Total number of printed pages–4

53 (CE 404) ENVE–I

2021

ENVIRONMENTAL ENGINEERING–I

Paper : CE 404

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* What are Intakes? What are the important considerations which govern the selection of site of an intake? 6

   (b) What do you understand by Mass Inflow Curve and how is it prepared? 4

   (c) Design a well for the following data : 5

   (i) Yield required = $0{\cdot}09 m^3/sec$

   (ii) Radius of drawdown = $300m$

   (iii) Permeability coefficient = $50m$/day

   (iv) Drawdown = $3m$

   (v) Thickness of combined aquifer = $40m$

Contd.

(d) Define the following terms : 5

(i) Aquifer

(ii) Perched aquifer

(iii) Specific yield

(iv) Cone of depression

(v) Coefficient of transmissibility.

2. (a) Discuss various factors that affect the rate of demand. How per capita demand is determined ? 6

(b) Compute the fire demand for a city having population of 1,50,000 using Buston's formula and Kuichling's formula. 4

(c) Explain in brief, the Geometrical increase method and Incremental increase method used for prediction of future. 6

(d) Write a note on common impurities found in water. 4

3. (a) List the important requirements of water for domestic use. 6

(b) Write a short note on Hardness of water. 4

(c) Explain in brief the determination of turbidity of water using Jackson's turbidimeter. 5

(d) Describe in brief, various types of screens used for screening water. 5

4. (a) Determine settling velocity of a discrete particle having diameter 0·1 *cm*, specific gravity 1·1 and temperature of 20°*C*. 5

(b) Derive Stokes' law for settlement of discrete particles in water. 8

(c) Describe various types of coagulants commonly used in water treatment. 5

(d) Find the area of rapid sand filter for a town having population of 80,000 with an average rate of demand of 140 litres per person per day. Assume average rate of filtration as 3800 litres per hour per m^2. 2

5. (a) What actions take place during filtration? 5

(b) Write a note on Wash-water troughs. How do you design them? 6

(c) Explain the underdrainage systems of rapid sand filter and mention the general rule of design for such a system. 6

(d) What is the difference between disinfection and sterilization? 3

6. (a) Discuss in brief that the method of distribution depends upon the topography of the area. 8

(b) Compare : 8

(i) Lime Soda and Zeolite process

(ii) Coagulation and flocculation.

(c) Explain breakpoint chlorination. 4