17503

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) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any <u>THREE</u> of the following:**   **12**

   (i)   Draw the flow diagram of water supply scheme.

   (ii) State the points to be considered while collecting a water sample.

   (iii) Explain the principle behind sedimentation with coagulation.

   (iv) Define Disinfection and state its object also.

Marks

b) **Attempt any <u>ONE</u> of the following:**   **06**

    (i) State the permissible limits of drinking water as per I.S.:-

        (1) Colour

        (2) Hardness

        (3) Calcium

        (4) B - coli

        (5) Chloride

        (6) MPN

    (ii) Describe in brief fluoridation and de-fluoridation.

2.   **Attempt any <u>FOUR</u> of the following:**   **16**

a) List the various types of demand of water with their percentage for a town.

b) Draw a neat sketch of clariflocculator.

c) Compare any four points between slow sand filter and rapid sand filter.

d) Describe Grid Iron System layout of distribution of water with suitable sketch.

e) Define trap and draw labelled sketch of any two traps.

f) Draw layout of water supply arrangement for residential building.

3.   **Attempt any <u>FOUR</u> of the following:**   **16**

a) Explain in brief flushing cistern.

b) Explain river intake with neat sketch.

c) Describe in brief reuse and recycling of domestic waste also state its necessity.

d) Explain about back washing of rapid sand filter.

e) Define self cleansing velocity and state the factors affecting it.

Marks

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

    (i) Differentiate between one pipe system and two pipe system.

    (ii) Describe in brief maintenance of house drainage system.

    (iii) Explain in brief step by step procedure of laying of pipes.

    (iv) Design the diameter of combined sewer having the following data:-

        1) Area = 500 hectares

        2) Population = 100000

        3) Water supply = 150 lits/capita/day

        4) Intensity of rainfall = 20 mm/hr

        5) Impermeability factor = 0.50

        6) Maximum permissible velocity = 2.0 m/sec

        Assume reasonable data if necessary.

b) Attempt any ONE of the following: **6**

    (i) Determine population in 2021.

Year	1961	1971	1981	1991	2001
Population	37500	39300	44200	54900	57700

    Use decrease rate of growth method.

    (ii) Explain the location and use of inspection chamber with a neat labelled sketch.

Marks

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

a) Draw a neat sketch of different sewers also suggest its favourable condition.

b) Describe the working of septic tank.

c) Define B.O.D. State its significance in sewage treatment plant.

d) Describe working of trickling filter.

e) Explain methods of rain water harvesting system.

f) State the type of impurities which are removed in skimming tank and state how it helps in improving further biological treatment.

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

a) State MPCB norms for discharge of treated sewage.

b) Explain the purpose of Grit chamber and state its location also.

c) State the location and function of the following pipe fittings :-

(i) Air valve

(ii) Reflux valve

(iii) Scour valve

(iv) Sluice valve

d) Draw a neat labelled sketch of drop manhole.

e) State the advantages and disadvantages of gravity system.

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