[4858] - 108
T.E. (Civil)
ENVIRONMENTAL ENGINEERING - I
(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section - II.*
2) *Answer to the two sections should be written in separate books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Use of logarithmic tables, slide rule, mollier charts, electronics pocket calculator and steam tables is allowed.*
6) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Give in tabular form, the design period adopted for various components of a water supply project justify the same with brief explanation for each. **[8]**

b) Enlist 4 types of pipe materials used in water supply. Write a detailed note on use of CI pipes in water supply project with reference to manufacturing jointing availability advantages and disavantages. **[10]**

OR

Q2) a) Give the permissible limit for following parameters in drinking water as per IS: 10500 and their adverse effect if they are in excess **[4]**

   i) Chlorides

   ii) Iron

   iii) Fluorides

   iv) Nitrites

b) Enlist various valves used in rising mains. Also state their location and functions. **[5]**

c) Enumerate the various methods of forecasting future population of a town and explain the incremental increase method. **[9]**

Q3) a) Draw the flow sheets of water treatment processes adopted for following conditions. **[8]**

 i) GW source with excess Fe, CO_2 and odorous gases.

 ii) Conventional WTP in urban area with river as raw water source.

 b) Maximum daily demand for water in a city is 130. MLD. Design cascade aerator for the same. Draw plan and elevation of the aeration fountain. Assume the inlet pipe diameter as 1.1m. **[8]**

OR

Q4) a) Explain with a neat sketch, various types of settling observed during sedimentation. **[4]**

 b) Design clariflocculator using following data and design criteria: **[12]**

 i) Desired average outflow from clarifiocculator = 300m³/hr

 ii) Water lost in desludging = 2%

 iii) Detention period = 20minutes

 iv) Average value of velocity gradient, G = 40S⁻¹

Q5) a) Enlist various types of filters based on **[8]**

 i) Driving force and

 ii) Type of media used. Explain each in brief

 b) A filter unit of size 5m × 10m is backwashed after filtering 12500 m³ of water in 24 hours. The filter is backwashed at a rate of 15 1/sec/sq.m, for 15 minutes. Compute the average flow rate, quantity and percentage of treated water used in washing. Also, find the rate of wash water flow in each trough if 4 troughs are provided. **[8]**

OR

Q6) Write short notes on: **[6+5+5 = 16]**

 a) Break point Chlorination

 b) Slow sand filters

 c) Operational problems in Rapid sand gravity filters.

SECTION - II

Q7) a) Defferentiate between carbonate and non carbonate hardness **[5]**

b) Write short note on fluoridation and defluoridation **[5]**

c) Discuss in detail water treatment of swimming pools. **[6]**

OR

Q8) a) Explain different methods of desalination. **[5]**

b) Elaborate various methods to remove odour and taste from water. **[5]**

c) Enumerate the methods of water softening. Describe Zeolite process of softening water in detail. **[6]**

Q9) a) Explain different layouts of distribution pipe network. **[4]**

b) Calculate the storage capacity of the distribution reservoir from the following data. **[8]**

Daily demand = 2,50,000 litres

Pumping hours = 9 hours per day between 8 am to 5pm

Pattern of draw off is as follows:

Supply hours	Percentage of day's supply
7 am to 8 am	30%
8 am to 5 pm	35%
5 pm to 6.30 pm	30%
6.30 pm to 7 am	5%

c) Discuss need of Rain water harvesting system **[4]**

OR

Q10) a) Give functions of Elevated Service Reservoir. **[4]**

b) Design balancing reserve of a service reservoir with the following data:

Time	6 am to 10 am	10 am to 6 pm	6 pm to 10 pm	10 pm to 6 am
Consumption in percentage of day's demand	35	20	40	05

Designed demand of 15MI/day is to be pumped at a uniform rate to the reservoir for all 24 hours. State the time: **[8]**

i) When FSL is reached and

ii) When LWL is reached in the reservoir

c) With the help of neat figure explain various component of rain water harvesting system. **[4]**

*Q11)*a) Draw the neat sketch of typical cyclone separator and label the parts.**[6]**

b) Explain fabric filter with sketch and its advantages and disadvantages.**[6]**

c) Explain different methods of odour control **[6]**

OR

*Q12)*a) Define plume and explain with sketches different types of plume behavior.**[6]**

b) Write effects of oxides of sulphur on human health, vegetation and materials. **[6]**

c) Explain the effects of noise pollution. **[6]**

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