

Total No. of Questions : 10]

SEAT No. :

**P1688**

**[5058]-308**

[Total No. of Pages : 3

**T.E.(Civil)**

**ENVIRONMENTAL ENGINEERING-I**  
**(2012 Course)(Semester-II)(End semester)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables are allowed.*
- 5) *Assume suitable data if necessary.*

- Q1)** a) What sound pressure level results from combining the following three levels-65 dB, 78 dB and 75 dB. [6]
- b) Write a note with a neat sketch on: Fabric filter. [4]

OR

- Q2)** a) Following is the population data for a town. Water supply scheme is to be designed for this town with a design period of 30 years. Find the population at the end of the year 2040 by arithmetical method. [6]

Year	1970	1980	1990	2000	2010
Population	48,000	59,000	67,000	76,000	89,000

- b) Draw a flow diagram of a public water supply scheme and explain each component. [4]
- Q3)** a) Explain following terms with unit: [6]
- i) Weir loading
  - ii) Overflow rate
  - iii) Flow through velocity
- b) Explain cascade aerator with a neat sketch. [4]

OR

**P.T.O.**

- Q4)** a) Prove that theoretically, the surface loading( $Q/A$ ) and not the depth is a measure of effective removal of particles in a sedimentation tank. [6]
- b) Write a procedure for the determination of pH and alkalinity of water.[4]
- Q5)** a) Acidity introduced by alum dose of 90mg/lit is to be neutralised using lime as CaO. Commercial CaO available is of 85% purity. Work out the quantity of the commercial CaO required in kg/day, if the raw water to be treated is 5 MLD. [8]
- b) Draw a neat sketch of a rapid sand gravity filter and show various components. Explain mechanisms of rapid sand gravity filter. [8]

OR

- Q6)** a) A water treatment plant treats 200 m<sup>3</sup>/hr. of water. Work out the following with respect to flocculator: [8]
- Dimensions of flocculator unit.
  - Power input by paddles to water.
  - Size and number of paddles.
- Assume  $\mu_{\text{water}} = 0.89 \times 10^{-3} \text{ N.s/m}^2$ .
- b) Explain with a neat sketch diffused double layer theory. [8]
- Q7)** a) What is break point chlorination? Explain with figure What are its advantages? [8]
- b) Explain adsorption technique with sketch for removal of odour and colour. [8]

OR

- Q8)** a) What do you mean by disinfection? Discuss the factors affecting efficiency of disinfection. Enlist at least four disinfectants used in water treatment plant and discuss anyone in detail. [8]
- b) Explain zeolite process in detail with neat sketch. [8]
- Q9)** a) Write a short note on: [9]
- Reverse osmosis
  - Packaged water treatment plant
- b) Explain the following layout systems for water distribution: [9]
- Tree or Dead end system
  - Ring or Circular System

OR

**Q10) a)** Find required balancing capacity of the reservoir by analytical method for the following data: [9]

Population : 1.0 million.

System of water supply : continuous

Rate of water supply : 270 lit/capita/day.

Break-up of water demand is as follows:

Sr.No.	Time	Liters per capita
1	7 am to 1 pm	100
2	1 pm to 5 pm	45
3	5 pm to 11 pm	95
4	11 pm to 2 am	20
5	2 am to 7 am	10
	TOTAL	270

Water is supplied from the treatment plant at a uniform rate of 11.25 million lit/hour for all 24 hours.

b) What do you mean by rain water harvesting? Write a necessity of rain water harvesting system. Draw a sketch of 'Roof Top Rain Water Harvesting System for a bungalow. [9]

