5E5062

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B.Tech. (Sem.V) (Main) Examination- 2014
Civil Engineering
5CE2 Environmental Engineering-I

Time : 3 Hours

Total Marks : 80
Min. Passing Marks : 24

Instructions to Candidates :
Attempt any five questions selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

UNIT–I

1. (a) Describe the factors affecting the per capita demand of water supply per day. (8)
   (b) What are various types of water demands? Describe the percent wise distribution of various types of water demands.(8)

OR

1. (a) The population of a city as per the census records available is as follows :

Census Year	1951	1961	1971	1981	1991	2001	2011
Population	24835	29578	16147	49960	57620	67832	74638

Estimate the population of the city after four decades by arithmetical increase, geometrical increase and incremental increase method. (12)

(b) Describe the role of environmental engineer in the protection of the environment. (4)

UNIT–II

2. (a) Explain the procedure to determine alkalinity in water. (4)
   (b) Discuss the common impurities found in water along with their adverse effects. (8)
   (c) Draw a neat sketch of hydrological cycle and explain its various components. (4)

OR

2. (a) Write down the physical, chemical and biological water quality standards for drinking water. (8)
   (b) Compare the surface and ground water sources of water. What are the problems associated with ground water and suggested solutions to them. (8)

UNIT–III

3. (a) Derive an expression for settling velocity of a discrete particle in a settling tank and prove that settling of a particle depends on surface area and is independent of the depth of the tank. (8)
   (b) With the help of a flow diagram, describe the unit processes in a municipal water treatment system. Also describe what kind of impurities will be removed after the end of each process. (8)

OR

3. (a) Water has to be supplied to a town with 1.5 lakh population at the rate of 220 liters per capita per day from a river 3.2 km away. The difference in elevation between lowest water level in the sump well and service reservoir is 45m. Determine the size of the main pipe and power of the pump required. Assume maximum water demand as 1.8 time the average demand, velocity of flow in pipe as 1.5 m/s. The pump works for 12 hrs. in a day, the efficiency of pump can be assumed as 70%.(8)
   (b) Why is it necessary to remove excess hardness from drinking water? Explain zeolite process to remove excess hardness.(4)
   (c) Differentiate between coagulation and flocculation and perikinetic and orthokinetic flocculation. (4)

UNIT–IV

4. (a) Explain the working of a rapid sand filter with neat sketch. What are the desirable qualities of filter media? (8)
   (b) What is the purpose of disinfection of water? Explain the factors influencing the efficiency of disinfection. (8)

OR

4. (a) Explain the terms : combined chlorine, break point chlorination, chlorine demand & residual chlorine and their significance.(8)
   (b) Compare slow sand filter and rapid sand filters for their performance and structure. (8)

UNIT–V

5. (a) Describe Hardy-Cross method of pipe network analysis. (8)
   (b) Give the layout of various water distribution networks with neat sketches. (8)

OR

5. (a) Sketch and explain various components of a domestic service connection. (8)
   (b) How will you determine the capacity of a service reservoir by mass curve method? (8)