USN _____   **15CV64**

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Water Supply and Treatment Engineering

Time: 3 hrs.   Max. Marks: 80

Note: 1. *Answer any FIVE full questions, choosing one full question from each   module.*
      2. *Assume any suitable data if necessary.*

Module-1

1   a. Explain the different types of water demand.   (06 Marks)
    b. What is meant by per capita demand? List and discuss the factors that affect the per capita demand.   (10 Marks)

OR

2 a. The population of the city in successive decennial census is given as 41500 and 57500. Assuming the census date as 10th April , find the midyear population as 10th July for
    i) 3rd Inter — Censal year and   (08 Marks)
    ii) 6th Post— Censal year by Arithmetical increase method and Geometrical increase method.
   b. With the help of neat sketch, explain in detail the variations in demand of water and effect of these variations on the design of various units of water supply scheme.   (08 Marks)

Module-2

3   a. Write a neat flow sheet of municipal water treatment plant with significance of each unit.   (08 Marks)
   b. Discuss on surface and subsurface water sources with regard to their quality and quantity.   (08 Marks)

OR

4 a.   List the objectives of water quality analysis.   (04 Marks)
   b.   Differentiate between composite sampling and grab sampling.   (04 Marks)
   C.   Write desirable limits of the following parameters as per BIS 10500 2012.
    i) Colour ii) pH   iii) Total hardness   iv) Nitrate   v) Iron   vi) Fluoride
   vii) Total dissolved solids   viii) Chlorides.   (08 Marks)

Module-3

5   The maximum daily demand at a water purification plant has been estimated as 12 million litres per day. Design the dimensions of a suitable sedimentation tank (Fitted with mechanical sludge removal arrangements) for the raw supplies, assuming a detention period of 6 hours and velocity of flow as 20cm/min.   (06 Marks)
   b. Explain in detail the theory of filtration.   (10 Marks)

OR

6 a. Discuss in detail the operational problems in filters.   (10 Marks)
   b. Bring out the differences between ultra and micro filtration.   (06 Marks)

Module-4

7   a. A sample of raw water contains 200 mg/C alkalinity , 50mg/C hardness as $CaC,C2$ and 75mg/f hardness as $MgSO4$. Compute the quantities of lime and soda required to treat 1 million litres of water. If slaked lime 85% **FirstR** is available in place of pure lime. What will be the required quantity of slaked lime?   (08 Marks)

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b. Explain the concept of reverse osmosis in water treatment with aid of neat sketch.

(08 Marks)

8 a. Differentiate between the following   (08 Marks)
   i)   Plain chlorination and Super chlorination.
   ii) Double chlorination and de — chlorination.
   iii) Pre — chlorination and Post — chlorination.
   iv) Disinfection and Sterilization.

b. Explain Defluoridation and Fluoridation.   (08 Marks)

Module-5

9 a. For a water supply of a town, water is pumped from a river 2 km away into a reservoir. The maximum difference of levels of water in river and reservoir is 25m. the population of town is 80000 and per capita water demand is 125 litres per day. If pumps are to operate for a total of 8 hours and the efficiency of the pump is 80%. Determine the horse power of the pumps. Assume friction factor as 0.03 and velocity of the flow as 2m/s and maximum daily demand as 1_5 times the average daily demand.   (08 Marks)

b. With the help of neat sketch, explain twin well type of river intake.   (08 Marks)

OR

10 a. Write short notes on any two :   (08 Marks)
   i) Corrosion in pipes   it) Reflux value   iii) Fire hydrant.

b. List the advantages and disadvantages of dead end system.   (04 Marks)

c. Differentiate between continuous and intermittent system of water supply.   (04 Marks)