

- 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.

09/12/2025

QP-10097522

1. **Attempt any four of the following** 20
 - a Define Rainwater harvesting potential. Explain various types of rainwater harvesting.
 - b How antisiphonage pipe is useful in building sanitation? Explain with neat diagram.
 - c Explain manholes in waste water drainage system.
 - d Explain 5 R principles.
 - e Discuss Dead end system with neat sketch giving the advantages and disadvantages.
2.
 - a Define softening. Enlist the methods of softening. Explain Base exchange process in detail. 10
 - b Design a high rate trickling filter for following data 10
Sewage flow = 10 MLD
Recirculation Ratio = 1.5
BOD of raw sewage = 250 mg /lit
BOD removal in primary clarifier = 30 %
Final Effluent BOD desired = 30 mg/lit
3.
 - a Calculate the diameter and discharge of a circular sewer laid at a slope of 1 in 500 when it is running half full and with a velocity of 1.8 m/s. Assume $n = 0.012$. 10
Why circular section is most commonly used in construction of sewers?
 - b How the cleaning of rapid gravity filter is carried out? Explain with neat diagram. 10
4.
 - a Explain the terms along with expressions - 1) Aeration period 2) F/M ratio 3) Sludge edge 10
 - b Design a septic tank for a hostel of 250 persons with average daily sewage flow of 120 lit/person. Cleaning interval is 1 year. Assume suitable data. Draw a neat sectional sketch showing details. 10
5.
 - a The BOD_5 of a waste water is 160 mg/lit at 20 °C. The k value is known to be 0.23 per day. What would be BOD_8 be if the test was run at 15°C? 10
 - b Discuss DO sag curve with neat diagram. 05
 - c Explain the working mechanism of oxidation ditch. 05
6. Write short note on (Any four) 20
 - a Pressure filters
 - b Chemical characteristics of sewage
 - c Reverse Osmosis Process
 - d Importance of chlorination in water treatment plant
 - e Effects of air pollution on environment
 - f Self-purification of water body