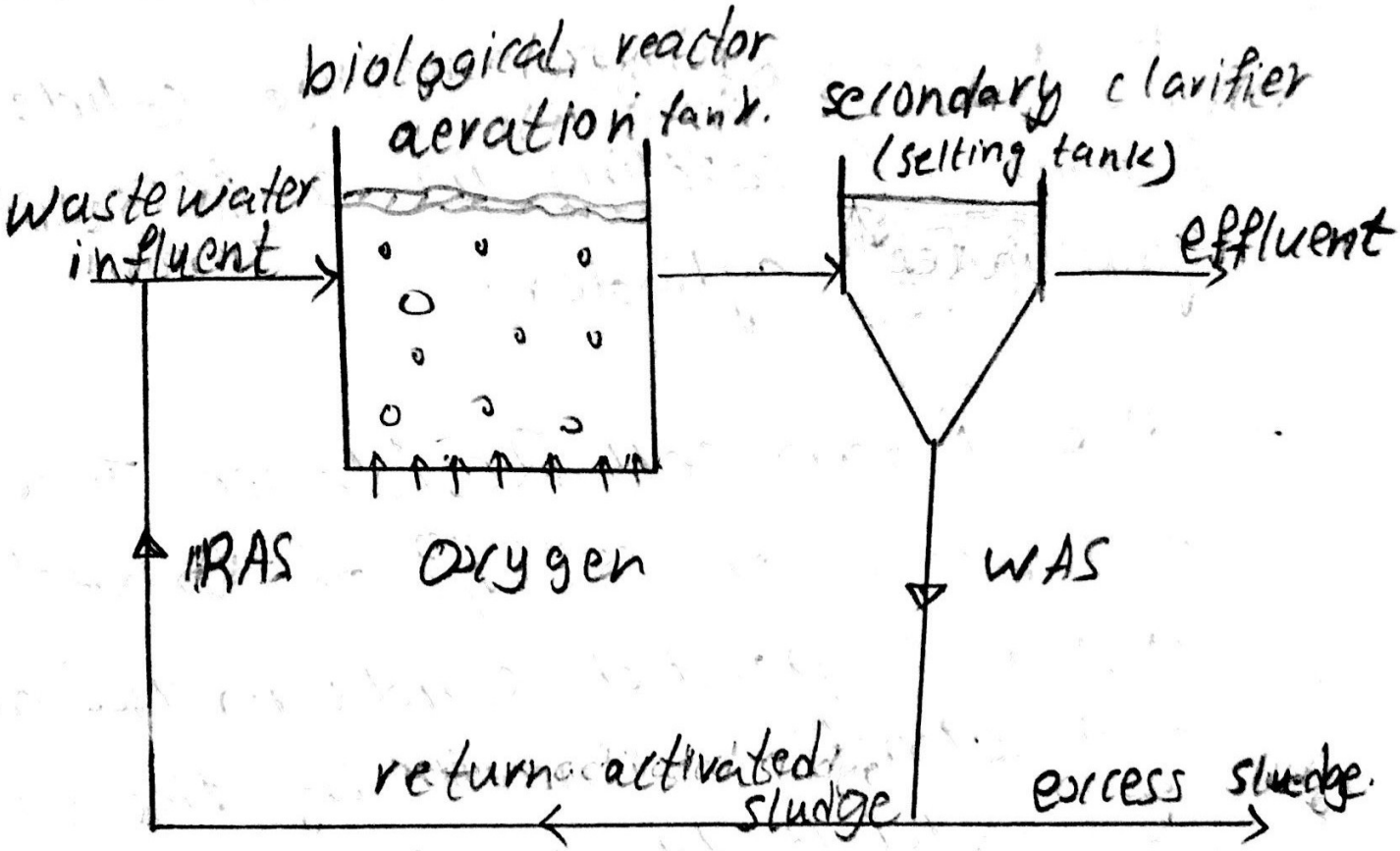
A S P involves production of activated mass of micro organism capable of stablizing waste

under aerobic conditions.

In aeration tank contact time is provided for mixing and aerating influent wastewater with microbial suspension. generally refferred to mixed liquor suspended solids.

Typically 99% of suspended solids and upto 90% of dissolved organics are removed by Activated sludge process.

The main drawback associated with ASP is its high electricity consumption particularly for Aeration.



Q=3

Assimilative capacity of Recieving water bodies:

Assimilative capacity of receiving water bodies refers to the ability of a body of water to cleanes itself. its capacity to recieve waste waters 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 waste water 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 the recieving water bodies may not become unsuitable for use.

Help of Assimilative capacity in wastewater treatment.

The assimilative capacity help in waste water treatment in the following ways:-

1 **Dilution:-** In this dilution occurs, which is a process in pollutants are reduce in recieving water, usually simply by mixing with more quantity of water.

2 **Dispersion:-** Another help of assimilative capacity in water treatment is the dispersion, which is the distribution of pollutants in relatively large area of water. Dilution and dispersion are inter related to help for treatmen.

3 **Sun linght:-** Another importance of Assimilative capacity for

treatment is sunlight. which facilitates biological decomposition of pollutants and kills pathogens by ultra violet radiation.

Temperature:. In Assimilative capacity the temperature plays an important role with increase in temperature of recieving water. the biological decomposition of organics and thus assimilative capacity will improve Increase in temperature also increase the dilution process

Flow velocity:. Assimilative capacity of recieving water also helps in terms of flow

velocity, higher the flow velocity will encourage quick dillution and dispersion of pollutants.

Depth of flowing water.

Assimilative capacity is directly related to the depth of recieving water bodies. Increase in depth, relates or radiation kills pathogens.

Q = 4

Sludge management:

Sludge refers to residual semisolid material left from municpal wastewater or industrial waste water treatment processes

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 substances are not transferred to humans or the environment i-e water, air or soil.

Advantages of sludge management in waste water Engineering:

1 As waste water engineering is directly related to environmental sludge management

is approach towards a better environment.

2 Residual wastes from hospitals research facilities and other industries can be hazardous to our health and environment These harmful elements may require thermal treatment to control the spread of diseases or toxins. sewage sludge incineration reduces volume upto 90% and weight upto 75% and breaks down dangerous substances such as pathogens and toxic chemicals. fuel gases from exaust pipes must be handled properly by utilizing a complex

treatment system to prevent hazardous emission and ashes from contaminating the environment.

3 The other importance is that as a result of sludge management sludge which manged is a agrivulture manure.

4 Due to excess of new problems in sludge management every year new techniques and professional experts are emerges in waste water Engineering industry to face the challenges and finding the sollutions.

Q=5

Envirnomental Impact:. Assessment (EIA)

A technique and a process by which information about environmental effects of a project is collected both by the, developer and from other sources and taken in to account by the planning authority in forming the judgement on whether the development should proceed.

Parameter considered while conducting EIA for newly proposed waste water treatment plant

The following consideration should keep in mind while conducting EIA for the newly proposed waste water treatment plant. Environmental Damages should be minimum such as do not affect water greenery and energy consumption which affect the environment should be controlled.

2 Environmental Benefits should be maximum and water life should

be protected.

3 The project should not conflict with Govt policies.

4 International Obligations should be strictly followed.

5 Most treatment plants have primary treatment and secondary treatment. some other treatment plants have tertiary treatment is to provide a final treatment stage to raise the effluent quality before it is discharged to the recieving environment Like sea, river, lake, ground. More than one treatment process may be used at any treatment plant.