(Three Hours)   **80 Marks**

N.B.

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

Q. 1   Solve the following.

    a. What is the necessity of water supply schemes?   **05**
    b. Write Physical and chemical characteristics of water.   **05**
    c. Draw a diagram of rapid sand filter.   **05**
    d. Explain different sources of solid waste.   **05**

Q.2 a. What are the various types of intake structure? Explain with sketches   **10**
        1. Reservoir intake
        2. River intake

    b. Explain water distribution networks with diagram.   **10**

Q.3 a. Design 5 slow sand filter beds from the following data for the water works of a town   **10**
of population 75000
Per capita demand = 135 lit/day/capita
Rate of filtration = 210 lit/hour/m^2
Assume maximum demand as 1.5 times the average demand. Out of five units, one
is to be kept as stand by and used while repairing other units.

    b. What do you mean by treatment of water? What are the objectives of treatment of   **10**
water? Draw flow chart of a city water supply scheme with rapid sand filter.

Q.4 a. Explain various population forecasting methods in brief.   **10**
    b. Write a note on taste & odour removal.   **05**
    c. Explain break point of chlorination.   **05**

Q.5 a. Compare ion exchange and lime soda process of water softing.   **05**
    b. Explain principle of sedimentation.   **05**
    c. Define leachate. How leachate is formed and controlled in the landfill site? Explain   **10**
with neat sketch.

Q.6   Write short note on **(any four)**
    a. Characteristics of Hazardous waste   **05**
    b. Water borne diseases   **05**
    c. Tube settler   **05**
    d. Fixtures & fitting of Building water supply   **05**
    e. Jar test   **05**