

USN

--	--	--	--	--	--	--	--	--	--

15CV71

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022 Municipal and Industrial Wastewater Engineering

Time: 3 hrs.

Max. Marks: 80

- Note :** 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Substantiate answer with sketches, wherever necessary.
3. Assume missing data, if any.

Module-1

- 1 a. Identify the need and necessity for sanitation. List the methods of sewage disposal. (05 Marks)
b. Define the term 'Dry weather flow'. Discuss the factors affecting dry weather flow. (06 Marks)
c. Classify and discuss the different types of Sewerage systems. (05 Marks)

OR

- 2 a. Discuss on "Time of Concentration" and its classification. (05 Marks)
b. Write a typical layout plan of residential building and indicate the house drainage connections. (05 Marks)
c. With a sketch, describe laying and testing of sewers. (06 Marks)

Module-2

- 3 a. Discuss the Rational method of estimating storm water runoff. What are the factors considered? (06 Marks)
b. Determine the size of a circular sewer for a discharge of 500 litres per second running half full. Assume $s = 0.0001$ and $N = 0.015$. (05 Marks)
c. Define the term 'Self Purification of Streams' Write a neat sketch of oxygen sag curve and mark salient points. (05 Marks)

OR

- 4 a. Distinguish between Self cleansing velocity and Non – Scouring velocity. (04 Marks)
b. Write an explanatory note on Sewage farming and Sewage sickness and preventive measures on it. (06 Marks)
c. Design a Sewer for the following data : (06 Marks)
i) Population to be served = 36000.
ii) Rate of water supply = 135 LPCD, of which 80%, find its way into sewer.
iii) Sewer running full has to carry 3 times the dry weather flow.
iv) $N = 0.012$ and $S = 1$ in 625 (slope).

Module-3

- 5 a. What is meant by Sampling? Mention the different types of sampling. (03 Marks)
b. With the aid of flow diagram, indicate the functions of unit operations and unit processes used in municipal waste water treatment plant. (07 Marks)
c. Categorise the different types of screens based in size, location and purpose. Draw the plan of a fixed bar type screen and name salient features. (06 Marks)

OR

1 of 2

- 6 a. Differentiate between suspended and attached growth systems with examples. (04 Marks)
 b. Determine the size of a high rate trickling filter for the data as follows :
 i) Wastewater flow – 5 MLD ii) Recirculation ratio – 1.5
 iii) BOD of raw wastewater – 230 mg/L iv) BOD removal in primary clarifier – 30%
 v) Effluent BOD5 desires – 25mg/L. (06 Marks)
 c. What is meant by 'Sludge digestion'? Discuss the factors affecting sludge digestion. (06 Marks)

Module-4

- 7 a. Discuss the effects of Industrial wastewater discharge on water bodies. (05 Marks)
 b. What is the need for neutralization of Industrial wastewater? List the different methods of neutralization and explain any one. (06 Marks)
 c. Discuss the circumstances under which the combined treatment of Municipal wastewater and Industrial wastewater is recommended. (05 Marks)

OR

- 8 a. Enumerate the methods adopted for removal of inorganic solids in Industrial wastewater. Explain any one method. (05 Marks)
 b. Define 'Volume Reduction'. Explain the methods of Volume reduction. (06 Marks)
 c. Discuss the various methods of Strength reduction of Industrial Wastewater. (05 Marks)

Module-5

- 9 a. Explain the significance of process flow diagram for identification of Industrial Waste streams. (06 Marks)
 b. Justify the need for Industrial wastewater reuse and Waste recovery. (05 Marks)
 c. Discuss on the major sources and characteristics of Industrial Wastewater. (05 Marks)

OR

- 10 a. With the help of treatment process flow diagram and characteristics of sugar industry, explain the function of each unit operation. (08 Marks)
 b. Discuss the treatment facilities and characteristics of effluent from a paper and pulp industry. (08 Marks)
