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Subject	Wastewater Engineering
Exam	Mid Term
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Q1:

Ans

Wastewater Engineering ::

Sanitary engineering also known as Public health engineering or wastewater engineering is the application of engineering methods to improve sanitation of human communities, primarily by providing the removal and disposal of human waste and in addition to the supply of safe Potable water.

- Wastewater also known as sewage is the liquid waste originates from household wastes, human and animals waste, industrial wastewater, storm runoff, inflow and infiltration.

\* Applications in Safeguarding the environment:-

Sewerage system in a city is provided for safe disposal of wastewater. For this purpose sewer lines are used it also prevent flooding of the area flow following a rainfall. the main purpose of sewerage system are as.

\* to provide a good sanitary environmental condition in a city.

\* the disposal of human excreta to a safe place by a safe and protective means.

\* proper disposal method should be adopted to protect sub soil water from contamination

\* the sanitary engineering aims at the creation of such conditions of living which will not result into serious outbreak of epidemic (wahbai-merz) diseases in a community.

\* Reclamation and utilization of Sewage: the recovery of sewage is an effective means of saving water resources and promoting the reuse of water resources. it is also an important measure to reduce the pollution of sewage and protect the environment. However the recovery and treatment of sewage must be treated with caution and prevent the expansion of water pollution caused by personnel problem and technical problem and the re-use of mon. compliance.

X — X — X — X — X

Q2

Ans:

Relationship b/w wastewater generation and water supply:

Average daily Per capita Consumption varies from 130 to 200 liters. Local use depends on:

(1) Characteristics of Population:  
Economic level of the population determines the use of water which usually ranges from 50 to 380 liter/capita/days in the slum districts it usually varies from 50 to 100 liter/capita/day. The quantity of wastewater is directly proportional to the characteristic of population.

(2) Quality of water:  
Water which is poor quality will be used less than the water which is ~~increase~~ satisfactory to consumer.

(3) Pressure:

High pressure maintained in the system results in greater use, In addition it increases losses in the leaks.

④ Maintenance:

A well designed program of ~~maintenance~~ maintenance will reduce loss and waste in the system (Detection of leaks, presence of unauthorized connection from survey.)

⑤ Size of the city:

Small communities tend to have more limited use of water. Unsewered homes have less use of water usually less than 40L/cap/day. Cities having water using industries may result in high per capita use thus waste-water generation increases.

⑥ Metering:

Metering of water supplies to the individual users has been shown to reduce the consumption substantially. As the consumer has to pay in proportion to the quantity of water consumed.



Q3

Ans

## Importance of wastewater characterization

A characterization of the wastewater which provides a wide variety of information regarding the type and concentration of the contaminants present must be carried out to determine the types of contamination concerned.

### \* Food and Beverage Industries wastewater :

A major concern is that ground water is susceptible to pollutants from residential and commercial sources. therefore food and beverage industry generated wastewater discharged to the subsurface must provide reasonable assurance of meeting groundwater quality standards. Due to the variability in contaminant concentration in wastewater across the food ~~standards~~. ~~Due to the variability in contaminant concentrations in waste water and beverage sector~~ facility specific and possibly production-specific characterization of wastewater plays a significant role in treatment determination and design.

## \* Miso Production Facility:-

Miso is a fermented bean paste food product typically made from soybeans or other legumes. It is used as a seasoning and is high in protein. Miso is produced by cooking soybeans and then combined the cooked beans with a mold that is cultivated on rice (koji) and salt. The combined ingredients are fermented over time to produce a thick paste. Wastewater generated by miso production can contain high concentration of organic constituents. Miso production wastewater treatment conducted examined treatment of constituents such as COD, BOD, suspended solids, phosphorus, and ~~the~~ nitrogen. Concentration of COD ranged from as low as 840 mg/L to as high as 15,000 mg/L and BOD results of 5210 + 260 mg/L.

X — X — X — X —

Q4

Ans

Characteristics of wastewater:

- \* Physical characteristics
- \* Chemical characteristics
- \* Biological characteristics

1) Physical characteristics

- ① odor
- ② Temperature
- ③ Density
- ④ Specific Gravity
- ⑤ Turbidity
- ⑥ color
- ⑦ total solids

2) Chemical characteristics

- ① chemical oxygen demand (COD)
- ② PH value
- ③ Organic contents
- ④ Nitrogen contents
- ⑤ chloride contents
- ⑥ Fats, oil and Greases
- ⑦ alkalinity
- ⑧ chlorides
- ⑨ Phosphorus
- ⑩ Dissolved oxygen (DO)
- ⑪ Toxics



### ③ Biological characteristics. ③

- ① Biochemical oxygen demand (BOD) .
- ② Oxygen required for nitrification and microbial Population .
- ③ Most of Bacteria are helpful in oxidation and decomposition of sewage .



Q5

Ans.

## Advantages and Disadvantages of Combine Sewerage System.

### Advantages

i) Both domestic sewage and storm water are carried in a single sewer, so construction cost is less.

ii) The strength of domestic sewage is reduced because of dilution of storm water.

iii) The sewers are of large size and therefore the chances of their choking are rare. It is easy to clean them.

iv) In towns with narrow streets this system is preferred.

### Disadvantages

i) Initial cost is high because of large dimensions of sewers.

ii) Because of large size of sewer their handling and transportation is difficult.

iii) Due to the inclusion of storm water the load on the treatment plant increases and ultimately increase treatment costs.

iv) If the whole sewage is to be disposed off by pumping it is uneconomical.

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## \* Advantages and Disadvantages of Separate Sewerage System.

### Advantages

i) Size of sewers is generally less.

ii) Since the sanitary sewage and storm water flows in a separate pipes the quantity of sewage to be treated is less.

### Disadvantages

i) Since the sewers are of smaller size, it is difficult to clean them.

ii) They are likely to get choked / blocked.

iii) As the sewer are smaller in section they can be easily ventilated

iii) Initial cost is high when two separate site are used

iv) Rain water can be discharged into the streams or can be reused / recycled with any treatment

iv) maintenance cost of a system is also high.

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Q5

Which sewerage system will you recommend for a new proposed township support your answer with justification.

Ans

I will suggest separate sewerage system because the rain water which is not that much contaminated will be treated or collected separately and needs little or no treatment also in case of more rain the rain water will be collected separately so no danger for pipes to burst out. And also the rain water will be protected from being contaminated with domestic sewage.

while the domestic sewage is highly contaminated and require strong treatment.