

III B.Tech I Semester Supplementary Examinations, November 2005
ENVIRONMENTAL ENGINEERING
(Civil Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Estimate the rate of demand of water per capita per day, and total quantity of water required per day for a town of 20,000 population. [8+8]
(b) Explain briefly the basic objectives of a good water supply scheme and their importance in the water supply scheme.
2. Write short notes on the following . [4 x 4=16]
 - (a) Spigot and Socket Joint
 - (b) Water meter
 - (c) Fire- Hydrant
 - (d) Air valve
3. (a) The 5 day 30°C B.O.D of a sewage sample is 110 mg/l. Calculate its 5 days 20°C BOD. Assume the deoxygenation constant at 20°C , K_{20} as 0.1. [8+8]
(b) The average sewage flow from a city is 80×10^6 l/day..If the average 5 day BOD is 285 mg/l, compute the total daily 5 day oxygen demand and the population equivalent of sewage. Assume per capita BOD sewage per day =75 g. If the period of incubation is 10 days at 20°C in the relative conductivity test on sewage, calculate the percentage of relative stability.
4. When is pumping of sewage required in a sewerage system. Draw a sketch of a typical sewage pumping station showing all the necessary arrangements to pump sewage of a town of one lakh population at the outfall sewer. [16]
5. (a) Explain briefly the sedimentation process in a water treatment plant with the help of a neat sketch. [10]
(b) What are the common types of sedimentation tanks? [6]
6. (a) Explain the use of the following in the rapid sand filtration: [8+8]
 - i. Flow rate controller
 - ii. Air compressor
 - iii. Wash water trough
(b) How is the dosage of chlorine determined in the laboratory?
7. (a) Design a standard rate trickling filter to treat 6.5 ML/D of sewage of B.O.D 220MG/L. The final effluent should be 30 MG/L and organic loading rate is $320\text{g}/\text{m}^3$. [8+8]

- (b) Calculate the BOD removal efficiency for a single stage high rate trickling filter. BOD loading is $700 \text{ g/m}^3/\text{d}$ and recirculation ratio is 0.60 .
8. (a) Explain different methods of effluent disposal of septic tanks. [8+8]
(b) Discuss the criteria for the design of a septic tank.

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