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SECTION

B

SUBJECT

Waste water Eng

INSTRUCTOR

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## \* Waste water treatment:

- Process used to remove contaminants from waste water 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 because treated waste water can be used for many purposes.
- The treatment of waste water is part of the field of sanitation. Sanitation also including the management of human waste and solid waste as well as storm water (drainage) management

## \* importance:

- The major aim of waste water treatment is to remove as much of suspended solid as possible before the remaining water, called effluent, is discharge to the environment. As solid decays, it used up oxygen, which is needed by plant & animal living in water.
- However waste water contains many harmful substance and cannot be released back into the environment until it is treated.
- Thus the importance of waste water treatment is to restore the water supply and to protect the plant from toxins.
- Waste water treatment is fundamental to protect the health of many different ecosystems.

Waste water, properly treated, is a source of water for many purposes. Good waste water treatment allow the maximum amount of water to be reused instead of going to waste.

Waste water Treatment also called sewage Treatment

Essential for life, clean water is one of the most important resource on the planet, waste water which is basically used water is also valuable resource. Especially with recurring drought and water storage in many area of the world however waste water contains many harmful substance and cannot be released back into the environment until it is treated. Thus the importance of waste water treatment is two fold to restore the water supply and to protect from toxics.

Why rectangular tanks are preferred over circular tanks:

Easy to operate and low maintenance cost.

Suitable to large capacity plant

Easy adaptation to high-rate settlers and tolerant to shock load.

Commonly used in municipal and industrial application

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Aerobic <sup>wast</sup> water treatment

- Aerobic process use bacteria that require oxygen, so air circulated through out the treatment tank
- The aerobic bacteria then break down the waste with in the waste water
- Some system utilize a pre treatment stage prior to main treatment to reduce the chance of clogging the system.
- electricity is required for system operation

Anerobic waste water treatment

Anaerobic bacteria transform inorganic matter in the waste water into bio gas that contain large amount of methane gas and carbon dioxide.

energy efficient process.

often used to treat industrial waste water that contains high level of organic matter in warm temperature

It can be used as a pre treated prior to aerobic municipal waste water treatment.

Active sludge process

- process for treating sewage or industrial waste water using aeration & a biological floc composed of bacteria
- A biological process that can be used for oxidizing carbonaceous biological matter oxidizing nitrogenous matter ( $NH_3$  &  $N_2$ ) removal of nutrients

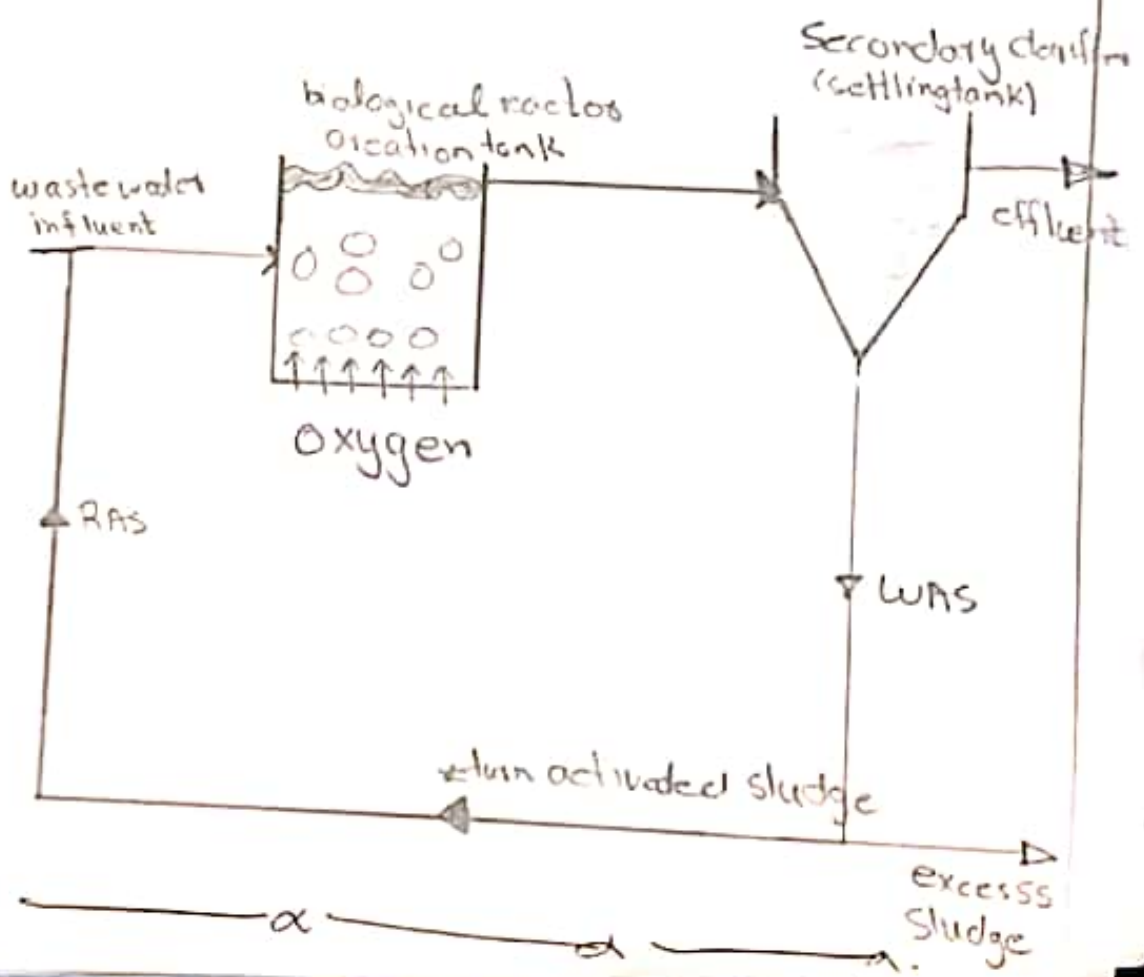
Aeration method - diffused aeration surface aerator (cone) and pure oxygen aeration

Process:

→ pre-treatment stage to remove large solid and other despicable substance

→ 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 disinfection is mixed with water to produce an antiseptic out



Q No #3

Assimilative capacity of receiving water bodies.

- The ability of a body of water to cleanse itself; its capacity to receive waste water without deleterious effect without causing damage to aquatic life or human 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 the natural water streams still it has impurities/pollutant that need to be removed or make them less effective so that the receiving water bodies may not become unsuitable for use or cause damage to the aquatic life.

Assimilative capacity of help in waste water treatment are:

Following are the factors which help in assimilation water capacity.

→ Sun light

→ Dispersion.

→ Dilution.

→ Temperature.

Depth of flowing water.

→ Sun light: Sunlight facilities biological decomposition of pollutants and kills pathogens by UV.

\* Dispersion: Dispersion is the distribution of pollutant in relatively large area of water. Dispersion and Dilution are inter related.

→ Temperature: Temperature play important role in assimilated capacity of receiving water temperature increases. the organics decomposes.

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# Sludge Management

Sludge management is most different and challenging task of waste water treatment plant due to its high water content and poor dewatering and strict regulation for sludge reuse or disposal.

→ One of the recent goal of waste water treatment plant is to develop more environmentally friendly process to reduce the volume of sludge for disposal and convert sludge into bio energy.

→ energy recovery of the sludge into bio gas, syngas and bio-oil which can be further converted into electrically mechanical energy & heat.

## Advantages.

→ Sludge refers to the residual material left from municipal waste water treatment



## Sludge management:

→ Substantive sludge handling/ managing may be defined as

→ A socially acceptable cost effective method that needs the requirement of source which ensuring that harmful substance are not transfer to human or environment.

## Advantages:

→ As environmental engineering directly related to environmental sludge management is approach toward a better environment

→ Residual waste from ~~industry~~ industries hospital research facilities can be hazardous to our health and environment. These should be manage properly because it spread diseases.

→ Sewage sludge incineration reduce volume and weight and breaks down harmful substance.

Due to excess of their problem in sludge management every year new techniques ~~are~~ used and expert are engaged in waste water engineering inst. industries to face the challenges and finding the solution.

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Q No 5

### Defination:

An environmental study comprising collection of data prediction of qualitative & quantitative impact comparison of alternative, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and framing of recommendation and such other component maybe prescribed.

→ A formal process to predict the environmental consequences of human development activities to play appropriate measure. to eliminate or reduce adverse effect and to enhance positive effect.

→ The following are the consideration  
 → Should keep in mind while  
 Consider EIA for newly proposed  
 Waste water treatment plants.  
 → environmental dangers should be minimum  
 such as do not effect water body  
 greenery and energy consumption  
 which effect the environment should  
 not be controlled environmental  
 Benefit should be maximum and  
 water life should be protected  
 ensure that the development is  
 according to (NEQS) The project  
 should not conflict which govt  
 policies.

→ international obligation should be  
 strictly follow:

→ most of the treatment plant have  
 primary and secondary treatment and  
 some other treatment phase tertiary  
 treatment option the purpose of  
 tertiary treatment.