

22504

22232

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following :

5 × 2 = 10

- (a) Enlist any two sources of surface and subsurface water.
- (b) State any two physical and chemical characteristics of water.
- (c) List the types of pipes used for conveyance of water.
- (d) Enlist the types of joints for pipes conveying water.
- (e) State values of self cleaning velocity and Non-scouring velocity of sewage.
- (f) List any four building sanitary fittings.
- (g) Define B.O.D.

2. Attempt any THREE of the following :

3 × 4 = 12

- (a) Explain factors affecting location of Intake structure.



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- (b) Explain need to protect water supplies.
- (c) Calculate the population at 2041 using incremental increase method with following population census data :

Year	1981	1991	2001	2011
Population	1,38,000	1,51,500	1,68,200	1,83,700

- (d) Describe expansion Joint with sketch.

3. Attempt any THREE of the following :

3 × 4 = 12

- (a) Explain the importance of pH in water treatment process and wastewater treatment process.
- (b) Explain with neat labelled sketch of cross-section of Rapid Sand Gravity Filter.
- (c) State any four types of valves and its uses.
- (d) Differentiate between slow sand filter and Rapid sand filter with eight points.

4. Attempt any THREE of the following :

3 × 4 = 12

- (a) Draw the flow diagram of water treatment plant.
- (b) Draw the layout of any two water distribution system.
- (c) State functions of service reservoirs for water distribution.
- (d) State the principles regarding design of building drainage.
- (e) State the objects of sewage treatment.

5. Attempt any TWO of the following :

2 × 6 = 12

- (a) Explain Electrolysis and Reverse osmosis treatment.
- (b) Draw the layout plan of drainage system for the residential building and label the components.
- (c) Design a circular shape sewer with following data :
- Zone population – 1,75,000
- Manning's constant (n) = 0.012
- Consider sewer running half full.

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6. Attempt any TWO of the following :

2 × 6 = 12

- (a) Differentiate with labelled sketch of one pipe and two pipe system of plumbing.
 - (b) Draw a neat labelled sketch of oxidation pond and explain its working.
 - (c) Draw the flow diagram of sewage treatment plant and state functions of each unit.
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