USN ☐☐☐☐☐☐☐☐☐☐ **10CV61**

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Environmental Engineering - I

Time: 3 hrs. Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1 a. Enumerate beneficial uses of water. **(04 Marks)**
  b. What is meant by per capital demand? Discuss the factors that affect the per capita demand of water. **(08 Marks)**
  c. Determine the population of a town after three decades for the available census data, using GIM and IIM methods. **(08 Marks)**

Year	1962	1972	1982	1992	2002
Population	45,000	48,000	54,000	62,000	67,000

2 a. Distinguish between infiltration gallery and infiltration well. **(06 Marks)**
  b. What are intake structures? Explain the factors to be considered while selecting a location for intake structure. **(08 Marks)**
  c. Briefly explain the Testing of the pipe lines. **(06 Marks)**

3 a. Explain types of Sampling in detail. **(04 Marks)**
  b. Write the desirable limits and its environmental significance for the following parameters as per BIS standards :
  i) pH   ii) Total hardness   iii) Chloride   iv) Fluoride   v) Iron. **(10 Marks)**
  c. In a water treatment plant the pH values of incoming and outgoing waters are 7.2 and 8.4 respectively. Find the average value of pH, assuming linear variation of pH with time. **(06 Marks)**

4 a. With a help of flow diagram, explain briefly the complete sequence of a water treatment plant. **(08 Marks)**
  b. Determine the quantity of alum required in order to treat 13 MLD of water at a treatment plant. Where 12mg/litre of alum dose is required. Also determine the amount of carbon dioxide gas which will be released per litre of water treated. Assume molecular weight of $A\ell = 26.97$, $S = 32.066$, $O = 16$, $H = 1.008$, $C = 12.01$. **(06 Marks)**
  c. How you will determine the optimum coagulant dosage in lab using Jar test apparatus? Discuss with sketch. **(06 Marks)**

PART – B

5 a. Explain with the help of a diagram, rapid sand filtration. **(10 Marks)**
  b. Design 5 slow sand filter beds for the following data for a town having population of 60,000.
  Rate of water supply = 120 ℓpcd ; Rate of Filtration = 180 ℓ/m²/hr ;
  Length of each bed = 2.5 times the width.
  Consider the maximum daily demand as 1.8 times the average daily demand. Also consider one unit out of 5 units will be kept as stand by unit. **(10 Marks)**

6   a. What is meant by disinfection of water? Explain the break point chlorination, with neat sketch. **(06 Marks)**

b. Briefly explain Zeolite process of hardness removal. **(06 Marks)**

c. A town having population of about 50,000 is to be supplied water at the rate of 150 ℓpcd. The disinfection of water is to be carried out with bleaching powder containing 30% of active chlorine. If the chlorine does required for disinfection is 0.3 mg/ℓ. Calculate the quantity of bleaching powered per year. **(08 Marks)**

7   a. What is meant by Defluoridation and Fluoridation? Explain the "Nalagonda technique" of defluoridation. **(08 Marks)**

b. Write brief note on significance of taste and colour removal. **(06 Marks)**

c. What are the requirements of an ideal distribution system? **(06 Marks)**

8   a. With neat sketch, explain the following :
i) Sluice valves   ii) Fire hydrants. **(10 Marks)**

b. Explain with neat sketches, the dead end system and grid iron system of layouts of distribution system. **(10 Marks)**

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