

Iqra National University

Department of Civil Engineering

Course Title: Wastewater Engineering

Course Code

Section # A

Semester: 8th

ID: 7708

Q1. What is Wastewater Engineering? Briefly describe its applications in safeguarding the environment?

Ans. **WASTEWATER ENGINEERING**

Wastewater Engineering or Sanitary engineering, also known as public health engineering, 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 purposes.

APPLICATIONS IN SAFEGUARDING THE ENVIRONMENT

1. By disposing of treated wastewater in order to reduce ground water contamination and protect aquatic life.
2. Wastewater engineering deals with management of wastewater and its treatment to reuse it for various purposes.
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 wastewater engineering is to provide a good sanitary environmental condition in a city.
5. Natural bodies of fresh water are polluted everyday by untreated water which is harmful for us as well as aquatic life, hence the application of wastewater engineering is that to prevent such water bodies from pollution.
6. It also reduces the Soil salinity by reducing the salt concentration in wastewater which is disposed of to the environment.

7. In wastewater engineering the chemically contaminated wastewater which is harmful for crops when disposed of to the fields. Thus, such wastewater is treated chemically which is then used for irrigation purposes.
8. When wastewater is discharged on dry land it seeps into the ground water table and contaminated it thus proper disposal method should be adopted to protect sub soil water from contamination.

Q2. Briefly describe the relationship of wastewater generation with water supply of a locality?

Ans. **RELATIONSHIP**

The relationship between waste water engineering with water supply of locality are as follow

1. In the field measurements of wastewater flow rates are not possible and actual wastewater flow rate data are not available, water supply records can often be used as an aid to estimate wastewater flow rates.
2. If there is no water supply then there will be no wastewater generation occurs in a locality.
3. If there might be changes occurring in between water supply and effecting the water supply there will also wastewater generation will also be affected.
4. About 60-85% of supplied water per capita becomes waste water.
5. Simply wastewater generated is dependent on supplied water, as the supplied water increases, the wastewater generation will be more.

Q3. What is the importance of wastewater characterization?

Ans. **IMPORTANCE**

The importance of waste water characterization is to know about physical, Chemical and biological characteristics of wastewater.

EXPLANATION

Due to physical characteristics we will know about the wastewater physical contamination in it and to treat them as per their waste contamination which is present for example the color of fresh waste water is grey but due to the passage of time it changes the color to black and this wastewater is known as septic wastewater and to remove the colour by coagulation and sedimentation etc. for this purpose its important .

Due to chemical characterization of wastewater we will know about which type of chemical waste is present in it and to treat them as per their chemical characterization which is present for example the amount of oxygen require during the decomposition of organic matter and the oxidation of inorganic chemicals such as ammonia etc. to remove such chemical waste for treatment is important.

Due to biological characterization we will know about the bacteria or pathogens present in the waste water and to treat them as per their biological characterization which is present for example is the amount of oxygen needed to convert organic and ammonia nitrogen into nitrates by nitrifying bacteria etc. so as per this bacterial actions biological characterization is important.

Q4. Enlist physical, chemical and biological characteristics of wastewater?

Ans **CHARACTERISTICS OF WASTEWATER**

1. PHYSICAL CHARACTERISTICS

- a) Turbidity
- b) Color
- c) Total solids
- d) Temperature

2. CHEMICAL CHARACTERISTICS

- a) Chemical oxygen demand (COD)
- b) Total organic carbon (TOC)
- c) Nitrogen

- d) Phosphorous
- e) Chlorides
- f) PH
- g) Trace elements
- h) Priority pollutants

3. BIOLOGICAL CHARACTERISTICS

- a) Biological oxygen demand (BOD)
- b) Oxygen required for nitrification
- c) Microbial population (bacteria pathogens)

Q5. What are the advantages and disadvantages of combine and separate sewerage system? Which sewerage system will you recommend for a new proposed township Support your answer with justification?

Ans COMBINED SYSTEM

1. ADVANTAGES

- a) Both domestic sewage and storm water carried in a single sewer, so construction cost is less.
- b) The strength of domestic sewage is reduced because of dilution of storm water.
- c) The sewers are of large size and the chances of their chocking are rare. It is easy to clean them.
- d) In towns with narrow streets, this system is preferred.

2. DISADVANTAGES

- a) Initial cost is high because of large dimensions of sewers.
- b) Because of large size of sewers, their handling and transportation is difficult.
- c) Due to inclusion of storm water, the load on the treatment plants increases and ultimately increases treatment cost.
- d) During heavy rain the sewer may be overflow and may thus create unhygienic conditions.

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

SEPARATE SEWERAGE SYSTEM

1. **ADVANTAGES**

- a) Size of the sewers is generally less.
- b) Since the sanitary sewage and storm water flows in separate pipes, the quantity of sewage to be treated is less.
- c) As the sewers are similar in section, they can be easily ventilated.
- d) Rain water can be discharged into the streams or can be reused/recycled without any treatment.

2. **DISADVANTAGES**

- a) Since the sewers are of similar size, so it is difficult to clean them.
- b) They are likely to get choked /blocked.
- c) Initial cost is high, when two separate sets are used.
- d) Maintenance cost of system is also high.

SUGGESTION

I will suggest combined sewerage because both domestic 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 and also easily maintainance can be done.