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Subject : Waste water

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# Wastewater Engineering

Q#1

Answer

## Wastewater Engineering

It is the application of engineering methods to improve sanitation of human communities, primarily by providing the removal and disposal of human waste, treatment and reuse application for various purpose.

### Applications.

- 1) By disposing off treated wastewater in order to reduce ground water contamination and protect aquatic life.
- 2) Wastewater engineering deals with the management of wastewater and its treatment to reuse it for various purpose.

3) The recovery of sewage is an effective means of saving water resources and promoting the reuse of water resources. It is an important measure to reduce the pollution of sewage and protect the environment.

4) Primary objective of water waste engineering is to provide a good sanitary environmental condition in a city.

Q# 02

Answer:

In situation where wastewater flow rate data are limited or unavailable wastewater flow rate estimate have to be developed from water consumption records in other information.

About 60-85% of supplied water per capita becomes waste water.

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Simply wastewater generated is dependent on supplied water as the supplied water increases, the wastewater will be more.

Q# 03

Answer:

A characterization of wastewater provides a wide variety of information regarding the type and concentration of contaminants present.

With characterization of wastewater we determine the nature of contaminant (physical, biological, chemical) and then design wastewater treatment plant according to the nature of contaminants.

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Q # 4

Answer

## Characteristics of Wastewater

### 1) Physical Characteristics

- a) Turbidity
- b) color
- c) odor
- d) total solids
- e) temperature

### 2) Chemical Characteristics

- a) Chemical oxygen demand (COD)
- b) Total organic carbon (TOC)
- c) Nitrogen
- d) Phosphorous, chlorides
- e) pH
- f) Heavy metals
- g) trace elements
- h) priority pollutants

# Biological Characteristics

- a) Biological oxygen demand (BOD)
- b) Oxygen required for nitrification
- c) Microbial population [Bacteria, pathogens]

## Q# 05

Answer:

### Combined System

#### Advantages.

- 1) Both domestic sewage and storm water are carried in a single sewer, so construction cost is less.
- 2) The strength of domestic sewage is reduced because of dilution of storm water.
- 3) The sewers are of large size, and therefore the chances of their chocking are rare. It is easy to clean them.

4. In towns with narrow streets, this system is preferred.

### Disadvantages:

1. Initial cost is high because of large dimensions of sewers.
2. Because of large size of sewer, their handling and transportation is difficult.
3. Due to the inclusion of storm water, the load on the treatment plant increases and ultimately increases treatment costs.
4. During heavy rain the sewer may be overflow and may thus create unhygienic conditions.
5. If the whole sewage is to be disposed off by pumping it is uneconomical.

## Separate System

### Advantages

1. Size of sewers is generally less.
2. Since the sanitary sewage and storm water flows in a separate pipes, the quantity of sewage to be treated is less.
3. As the sewer are smaller in section, they can be easily ventilated.
4. Rain water can be discharged in to the streams or can be reused/recycled without any treatment.

### Disadvantages

1. Since the sewers are of smaller size. It is difficult to clean them.
2. They are likely to get choked/blockaded

3 Initial cost is high, when two separate sets are used.

4 Maintenance cost of system is also high.

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I will suggest combined sewage sewerage system because both domestic sewage and storm water are carried in a single sewer so construction cost is less and sewers are of large size so they are easy to clean