



Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025 Public Health Engineering

Time: 3 hrs.

Max. Marks: 100

Note : Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. List and explain the types of water demand. (06 Marks)
b. What is design period? Discuss the factors governing the design period. (07 Marks)
c. In a town, it has been decided to provide 200 lt / head / day in the 21st century. Estimate the domestic water requirements of this town in the year 2000 by projecting of population of town by the incremental increase method from the data given below :

Year	1940	1950	1960	1970	1980
Population	250000	480500	550300	638600	695200

(07 Marks)

OR

- 2 a. What is sampling? List the sampling techniques and explain each. (07 Marks)
b. What is population forecasting? List the methods of population forecasting. Explain incremental increase method and comparative graphical method. (07 Marks)
c. Mention the permissible limits as per BIS of the following water quality parameters and write the problem caused if the limit is exceeded.
i) Fluoride ii) Nitrate iii) Turbidity. (06 Marks)

Module-2

- 3 a. Explain with a flow diagram indicating the various steps of water treatment and state the significance of each unit. (08 Marks)
b. A water has to purify for a town whose daily demand is 8 MLD. Design a suitable sedimentation tank filled with mechanical sludge removal.
Assume velocity of flow = 22 cm/min, detention period = 8 hrs. (08 Marks)
c. Explain the terms i) Sedimentation with coagulation ii) Back washing. (04 Marks)

OR

- 4 a. Design 6 slow sand filter bed from the following data :
Population = 40000 , Per capita demand = 150 L/h/d , Rate of filtration = 180 L/hr/m² ,
Length of each bed = twice the breadth. Assume maximum demand ad 1.8 times the average daily demand and also assume that 1 unit out of 6 will be kept as stand by. (10 Marks)
b. List and explain the filter troubles in filtration. (10 Marks)

Module-3

- 5 a. List and explain the forms of chlorination. (10 Marks)
b. With a neat sketch, explain the working process of Zeolite with reactions. (10 Marks)

OR

- 6 a. List and explain the systems of sewage. Explain each with its advantages and disadvantages. (10 Marks)
- b. The BOD of sewage incubated for 1 day at 30 °C has been found to be 110 mg/lt. What will be the 5 day 20 °C BOD? Assume $K_1 = 0.1$ at 20 °C. (06 Marks)
- c. Define the terms : (04 Marks)
- i) BOD ii) Turbidity of sewage.

Module-4

- 7 a. Draw a neat flow diagram and explain the municipal waste water treatment unit operations and process. (10 Marks)
- b. Write a note on necessity of sedimentation tanks. Explain the types along with a neat sketch of rectangular settling tank. (10 Marks)

OR

- 8 a. Explain the working of conventional activated sludge process with flow diagram. (10 Marks)
- b. Draw a neat sketch of oil and grease removal tank and write the reasons for excluding grease and oil. (10 Marks)

Module-5

- 9 a. Determine the size of high rate trickling filter for the following data : (10 Marks)
- i) Sewage flow = 4.5 MLD
- ii) Recirculation ratio = 1.5
- iii) BOD of raw sewage = 250 mg/lt
- iv) BOD removal in primary tank = 30%
- v) Final effluent BOD desired = 30 mg/lt. (10 Marks)
- b. Explain with a neat sketch, process of stabilization pond and also explain the types of stabilization pond. Write the advantages and disadvantages of the same. (10 Marks)

OR

- 10 Write a note on : (20 Marks)
- a. Rotating biological contactors.
- b. Sludge digesters.
- c. Suspended growth system and attached growth.
- d. Oxidation ditch.

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