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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 capita 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 Al = 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  $\ell$ pcd ; Rate of Filtration = 180  $\ell$ /m<sup>2</sup>/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)

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.



10CV61

- 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 dose required for disinfection is 0.3 mg/l. Calculate the quantity of bleaching powder 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 : (10 Marks)
- i) Sluice valves                      ii) Fire hydrants.
- b. Explain with neat sketches, the dead end system and grid iron system of layouts of distribution system. (10 Marks)

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