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Subject # Wastewater Engineering

Q no 1:

↳ What is Wastewater Engineering?  
Briefly describe its applications in safeguarding the environment?

Ans:

Waste Water Engineering:

Also known as public health engineering, it is the application of (communities, primarily by providing the removal and disposal of human waste.

Applications:

\* Community produces two type of wastes solid and liquid. The liquid waste is known as the wastewater. It is collected in a sewerage system and transferred it to a treatment plant for process.

\* To make it for reuse and it passes through many process of treatments,

\* We can use it in irrigation purpose.

\* Day by Day the quantity of water reservoir is decreasing so it need is increasing and by treating it we can make it drinkable.

\* Major sources of wastewater are residential areas, commercial activities, industries and educational institutions.

Ques 2:

Briefly describe the relationship of waste water with water supply of a locality?

Ans:

\* In situations where wastewater flows rate are limited wastewater flow rate estimate have to be developed from water consumption records in other details.

\* 60 to 85% of supplied water per capita becomes wastewater.

\* Both are directly connected.

Locality of water:

① A drainage Basin.

② A raw water collection point, where the water accumulates, like lake, river or ground water from aquifer.

③ Small water systems may store the water in pressure vessels.

④ Tall buildings may also need to store water locally in pressure vessels in order to reach upper floors.

⑤ If gravity flow is impractical then we need pumping stations.

⑥ Water supply networks are often run by public utilities of the water industry.

Qno 3:

What is the importance of wastewater characterization?

Ans:

## "Waste-Water Characterization"

Wastewater is characterized in terms of its physical, chemical and Biological composition.

- Because of changing wastewater characteristics and the imposition of stricter limits on wastewater discharges and bio solids - are used beneficially.
- Process modeling for activated sludge as it is currently requires experimental assessment of kinetic and stoichiometric constant.
- Fractionation of organic nitrogen, chemical oxygen demand and total organic carbon into soluble and particulate constituents is now used to optimize the performance of both existing and proposed new biological treatment plants.
- The understanding of the nature of wastewater is fundamental to the design.

Qno 4:

List physical, chemical and Biological characteristics of wastewater?

Ans:

Characteristics of wastewater:-

There are three characteristics of waste water.

- ① Physical
- ② Chemical
- ③ Biological

① Physical:

Physical characteristics include solids, temperature, color and odor.

\* Solids:

There many types of solids some of them are following

- Total Solids
- Suspended Solids
- settle able Solids
- volatile Solids
- fixed Solids

(\*) Temperature :- wastewater is slightly higher than that of water supply.

(\*) Color :-  
fresh water is usually a light brownish-gray in color.

(\*) Odor :-  
Odor in domestic wastewater is caused by gases produced by decomposition of organic matter.

## Chemicals :-

It contains Organic matters, Inorganics and Gases.

### (1) Inorganic :-

(i) PH

(ii) Alkalinity

(iii) Nitrogen

(iv) Sulfur.

(v) Heavy Metal.

## 2) Gases:

### (i) Dissolved Oxygen:-

Its presence is necessary to avoid anaerobic conditions and for aerobic biological treatment of waste.

### (ii) Hydrogen sulfide:-

Causes sewer corrosion.

## 3) Organic Matter:

Organic constituents are carbohydrates, proteins and fats.

### (i) Biochemical Oxygen Demand:

It is amount of oxygen required by bacteria to oxidize organic matter to stable.

## Biological :

Biological Oxygen Demand (BOD),  
Nitrogen Oxygen Demand (NOD)

Microbial life in waste water,  
waste water contains the following  
microbes.

- ① Bacteria
- ② Protozoa
- ③ Fungi
- ④ Viruses
- ⑤ Algae
- ⑥ Rotifers
- ⑦ Nematodes

Oil and Gases :- oil and gases originate from food waste and petroleum products.

Qno 5:

Ans:

Sewerage:

Sewerage is a system for the collection and conveyance of municipal wastewater to the wastewater treatment plant or to the point of disposal.

Types:

There are three systems of sewerage adopted in practice.

- ① Combined system.
- ② Separate System.
- ③ Partially Separate System.

① Combined System:

When both sanitary sewage and storm water are carried in a single sewer.

Advantages:

- \* The maintenance cost is less
- \* The self cleaning velocity is easily achieved
- \* In towns with narrow streets, this is preferred.

## Disadvantages:

\* The Load on the treatment plant becomes high.

\* The storm water is unnecessarily polluted.

\* The sewers are large in diameter.

## (2) Separate Sewerage System:

In this system two separate sets of sewers are installed one for collection and conveyance of sanitary sewage and other for storm water.

## Advantages:-

(1) The storm water is not unnecessarily polluted.

(2) The sewers are small in size.

(3) The load on the treatment unit becomes less.

## Disadvantages:-

(1) The maintenance cost is high.

(2) The self-cleaning velocity is not easily achieved.

(3) They are likely to get blocked.

## Recommendation :-

I recommend the Combine Sewerage System in proposed township because of the following reasons,

- (i) More Efficient
- (ii) Maintenance cost is less
- (iii) Clearing of sewers is easy.
- (iv) Most economical.

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