B.E. (Civil Engineering) Eighth Semester (C.B.S.)
Elective – III : Water & Waste Water Treatment Paper – I

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Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No.2.
3. Solve Question 3 OR Questions No.4.
4. Solve Question 5 OR Questions No.6.
5. Solve Question 7 OR Questions No.8.
6. Solve Question 9 OR Questions No.10.
7. Solve Question 11 OR Questions No.12.
8. Assume suitable data whenever necessary.
9. Diagrams and chemical equations should be given whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Draw a flowsheet of conventional water treatment plant. Explain working of each unit in brief. **7**

b) What points should be kept in mind while selecting a location of treatment plants? **6**

OR

2. a) Explain the types of Aerators. **6**

b) Design a cascade Aerator for the design flow of 15 MLD. **7**

3. a) Write down the factor affecting coagulation and flocculation. **6**

b) Design a Clariflocculator for design flow of 500 m^3/hr. Assume suitable data. **7**

OR

4. a) State the types of coagulants used in water treatment plant & explain any one. **6**

b) Design the flash Mixer for design flow of 10MLD. **7**

5. a) Write short note on **any two.** **7**

   i) Iron & manganese removal.

   ii) Break point chlorination.

   iii) Differentiate between slow sand filter & Rapid sand filter.

b) What are the objectives of filtration & Discuss the various factors affecting the filtration. **6**

OR

6. Design a Rapid sand filter for 15 MLD along with underdrainage system, design of sand bed, gravel & trough. **13**

7. a) Write down the characteristics of waste water. **6**

b) The following observations were made on a 3% dilution of waste water for measuring BOD. **8**
  i) Dissolved oxygen (Do) of aerated water used for dilution = 3.0 mg/lit.
  ii) Dissolved oxygen (Do) of diluted sample after 5 days incubation. = 0.8 mg/lit.
  iii) Dissolved oxygen (Do) of original sample = 0.6 mg/lit.
  Calculate the BOD of 5 days & ultimate BOD of the sample assuming that the deoxygenation constant 0.1.

OR

8. a) Write a short note on the broad irrigation & sewage farming. **7**

  b) What is 'oxygen sag curve" in stream pollution. Explain with sketch. **7**

9. a) Draw a flowsheet of conventional waste water treatment plant & explain working of each unit in brief. **7**

  b) Design a grit chamber for a flow of 0.5 m^3/sec. Assume the peak flow rate to be 3 times the average flow. **7**

OR

10. a) Draw a neat sketch & explain the inlet & out let arrangements of sedimentation tank. **7**

  b) Design a circular sewage sedimentation tank for a town having population of 50,000. The average water demand is 140 lpcd. Assume that 80% water reaches at the treatment unit & maximum demand is 2.7 times the average demand. **7**

11. a) Design the Activated sludge treatment unit with the following data. For a town of population. of 70,000. **7**
  i) Average sewage flow = 210 lit/cap/day.
  ii) BOD of raw sewage = 200 mg/lit
  iii) Suspended solids in raw sewage = 300 mg/lit
  iv) BOD removed in primary treatment = 40%
  v) Overall BOD removal desired = 90%

  b) Explain working of sludge drying beds with neat sketch. **6**

OR

12. a) Write down the factors affecting anaerobic digestion tank. **6**

  b) Write notes on **any two.** **7**
  i) Trickling filter.   ii) Sludge digester.
  iii) MLSS & MLVSS.   iv) BOD/COD ratio.

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