Sixth Semester B.E. Degree Examination, June/July 2016
Environmental Engineering – I

Time: 3 hrs.

Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting*
atleast TWO questions from each part.
2. Draw sketches wherever necessary.
3. Assume any missing data suitably.

PART – A

1 a. Explain the need and importance for planned water supply scheme to town. (06 Marks)
  b. Define per capita demand and explain various factors that affect the per capita demand. (08 Marks)
  c. The population data of a town are given below:

Year	1990	2000	2010	2020	2030
Population	90,000	1,20,000	1,60,000	2,50,000	2,60,000

  Estimate the expected population in the year 2050 by Geometric Increase Method. (06 Marks)

2 a. Enumerate the different surface and subsurface sources of water and compare the quality and quantity and suitability of various sources. (08 Marks)
  b. What is an intake structure? What are the factors governing the selection of site for locating an intake. (06 Marks)
  c. Explain with a neat sketch of a reservoir intake. (06 Marks)

3 a. Explain the different physical, chemical and bacteriological tests conducted on water. (08 Marks)
  b. Mention the max. permissible limits as per BIS of the following water quality parameters and write the problem caused if the limit is exceeded.
  (i) Hardness   (ii) pH   (iii) Fluoride   (iv) Turbidity (06 Marks)
  c. Explain various waterborne diseases and their control. (06 Marks)

4 a. With the help of a flow diagram, explain briefly the complete sequence of a water treatment plant. (08 Marks)
  b. Explain with a sketch how the optimum coagulation dosage is determined in the laboratory. (06 Marks)
  c. Design a circular sedimentation tank to treat 10 MLD of water, given the following data:
     Depth of liquid = 3.5 m   Detention time = 4 hr.
     Calculate, also over flow rate. (06 Marks)

PART – B

5 a. Explain the theory of filtration. (06 Marks)
  b. Compare slow sand filters with Rapid sand filters. (06 Marks)
  c. What is meant by disinfection in water treatment? Give the requirements of an ideal disinfectant. (08 Marks)

6 a. List the different forms of chlorination and explain any two of them. **(08 Marks)**
   b. Write a note on fluoridation and defluoridation. **(06 Marks)**
   c. Explain the zeolite methods of water softening. **(06 Marks)**

7 a. Explain the environmental significance of hardness in water. **(08 Marks)**
   b. Explain methods of water softening to remove permanent hardness of water. **(06 Marks)**
   c. Calculate the hardness of given water sample data:

   Na^{2+} = 30 mg/L Cl^- = -54 mg/L
   Ca^{2+} = 20 mg/L Sr^- = 04 mg/L
   Mg^{2+} = 15 mg/L   Turbidity = 50 mg/L

   Comment on the result. **(06 Marks)**

8 Write short notes on the following (any four) :
   a. Defluoridation
   b. Pressure filters
   c. Iron and Manganese removal
   d. Removal of Taste & Odour
   e. Activated Carbon treatment. **(20 Marks)**

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