

N.B:

1. Question No.1 is compulsory
2. Attempt any **three** questions from remaining **five** questions.
3. Assume suitable data wherever required.
4. Figures to the right indicate full marks.

1. Attempt any **four** of the following **20**
 - (a) What is per capita demand. Explain factors affecting per capita demand.
 - (b) Write a short note on drinking water standards.
 - (c) Write a note on necessity of aeration in water treatment.
 - (d) What are different forms of chlorine disinfection methods? Explain dechlorination.
 - (e) Find settling velocity of spherical silica particle of specific gravity 2.67, in water at 25°C $v = 0.009\text{cm}^2/\text{sec}$, if the diameter of particles is 0.004 cm. Assume data wherever required and mention the same.

2. (a) What are various types of intakes? Explain Reservoir intake with neat sketch. **10**
 (b) A city has a population of 25,000 with an average rate of demand 155 litres per capita per day. Find the area of slow sand filter. **05**
 (c) Draw a neat sketch of rapid sand filter showing various components. **05**

3. (a) Explain various methods for feeding coagulants in detail? What is the necessity of mixing devices? **10**
 (b) What are primary and secondary pollutants? Explain impact of secondary pollutants. **05**
 (c) Write a note on measurement of noise levels. **05**

4. (a) Chlorine usage in the treatment of 30000m³/day is 8 kg/day. The residual chlorine after 12 min contact is 0.2 mg/l. calculate the dosage in milligrams per litre and the chlorine demand of water. **05**
 (b) Explain demineralisation process in detail. **10**
 (c) A flat bottom trough is to receive the wash water from a section of the filter which is 2 m wide and 3 m long. The wash water rate is 700 litres per min per sq.m. If the water is to have a depth of 25 cm at the upper end of the trough, What should be the dimension of the trough? **05**

5. (a) Write a note on eutrophication. **05**
 (b) Write a note on well water disinfection **05**
 (c) Explain theory of coagulation and flocculation. What are factors affecting coagulation process. **10**

6. Write short note on (**Any four**) **20**
 - a Pressure filters
 - b Activated Carbon
 - c Roof-Top rainwater harvesting
 - d Requirement of sanitary fixtures and fittings for 1 bhk flat.
 - e Control measures for thermal pollution
