17503

11819

3 Hours / 100 Marks

Seat No.

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. **(A) Attempt any THREE of the following :** **12**

   (a) Draw a flow diagram of water supply scheme.

   (b) State acceptable limits of drinking water for below listed parameters according to IS – 10500 :

   (i) MPN

   (ii) Fluoride

   (iii) Hardness

   (iv) Chlorides

   (c) Describe Electrolysis process in advance water treatment.

   (d) State break point chlorination & its importance.

   (B) Attempt any ONE of the following : **6**

   (a) Explain any two types of intake structures with neat sketch.

   (b) Differentiate between slow sand filter & rapid sand filter. (Any six points)

2. **Attempt any FOUR of the following :** 16

   (a) Describe factors affecting water demand.

   (b) Describe principle of coagulation with its process.

   (c) Discuss an importance of prevention of bores & borewell water source.

   (d) Differentiate between dead end system & circular system.

   (e) Describe recycle & reuse of domestic sewage.

   (f) Draw a line plan showing water supply arrangements in residential buildings.

3. **Attempt any FOUR of the following :** 16

   (a) Define terms :

      (i) Sullage pipe

      (ii) Soil pipe

      (iii) Vent pipe

      (iv) Sewage

   (b) Differentiate between treatments required for surface and subsurface source of water used for domestic purpose.

   (c) Describe principle of building drainage system.

   (d) Compare four points of plain sedimentation & sedimentation with coagulation.

   (e) Describe terms :

      (i) Self-cleaning velocity

      (ii) Non-scouring velocity

4. **(A)** **Attempt any THREE of the following :** **12**

    (a) Describe with neat sketch on inspection chamber.

    (b) Differentiate between Indian and European type of water closets.

    (c) Draw a neat sketch of

        (i) Air relief value &

        (ii) Expansion joint

    (d) Design a circular sewer pipe for following data :

        Population – 70,000; Rate of water supply – 135 Lpcd; N = 0.015; and

        Max flow = 2 × average flow.

(B) **Attempt any ONE of the following :** **6**

    (a) Estimate probable population for data provided for year 2031 & 2041 using incremental increase method.

Year	Population
1991	9,876
2001	10,865
2011	11,509
2021	13,852

    (b) Differentiate between one pipe & two pipe system of plumbing and draw neat sketch of any one system for G + 1 building.

5. **Attempt any FOUR of the following :** 16

   (a) Explain suitability of

      (i) Manhole

      (ii) Sewer inlet

   (b) State BOD & COD with their significance & limits.

   (c) Draw a layout of sewage treatment plant.

   (d) Explain activated sludge process for domestic waste water treatment.

   (e) Explain importance of rainwater harvesting.

   (f) Differentiate between aerobic & anaerobic process for sewage treatment.

6. **Attempt any FOUR of the following :** 16

   (a) Differentiate between oxidation pond and oxidation ditch.

   (b) State any four parameters suggested by MPCB for sewage discharge with their limits.

   (c) Explain any two methods of distribution system.

   (d) Describe testing of sewer pipes.

   (e) Describe necessity & importance of any one type of service reservoir.

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