CBCS SCHEME

USN | | | | | | | | | | |

18CV46

Fourth Semester B.E. Degree Examination, July/August 2022
Water Supply and Treatment Engineering

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a.   Explain the various types of water demand.   (06 Marks)
    b.   Discuss the factors that affect per capita demand.   (08 Marks)
    c.   Calculate the fire demand for 2 lakh population by different formula.   (06 Marks)

OR

2   a.   What is population forecasting? List any eight methods of population forecasting. Explain the incremental increase and comparative graphical method.   (10 Marks)
    b.   The following is the population data of a city available from past census records. Determine the future population of the city in 2040 by
         i)   Arithmetical increase method
         ii)   Geometrical increase method.

Year	1970	1980	1990	2000	2010
Population	25,000	28,000	34,000	42,000	47,000

                                                                                        (10 Marks)

Module-2

3   a.   Give complete sequence of a water treatment plant with a flow diagram and mention the significance of each unit.   (08 Marks)
    b.   Briefly explain different methods of water sampling.   (06 Marks)
    c.   Give the drinking water quality standards as per BIS for the following parameters. Discuss their effects when they are excluding their limits. i) Iron   ii) Chlorides   iii) Fluoride
         iv) Nitrate.   (06 Marks)

OR

4   a.   Explain the factors to be considered while selecting a site for intake structures.   (06 Marks)
    b.   What are intake structures? List the different types of intakes and explain any one, with neat sketch.   (08 Marks)
    c.   List the different types of aeration process and explain any one, with neat sketch.   (06 Marks)

Module-3

5   a.   Briefly explain the term i) Sedimentation   ii) Coagulation   iii) Clarification.   (06 Marks)
    b.   How you will determine the optimum coagulant dosage in lab using Jar test apparatus? Discuss with sketch.   (07 Marks)
    c.   The maximum daily demand at a water purification tank plant is 12MLD. Design the dimensions of a suitable rectangular sedimentation tank for the raw water supplies. Take detention time period of 6 hours and the depth of 4.0mts. The velocity of flow is 20cm/min.
                                                                                        (07 Marks)

OR

6   a.   Briefly explain theory of filteration.   **(06 Marks)**
    b.   With the help of a neat sketch, explain the working of rapid gravity filter.   **(08 Marks)**
    c.   Determine the dimensions of a set of rapid gravity filters for treating water required for a population of 50,000 with average rate of demand as 180 litres per day per person. Assume a peak factor of 1.8 by ignoring wash water requirements. Assume rate of filteration is $5000 l/h/sq.m$.   **(06 Marks)**

Module-4

7   a.   Explain theory of chlorination of water with chemical equation.   **(06 Marks)**
    b.   Explain break point chlorination graphically.   **(06 Marks)**
    c.   Estimate the quantity a bleaching powder required for a city water tank, for one month (31 days), use the following data:
      Population: 1 lakh
      Strength of bleaching powder: 20%
      Chlorine demand of water: $0.4 mg/l$
      Residual chlorine required: $0.2 mg/l$
      Rate of water supply: 250 liter/capita/day.   **(08 Marks)**

OR

8   a.   Explain the zealite process of water softening with sketch. Write down the relevant chemical equation.   **(10 Marks)**
    b.   Explain with a line diagram the "Nalagonda Technique" of defluridation.   **(06 Marks)**
    c.   Explain reverse osmosis process of softening of water.   **(04 Marks)**

Module-5

9   Briefly explain the following with the help of neat sketch.
    a.   Economical diameter of raising main
    b.   Sluice valve
    c.   Air valve
    d.   Fire hydrant.   **(20 Marks)**

OR

10   a.   Discuss the various methods of distribution system.   **(06 Marks)**
    b.   With sketches, explain briefly dead end system and grid iron system of distribution networks.   **(08 Marks)**
    c.   Briefly explain the surface and elevated reservoirs.   **(06 Marks)**

* * * * *