

Total number of printed pages-4

53 (CE 404) ENVE-I

2021

**ENVIRONMENTAL ENGINEERING-I**

Paper : CE 404

Full Marks : 100

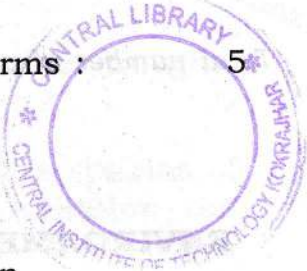
Time : Three hours

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

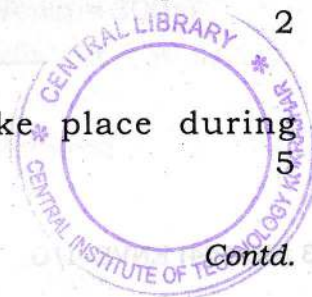
Answer **any five** questions.

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 =  $0.09\text{m}^3/\text{sec}$
  - (ii) Radius of drawdown =  $300\text{m}$
  - (iii) Permeability coefficient =  $50\text{m}/\text{day}$
  - (iv) Drawdown =  $3\text{m}$
  - (v) Thickness of combined aquifer =  $40\text{m}$

Contd.

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- (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

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- (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  $0.1\text{ cm}$ , specific gravity  $1.1$  and temperature of  $20^\circ\text{C}$ . 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  $\text{m}^2$ . 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

