

Answer # 02:

Difference between aerobic and anaerobic wastewater treatment:

Aerobic

* Wastewater treatment is a biological wastewater treatment processes which uses an oxygen rich environment.

Anaerobic

* Waste water treatment is a process where anaerobic organisms break down organic material in an oxygen absent environment.

Bacteria

* Bacteria involved in the aerobic wastewater treatment are aerobes

* Bacteria involved in the anaerobic wastewater treatment are anaerobes

Production of Biogas.

* Aerobic wastewater treatment does not produce methane and carbon dioxide

* Anaerobic wastewater treatment produces methane and carbon dioxide.

Energy Efficiency:

* Aerobic wastewater treatment requires energy, hence they are less energy efficient

* Anaerobic wastewater treatment is an energy efficient process

Examples:

Activated sludge method, trickling filter, rotating biological reactors and oxidation ditch are example of aerobic wastewater treatment.

Anaerobic lagoons, septic tanks and anaerobic digesters are examples of anaerobic wastewater treatment.

Activated Sludge Process (ASP)

* Microorganisms responsible for treatment are maintained in liquid suspension by appropriate mixing methods.

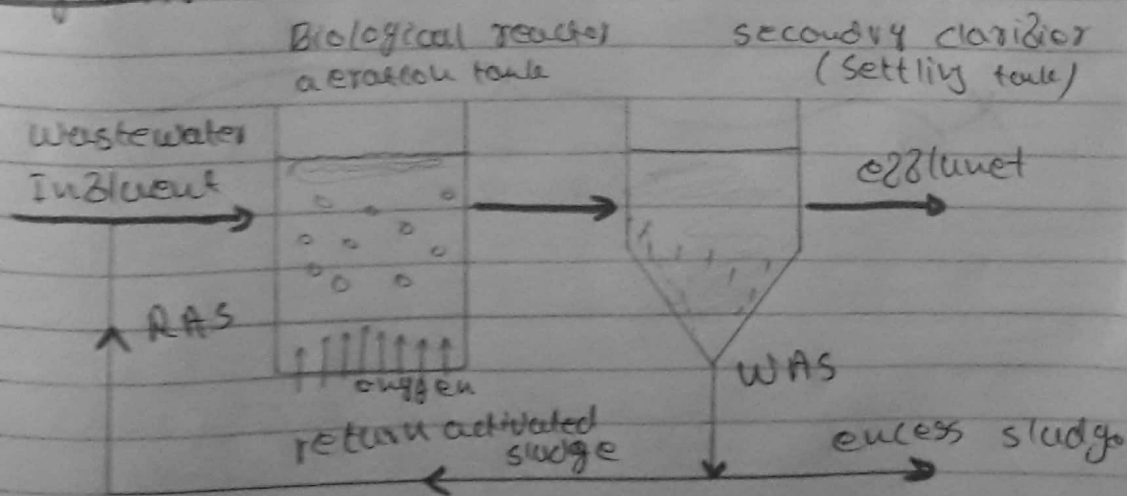
* Main constituents of ASP are Aeration tank in which oxygen is provided for the micro-organisms to grow. This aeration also helps to keep micro-organisms in suspension.

* Aeration tank is followed by clarifier / settler in which the micro-organisms form flocs and settled down at the bottom.

* Formation of floc particles, ranging in size from 50 to 200 μm , removed by gravity settling leaving relatively clear liquid as treated effluent.

* A part of settled bio flocs are recycled back to the aeration tank to maintain certain amount of micro-organisms in the system for efficient operation of the system. This is known as Recycled Activated Sludge (RAS).

Diagram:

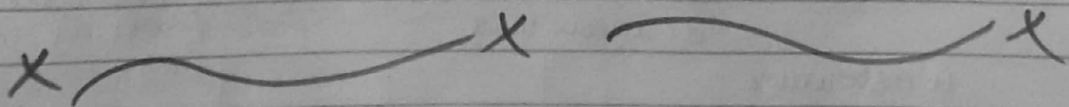


* APS involves production of activated mass of micro-organisms capable of stabilizing wastewater aerobic conditions:

* In aeration tank contact time is provided for mixing and aerating influent wastewater with microbial suspension generally referred to mixed liquor suspended solids (MLSS)

* Typically 99% of suspended solids and up to 90% of dissolved organics are removed by Activated Sludge process.

* The main drawback associated with APS is its high electricity consumption particularly for aeration.



Wastewater treatment:

wastewater treatment is the process of converting waste-water that no longer needed or is no longer is suitable for use into treated water that can be discharged back into the environment without causing any environmental or human health concern.

=> wastewater is full contaminants including bacteria, chemical and other toxic. Its treatment aims at reducing contaminants including bacteria to acceptable levels to make the effluent safe to discharge back into the environment or reuse it for various purpose.

Importance:

It is very important to provide some degree of treatment to waste water before it can be used for agricultural or landscape irrigation or for aquaculture.

The principle objective of wastewater treatment is generally to allow human effluent to

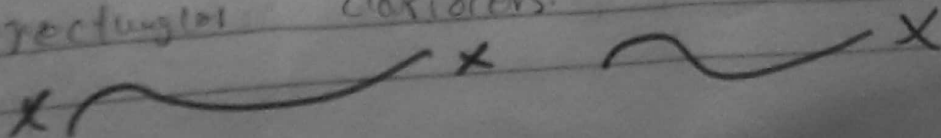
disposed of without danger
to human health or manifest
damage to the natural environment.

According to research a large
number of people die from
water born diseases in most
of the developing countries therefore
it is very important to get
proper treatment of the water
for a healthy living.

The objective is produce in
emitted safe liquid waste stream
and a solid waste substance
for disposal or reuse.

Why rectangular tank preferred over circular tank.

The shape of rectangular clarifiers
provides a long path for wastewater
and suspended sludge to travel and
subsequently longer detention time which
warrant less short circuit and
more sludge settling speed/precipitation
overflow circular clarifiers. In addition
flow distribution among several clarifiers
is usually more even and after
same less head loss for
rectangular clarifiers.



Answer #03

Assimilative Capacity of Receiving Bodies:

* Assimilative capacity of receiving water bodies refers to the ability of a body of water to clean itself. Its capacity to receive wastewaters without deleterious effects and without causing damage to aquatic life or humans who consume the water. It is level to which water body of nature control the toxicity without affecting the aquatic life.

* Although wastewater is properly treated before it is disposed of the natural water streams still it has impurities pollutants that needs to removed or make them less effective so that the receiving water bodies may not become unusable for use or cause damage to the aquatic life.

Help in wastewater treatment:

① Dilution:

Dilution is a process of reducing the concentration of

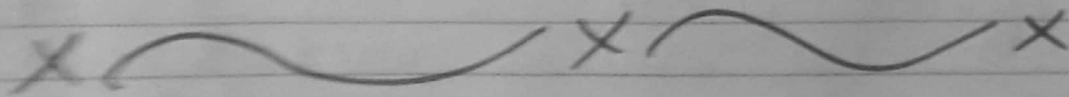
Pollutants in receiving water,
usually simply by mixing
with the water quantity of
water.

(A) Dispersion:

Dispersion is the distribute
of pollutants in relatively large
area of water dilution and
dispersion are inter-related.

(B) Sunlight:

Sunlight facilitates
biological decomposition of pollutants
and kills pathogens by ultraviolet
radiation (UV)



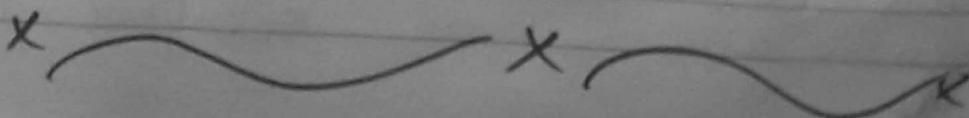
Answer # 04

Sludge Management:

It is one of the most difficult and challenging tasks of wastewater treatment plants due to its high water content and poor dewaterability and strict regulation for sludge reuse or disposal one of the main goals of wastewater treatment plants is to develop more environmentally friendly process to reduce the volume of sludge for disposal and to convert sludge into bioenergy.

Advantage of sludge treatment:

- * It reduce pathogen and volume to be disposed.
- * protect wild life aquatic life and also prevent diseases.
- * Sustainable management of organic waste.
- * Reduction of odor and diseases causing agents.
- * Producing biogas.



Auswert # 05

Environmental Impact Assessment:

- * The concept of Environmental Impact Assessment (EIA) is linked to Development.
- * Development basically aims to bring about a positive change in a society. This change may be of social wellbeing and/or economical advancement.
- * In the past promotion of economic growth for increased wellbeing of society was the main development goal with little sensitivity to adverse social or environmental impacts.

Parameters to be considered while conducting EIA for newly proposed waste water treatment plant.

- * Screening to determine which projects requires a full partial impact assessment study.
- * Assessment and evaluation of impacts and development of

alternatives to predict and identify the likely environmental impacts of a proposed or development, including the detail elaboration of alternatives

* Reporting the (EIS) or (EIA) report, including an environmental management or plan (EMP) and a non-technical summary for the general audience.

* Review of the environmental impact statement based on the terms of reference participation.

* Compliance, enforcement and environmental auditing. Monitor whether the predicted and proposed mitigation measures occur as desired in the EMP.

