Code No: 07A60102 **R07** **Set No. 2**

III B.Tech II Semester Examinations,December 2010
ENVIRONMENTAL ENGINEERING - I
Civil Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Enumerate the advantages of use of free chlorine gas as a disinfecting material.
   (b) Explain the different forms of chlorination. [8+8]
2. (a) When and where the following are to be installed?
      i. Scour valves
      ii. reflux valves.
   (b) Explain the assumption made and practical significance of hardy cross method. [16]
3. (a) What is COD? State its practical significance.
   (b) Explain with a sketch the sulphur cycle of decomposition of organic matter in nature. [16]
4. (a) With a neat diagram purification mechanism of waste water in a trickling filter.
   (b) What are grits and how they removed from waste water. [16]
5. Design and sketch a oxidation pond of a colony of population 30,000 in a tropical country like India, assuming necessary data. Determine detention time also. [16]
6. (a) What are the chief points to be considered in investigating a river supply of water?
   (b) Examine shallow wells as sources of water supply schemes. [8+8]
7. Distinguish between the following:
   (a) Water metres of displacement type and velocity type.
   (b) Arithmetical increase method of population and geometrical increase method of population . [8+8]
8. In an ideal settling tank, 16% of 30 mm diameter particles are removed having specific gravity of 1.20. Temperature at the time of removal is 20^0C. What will be the size of the particles for which the tank is actually designed? Assume the specific gravity of these particles same as that of 30mm diameter particles. [16]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: 07A60102 **R07** **Set No. 4**

III B.Tech II Semester Examinations,December 2010
ENVIRONMENTAL ENGINEERING - I
Civil Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Enumerate the factors to be considered while selecting the site for a storage reservoir.
   (b) Discuss the analytical method of computing storage capacity of a reservoir. [8+8]

2. Write short notes on :
   (a) Sanitary survey of area
   (b) Contour plans
   (c) Water supply schemes in India
   (d) Importance of water [4+4+4+4]

3. (a) How will you compute the quantity of sludge gas and its fuel valve?
   (b) Define sludge volume index. What is its importance in sewage treatment? [8+8]

4. (a) What are the various precautions to be taken in laying of water distribution pipe lines?
   (b) What are the different function of balancing reservoirs? [8+8]

5. (a) Draw the flow diagram of activated sludge process treatment unit and explain its working.
   (b) Define recirculation ratio. How do you determine the efficiency of trickling filters? [8+8]

6. Explain the following along with neat sketches
   (a) Inlet arrangement.
   (b) Outlet arrangement. [8+8]

7. (a) Write short answers
      i. Egg- shaped sewers are hydraulically efficient why?
      ii. How do you account for variation in the design of sewers.
   (b) For a circular and rectangular sewer to be hydraulically equivalent, find the relation between the depth of the rectangular sewage and diameter of the circular sewer. Take the width of rectangular sewage as 1.5 times the depth and assume that only three sides of the rectangular sewage are wetted. [8+8]

8. (a) How are iron and manganese removed from water?
   (b) What is meant by fluoridation? Explain. [8+8]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: 07A60102 **R07** **Set No. 1**

III B.Tech II Semester Examinations,December 2010
ENVIRONMENTAL ENGINEERING - I
Civil Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What is meant by the term pure water? What are the impurities present in water?
   (b) Mention scale of hardness. Explain various methods for measuring hardness . [8+8]

2. Explain the following along with neat sketches
   (a) Fill and draw type settling tank.
   (b) Continuous flow type settling tank. [8+8]

3. (a) What are the effects which occur on water during filtration? Explain the theory of filtration to explain such effects.
   (b) Effective size of sand; Uniformity coefficient of sand; strainer; negative head; roughing filter. [8+8]

4. (a) Using NRC formula, design high rate trickling filters, for treating a wastewater of 10 MLD with a BOD of 250mg/l when desired efficiency is 80%.
   (b) Differentiate between
      i. grit chamber and sedimentation tank.
      ii. Skimming tank and flotation tank. [8+8]

5. (a) State the factors you would take into consideration and procedure you would follow in designing a distribution system for the water supply of a city.
   (b) What is the importance of zoning in the design of a distribution systems? State the functions of an elevated reservoir. [8+8]

6. (a) Mention the porosities of some of the common types of soils and rocks
   (b) What are the fundamental principles involved in the yield of a well? [8+8]

7. (a) What do you understand by "Dry wealth Flow" ? Discuss in brief various factors affecting the dry wealth flow.
   (b) Write down advantages and disadvantages combined systems of sewerage. [8+8]

8. The sludge production having 96% moisture content from a waste water treatment plant is 1000kg on dry solid basis. The solids contain 70% volatile matter with a specific gravity of 2.5 . Determine the volume of raw and digested sludge if reduction in volatile solids is 50% during digestion and moisture content of digested sludge is 92%. [16]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: 07A60102 **R07** **Set No. 3**

III B.Tech II Semester Examinations,December 2010
ENVIRONMENTAL ENGINEERING - I
Civil Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What are the different types of pumps used in wastewater engineering.
   (b) Write short notes on dilution methods of sewage disposal. [8+8]

2. Differentiate between the following?
   (a) Pathogenic bacteria and non-pathogenic bacteria.
   (b) Confirmed and completed tests of B-coli test.
   (c) Temporary hardness and permanent hardness.
   (d) Free ammonia and albuminoid ammonia. [4+4+4+4]

3. What do you understand by low cost waste water treatment unit? Design a septic tank for following .
   (a) Population :200
   (b) Sewage flow rate : 180 lpcd.
   (c) Deluding period : once in three year.
   (d) Detention time : 36 hours.
   (e) $\frac{L}{B} = 4$

   What would be the size of its soak pit if the effluent from this septic tank is to be discharges in it? Draw a neat sketch of the septic tank and soak pit system for the dimensions of the designed data. Make suitable assumptions. [16]

4. (a) What is the need for pumping in public water supply schemes?
   (b) How would you use the pump characteristic curves for selection of suitable pumps in water supply scheme? [8+8]

5. Distinguish between the following :
   (a) Flash mixers and flocculators
   (b) Floc chamber and settling tank . [8+8]

6. (a) What is meant by rankings? With the help of a neat sketch explain the working of a bar screen.
   (b) Find the volume of activated sludge units for a city having a sewage flow of 250 mld with a BOD at 20^0C of 250mg/l with the following data.
      i. 1200 gm of BOD should have one m^3 of volume.

ii. The mixed liquor is maintained to have 2500mg/l of suspended solids.
iii. BOD loading should be 60 gm per 120gm of suspended solids [16]

7. Differentiate between the following:
   (a) Aquifer and outcrop
   (b) Drawdown curve and circle of influence. [8+8]

8. Distinguish between the following :
   (a) Activated carbon and copper sulphate
   (b) Sodium hexafluorosilicate and hexafluorosilicic acid. [8+8]

⋆ ⋆ ⋆ ⋆ ⋆