Code No: **R204101U** **R20** **Set No. 1**

IV B.Tech I Semester Regular Examinations, January – 2024

ENVIRONMENTAL ENGINEERING

(Common to All Branches except Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

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UNIT - I

1 a) Predict the population for the years 2031, 2041 and 2051 from the following census figures of a town using Geometric Increase and Arithmetic Mean method.

Year	1941	1951	1961	1971	1981	1991	2001	2011	2021
Population (thousands)	75	82	87	95	100	120	135	152	168

[10]

b) Classify various types of water demand. [4]

(OR)

2 a) Discuss in detail about necessity and components of Protected Water Supply system. [7]

b) For an area, the Population at design year is 4,54,895 and Municipal demand is 450lpcd. Calculate the design flow of water treatment plant and fire flow demand. Also determine the design capacity of water distribution system [7]

UNIT - II

3 a) With a neat sketch, classify the types of subsurface water bearing formations. [7]

b) Discuss the main functions served by the distribution reservoirs with a neat sketch. [7]

(OR)

4 a) By means of a schematic diagram explain the various storage zones. [7]

b) Classify various types of pipes along with the limitations, advantages and disadvantages. [7]

UNIT - III

5 a) Mention the drinking water quality standards as given by IS and WHO. [7]

b) Classify the various instruments adopted for the measurement of Turbidity. [7]

(OR)

6 a) Define the terms: Hardness and types of hardness.
50ml of a sample water consumed 15ml of 0.01 EDTA before boiling and 5ml of the same EDTA after boiling. Calculate the degree of hardness, permanent hardness and temporary hardness. [7]

b) Explain the significance and means of measurement of Colour, Taste and Odour for drinking water. [7]

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UNIT - IV

7 a) With a neat sketch explain the treatment and unit processes involved in municipal water treatment plant. [7]

b) Design a rapid sand filter to treat 10 million litres of raw water per day allowing 0.5% of filtered water for backwashing. Take half an hour per day for backwashing, c/c of lateral = 30cm, rate of filtration be 4500l/h/m^2, 3 troughs running lengthwise. Assume any other required data suitably. [7]

(OR)

8 a) Define the term: Coagulation and Flocculation.
The coagulation treatment unit having a flow of 1.75cumec is dosed with alum at 24mg/l. The raw water suspended solids concentration is 37mg/l, and the effluent suspended solids concentration was found to be 18mg/l with a sludge content of 1.2%. The specific gravity of the sludge solids is 3.01. Estimate the volume of sludge deposited each day. [7]

b) Explain in detail about any three various forms of chlorination. [7]

UNIT - V

9 a) Exemplify with a neat sketch about Dead end and Circular system of layout of distribution system. [7]

b) Find the equivalent pipe of 35cm diameter pipe for the network shown in the figure 9(b) using Darcy's and Hazen-William formula [7]

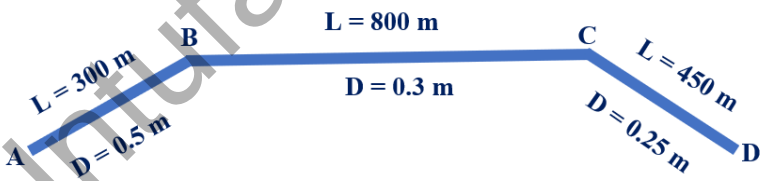

Figure 9(b)

(OR)

10 a) Discuss in detail about the importance and factors governing the pressure in the distribution system. [7]

b) Explain the salient features of Hardy Cross method using balancing heads method. [7]