



17503

15162

3 Hours / 100 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. A) Attempt **any three** of the following : **12**
- a) State the importance of Public Health Engineering with respect to water supply and sanitation.
 - b) State the precautions required to be taken during water sampling.
 - c) State the objectives of aeration process and describe any one method of aeration.
 - d) Define co-agulation and state any four coagulants commonly used.
- B) Solve **any one** of the following : **6**
- a) Describe Ground water Recharging with respect to Necessity and Advantages.
 - b) State the advanced methods of water treatment and suggest type of treatment to be given to raw water in following cases.
 - i) River water in rainy season with partially contaminated
 - ii) Ground water with hardness-400 ppm and fluoride content-2 mg/lit.
2. Attempt **any four** of the following : **16**
- a) Describe need of protected water supplies.
 - b) Describe theory of filtration.
 - c) Describe working of Rapid Sand filter.
 - d) Draw neat sketch of any two methods of distribution of water.
 - e) State any four points of importance and necessity of Sanitation.
 - f) State Necessity of Rain Water harvesting.

P.T.O.



3. Attempt **any four** of the following :

16

- Describe one pipe system of plumbing with a neat sketch.
- Explain different surface and subsurface sources of water.
- Describe Recycling and Reuse of domestic waste.
- Differentiate between Slow Sand filter and Rapid Sand filter.
- Define the following terms :
 - Self cleaning velocity
 - Non-scouring velocity

4. A) Attempt **any three** of the following :

12

- State different types of traps. Enlist qualities of good trap.
- Draw a layout plan for building drainage.
- State any eight type of pipes used for conveyance of water.
- Design a circular Sewer for following data-
Zone population-8500 souls.
Rate of water supply-110 lp.c.d.
 $\eta = 0.015$, Maximum Flow = $2 \times$ Average Flow.

B) Attempt **any one** of the following :

6

- Estimate the probable population for a town with following census data in the year 2041.

Year	1981	1991	2001	2011
Population	78,000	1,22,000	1,78,500	2,27,500

Use incremental increase method.

- State suitability of two pipe plumbing system and draw a labelled sketch of it.

5. Attempt **any four** of the following :

16

- Draw a neat labelled sketch of drop manhole.
- Describe Aerobic Treatment process.
- Describe working of trickling filter.
- Explain the working of a septic tank.
- Draw a line diagram of water supply arrangement for residential building.
- Differentiate between oxidation pond and oxidation ditch.

6. Attempt **any four** of the following :

16

- State MPCB norms for discharge of treated sewage .
- Draw a payout and flow diagram of Sewage Treatment Plant (STP).
- Describe Grid Iron system layout of distribution of water with suitable sketch.
- Describe testing of sewers after construction.
- State different types of valves used in conveyance of water and write the location where they are used.