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PAPER :- WASTE WATER ENGINEERING

SUBMITTED TO :-

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Q No 18. ✓

WASTE WATER ✓

It removes contaminants & undesirable components or reduced their concentration, so that the water becomes fit for its desired end use. This treatment is crucial to human health & allow humans benefit from both drinking & irrigation use.

IMPORTANCE of WASTE WATER ✓

It is important to produce an environment safe fluid waste stream & a solid waste suitable for disposal or re-use.

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

The major aim of waste water treatment is to remain suspended solids as possible before the remaining water called effluent is discharge back to the environment.

Waste water treatment is fundamental to protect the health of many different ecosystem.

(2)

WHY rectangular tanks are preferred over circular tanks for removal of settleable solids:-

* Rectangular tanks required less land than circular tank.

* Require less head loss for rectangular tank.

* The shape of rectangular clarifiers provides a less longer path for waste water flow & suspended solids to travel & subsequently longer detention time which warrants less short circulating & more sludge setting compared to center feed/peripheral overflow flow circular clarifiers / tank.

* flow distribution configuration for rectangular tank require simpler & less expansion pipe work layout while circular require complicated & expensive pipe work.

Q No(2)

Ans:→ Difference b/w Aerobic & anaerobic

AEROBIC	ANAEROBIC
① Aerobic waste water treatment is a biological wastewater treatment process which uses an oxygen rich environment	① Anaerobic waste water treatment is a process where anaerobic organisms break down organic material in an oxygen absent environment
② Bacteria involved in the aerobic waste water treatments are aerobes.	② Bacteria involved in the anaerobic waste water treatments are anaerobes
③ Air is circulated in aerobic wastewater treatment tanks.	③ Air is not circulated in anaerobic wastewater treatment tanks.
④ Aerobic wastewater treatment does not produce methane & CO ₂ .	④ Anaerobic wastewater treatment produces methane & CO ₂ .

ACTIVATED SLUDGE PROCESS:→

Micro organisms responsible for treatment are maintained in liquid suspension by appropriate mixing method.

Main constituents of ASP are

④

Aeration tank in which oxygen is provided for micro organisms to grow & also help organism to grow & also keep them in suspension.

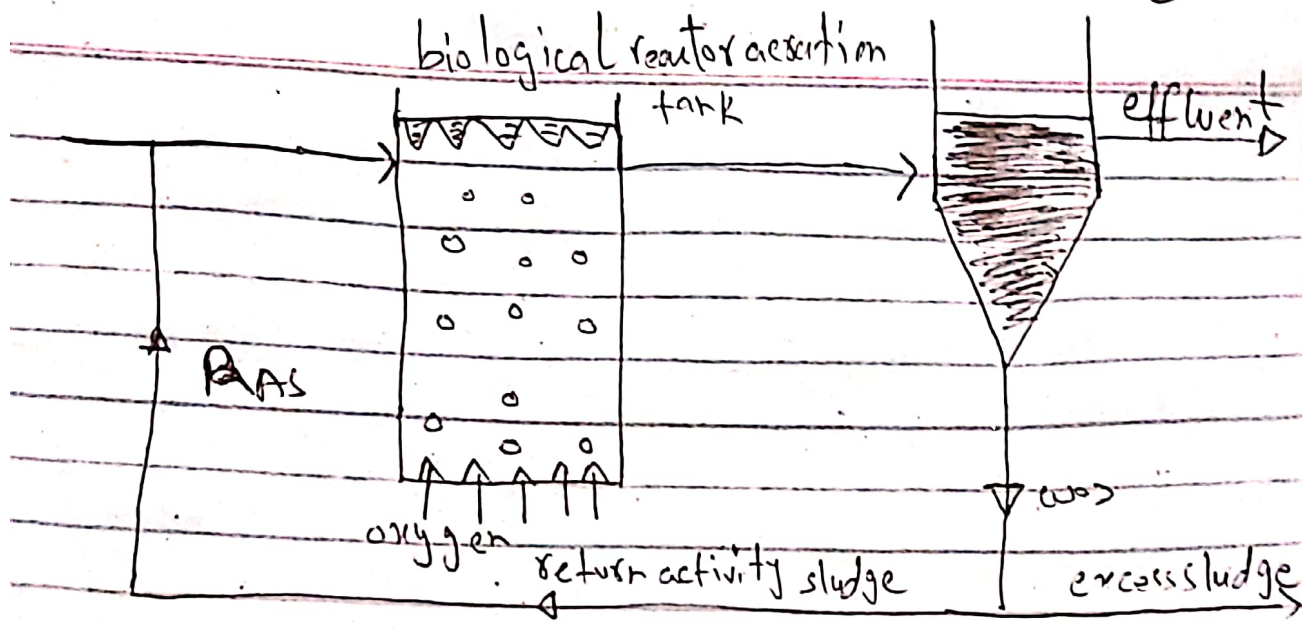
① Aeration tank is followed by clarifier/settler in which the micro organism from flocs & settled down at the bottom.

② formation of flocs particles, ranging, in size 50 to 200 μm settling.

③ A part of settled bio flocs are recycled back to the aeration tank to maintain certain amount of micro organism in the system for efficient operation of the system. This is known as recycled Activated sludge (RAS).

④ Remaining settled bio flocs are removed from the system is termed as waste Activated sludge (WAS)

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APs involved production of activated mass of micro organism capable of stabilizing waste under aerobic condition.

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

The main draw back associated with APs is high electricity consumption particularly for aeration.

Q3:-

Ans:- Assimilative Capacity of Receiving Bodies:-

Assimilative capacity refers to the ability of a body of water to cleanse itself. Its capacity to receive waste water or toxic substances without damage, deteriorous effect & without damage to aquatic life or humans who consumes the water it is level to which water body or nature control the Toxicity without effecting the aquatic life.

How Does it help

IN WASTE WATER TREATMENT

Although waste water is properly treated before it is disposed into the natural water streams still it has Impurities / Pollutants 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.

Qy

ANS-1

Sludge refers to the residual semi-solid material left from municipal waste water or industrial waste treatment process.

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

Sludge Handling - Process

1. Primary operation.
- 2) Thickening.
- 3) Stabilization
- 4) Dewatering
- 5) Heat drying

Sludge Disposal

Sewage sludge contains both compound of agricultural value & pollutants

- (i) Agriculture value - organic matter
nitrogen, phosphorus & potassium

i) - Pollutants - heavy metal, organic pollutants & pathogens.

METHOD of SLUDGE DISPOSAL -

- 1) Land fill
- 2) Agricultural use
- 3) Other methods.

LAND FILL:-

A site for the disposal of waste materials by burial & is the oldest form of waste disposal. Problem with this method is that many landfills are filling up, & towns are having trouble finding place to put new ones.

2) Agriculture Purpose -

1- The purpose of using sludge in agriculture is partly to utilize nutrients such as phosphorus & nitrogen. & partly to utilize organic substances for soil improvement.

All types of sludge can be spread on farmland if they fulfill the quality requirement (heavy metals, pathogens, pretreatment).

3- other methods :-

1- Ocean Disposal

Dumping or controlled release of sewage sludge into marine water.

2) Distribution & marketing -

The given company transfers or sale of sewage sludge product either bagged or bulk form.

3) Surface Disposal.

A controlled area of land where only sewage is placed for a period of year or longer. Sludge placed in this area is not provided with daily or final cover.

Effluent reuse :-

- 1) Landscape Irrigation.
- 2) Agriculture Irrigation.
- 3) Ground water Recharge.
- 4) Street washing.
- 5) fire fighting.
- 6) Non-portable domestic uses.

ADVANTAGES of SLUDGE TREATMENT :-

- It reduce pathogen & volume to be disposed.
- Protects wild life, aquatic life & also prevents disease.
- Sustainable management of organic waste.
- Reduction of odors & disease causing agents.
- Producing of bio gas.

Q5-

Ans Environmental Impact assessment

There are different defining of EIA but the most summarized one & in simple word EIA ~~but~~ the most defined as

A formal process to predict the environment consequences of human developed activities & to plan appropriate measures to eliminate to reduce adverse effects & to enhance positive effects. EIA thus has three main function

to predict problems to find way to avoid/mitigate them, & to enhance positive effects - Environment legislation is the collection of laws & regulation pertaining to air quality, water quality & endangered wild life & other environments.

Environment is broadly divided into four spheres:

- 1) Lithosphere (our earth)
- 2) Atmosphere (air gases)
- 3) Hydrosphere (water both surfaces & ground including oceans)
- 4) Biosphere (all living organisms including plants, animals, micro-organisms)

- Q To provide decision-makers with an analysis of all aspects of the environments so that decision can be made based on as nearly complete & balanced information as possible.
- Q To improve the design of new developments & safeguard the environment through the application of measures to avoid & mitigate negative impacts.
- Q To provide information to the public on the planned development proposal.
- Q To formalize the consideration of alternatives keeping in view Pakistan's scenario parameters like credibility, transparency, cost effectiveness, & most importantly accountability should be considered while conducting EIA for wastewater treatment plant.