M.E. Second Semester (Civil (Environmental Engineering) (P.T.) (CGS)

13392 : Advanced Waste Water Treatment : 2 SCEE 3

P. Pages : 2 | **AW - 3665**

Time : Three Hours | Max. Marks : 80

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Notes :
1. All question carry marks as indicated.
2. Answer **three** question from Section "A" and **three** question from Section "B".
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Diagrams and chemical equations should be given wherever necessary.
6. Illustrate your answer necessary with the help of neat sketches.
7. Discuss the reaction, mechanism wherever necessary.
8. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) What are the objectives of wastewater treatment? State the need for advanced wastewater treatment. **6**

b) What is BOD? Determine 5 day 20°C BOD for a wastewater whose 5 day 30°C BOD is 110 mg/l. Assume reaction constant k (base 10) = 0.1 per day. **7**

2. a) Draw the flowsheet of the conventional wastewater treatment plant and state the function of each unit. **6**

b) Enlist the reactors used for the treatment of wastewater. What are the operational factors that must be considered in the selection of type of reactor or reactors to be used in the treatment process? **7**

3. a) What is the Mass-Balance Principle? Explain mass balance analysis in wastewater treatment. **6**

b) What are the various types of screens used in wastewater treatment? Explain with sketch the working of bar screen. **7**

4. a) What is flow equalization? What are the benefits that can be derived from application of flow equalization in wastewater treatment? **6**

b) Design a rectangular grit chamber for the following data: **7**
Maximum flow = 22MLD
Diameter of smallest grit particles to be removed = 0.2mm
Average temperature = 20°C
Specific gravity of grit particles = 2.65

5. a) What is flotation? What are the various methods of flotation? Explain any one with the help of neat sketch. **7**

b) What is meant by sedimentation of wastewater? design a sedimentation tank to treat 10MLD of wastewater. **7**

SECTION - B

6. a) What are the objectives of biological treatment of wastewater. Enumerate the major treatment processes used for wastewater treatment. **6**

   b) Enlist various modifications of Activated sludge process. Explain any one modification with sketch. **7**

7. a) What is Rotating biological contractor? Explain its working. **6**

   b) Design a high rate trickling filter for the following data: **7**
   Sewage flow = 5MLD
   Recirculation ratio = 1.4
   BOD of raw sewage = 250 mg/l
   BOD removed in primary settling tank = 25%
   Final effluent BOD desired = 50 mg/l

8. a) Why dewatering of sludge is necessary? Explain the method of dewatering of sludge on sludge drying beds. **6**

   b) What is sludge digestion? What are the advantages and disadvantages of aerobic digestion as compared to anaerobic digestion? **7**

9. a) What is meant by 'Adsorption'? What are the factors affecting adsorption. **6**

   b) Explain various methods of final disposal of sludge. **7**

10. Explain:

    a) Reverse Osmosis. **4**

    b) Desalination. **5**

    c) Electrodialysis. **5**

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