

B.Tech IV Sem. Main/Back New Scheme 2025-2026

Civil Engineering**(4CE4-03) -Environmental Engineering****Time :3Hours****Maximum Marks: 70**Instructions to Candidates:

Part-A: Short answer questions (up to 25 words) 10x2 marks = 20 marks. All ten questions are compulsory.

Part- B: Analytical/Problem Solving questions 5x4 marks = 20 marks. Candidates have to answer 5 questions out of 7.

Part – C: Descriptive/Analytical/Problem Solving questions 3x10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1 _____ Nil _____

2 _____ Nil _____

PART-A

- Q.1. A town water supply is given at 135 liters per head per day. Write down suitable breakup of the consumption on different heads. [2]
- Q.2. State briefly, the geological factors governing the occurrence of ground water. [2]
- Q.3. Give one cause of taste and odour in water supplies. [2]
- Q.4. Enlist the units that constitute the coagulation sedimentation plant. [2]
- Q.5. What are the appurtenances required in a water distribution system? [2]
- Q.6. What does it mean by the term "sewerage"? [2]
- Q.7. List the forces acting on sewer pipes. [2]
- Q.8. What is skimming in sewage treatment? [2]
- Q.9. Why is a septic tank not considered a secondary treatment unit? [2]
- Q.10. What is pre-chlorination of sewage? [2]

PART-B

- Q.1. A water supply scheme has to be designed for a city having a population of 2 lakhs. Estimate the important kinds of drafts which may be required to be recorded for an average water consumption of 180 liters per head per day. Also record the required capacities of major components of the propose water works system for the city using a river as a source of supply. Assume suitable data, wherever needed. [4]
- Q.2. Prove theoretically that the surface loading and not the depth is a measure of effective removal particles in an ideal sedimentation tank. Mention the assumptions made in theory. [4]
- Q.3. Sketch and explain the importance and functioning of gate valves and reflux valves. [4]
- Q.4. Chlorine usage in the treatment of 20000 cubic meter per day is 8 kg/day. The residual after 10-minute contact is 0.20mg/l. Calculate the dosage in milligrams per liter and chlorine demand of the water. [4]
- Q.5. Calculate the diameter and discharge of a circular sewer laid at a slope of 1 in 500 when running half full. and with a velocity of 2 m/sec. Take $N=0.012$ in Manning's formula. [4]
- Q.6. Describe drop manhole with the help of a neat sketch. [4]

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Q.7. Write a short note on disposal of grit.

[4]

PART-C

- Q.1 A rapid sand filter is proposed for water supply treatment plant for a town with a population of 75000. The average rate of water supply is 150 liter/capita/day and rate of filtration is to be 100 liter/minute/m². Design
- a. Size and number of filter beds
 - b. Manifold lateral under drainage system
- Q.2. Describe the Zeolite process for water softening and explain the regeneration of zeolite with chemical reactions. [4+6]
- Q.3. Design of high-rate trickling filter for the following data: [10]
- i) Sewage flow = 5 MLD
 - ii) Recirculation ratio = 1.5
 - iii) BOD of raw sewage = 230 mg/l
 - iv) BOD removal in primary clarifier = 30%
 - v) Final effluent BOD desired = 25mg/l.
- Q.4. Why coagulants are used in Sewage treatment? List various coagulants used along with their effectiveness in sedimentation of sewage. [10]
- Q.5. Explain the constructions and working of intermittent sand filters. What are its advantages and disadvantages. [10]
