

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

Q.1 Attempt any four

- a. Mention the factors that influence per capita demand. **05**
- b. Give the maximum acceptable limits of the following for the public drinking water: i)Hardness ii)Turbidity iii)Fluorides iv)Nitrates v)Iron **05**
- c. Compare the merits and demerits of the 'continuous' and 'intermittent' systems of water supply. **05**
- d. Determine the quantity of alum required in order to treat 15million litres of water per day at a treatment plant. **05**
- e. Write down characteristics of hazardous wastes. **05**

Q.2 a. Explain the Hardy Cross Method used for pipe network analysis in water distribution system. 10

- b. Design the dimensions of a set of rapid sand filters for treating water required for a population of 50,000, the rate of supply being 180 lit/day. The filters are rated to work 4000 lit per hour per square meter. Also Design under drainage system and wash water troughs. Assume whatever data are necessary. **10**

Q.3 a. What is Leachate? How it is formed? How its movement is controlled? 10

- b. What is meant by 'disinfection'? What is its importance? Explain in detail different methods of Disinfection. **10**

Q.4 a. Enumerate and discuss in brief the various physical, chemical and biological characteristics of testing of raw water supplies. 10

- b. Three million litres of water per day is passing through a sedimentation tank which is 6m wide, 14m long and having a water depth of 3m.
 - a) Find the detention time for the tank? b) What is the average flow velocity through the tank? c) Compute the overflow rate. **10**

Q.5 a. Explain with the flow diagram the various methods which are adopted collectively for treating public water supplies. 10

- b. Discuss any two types of water piping systems that may be employed in buildings, giving merits and demerits of each system. **10**

Q.6 Write short note on(any four) 20

- a. Geometric Increase method of population forecasting
- b. Zeolite process
- c. Jar Test
- d. Sources of solid waste
- e. Reverse Osmosis
- f. Water Meters