Total No. of Questions : 12]

SEAT No. :

P2251

[Total No. of Pages :4

[4758] - 8
T.E. (Civil)
ENVIRONMENTAL ENGINEERING - I
(2008 Pattern) (Semester -II)

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

Instructions to the candidates:

1) ***Solve Question1 or Q2, Q3 or Q4, Q5 or Q6 from Section I and Question 7 or Q8, Q9 or Q10, Q11 or Q12 from Section II.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicates full marks.***
4) ***Your answers will be valued in a whole.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket, calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Draw a detailed conventional water treatement plant. **[6]**

b) What is design period? State the factors effecting design period. **[4]**

c) Estimate the population of a town after 4 decades by incremental increase method. **[8]**

Years	1940	1950	1960	1970
Population in thousands	50	58	67	89

OR

Q2) a) Explain Bell Spigot Joint and draw labeled sketch. **[4]**

b) Write a note on:- **[6]**

i) Temporary and Permanent Hardness

ii) PH and its determination

iii) MPN

c) Find out the fire demand for the town having population 2,25,000 using various formulae. **[8]**

P.T.O.

Q3) a) What are various processes involved during treatment of water and explain the impurities removed by each process? **[6]**

b) Explain different methods of aeration. **[4]**

c) Design aeration fountain for maximum daily demand of 114 MLD. **[6]**

OR

Q4) a) Explain the terms and give their units. **[6]**

i) Detention Period

ii) Overflow Rate

iii) Weir Loading

iv) Flow Through Velocity

v) Displacement Velocity

vi) Mean Gradient Velocity

b) Prove theoretically that the surface loading (Q/A) and not the depth is a measure of effective removal of particles in sediment tank. **[6]**

c) Enlist different coagulants used why alum is universally used. **[4]**

Q5) a) Explain what do you understand by: **[4]**

i) Dual media Filters

ii) Mixed media Filters

b) Explain the terms: **[6]**

i) Plain Chlorination

ii) Post Chlorination

iii) Super Chlorination

iv) Break point Chlorination

c) Design a set of rapid sand filter for treating water required for a population of 80,000. Rate of water supply = 200 lit/hr/day. The filters are rated to work at 5,000 lit/hr/m^2. Show the arrangement of filter units. **[6]**

OR

Q6) a) Compare slow sand filters and rapid sand filters. **[6]**

b) Explain the theory of Chlorination. What are different forms of application of chlorine? **[4]**

c) Calculate the quantity of disinfectant required to disinfect the 20 million liters of water per day. The does of chlorine is 0.7mg/lit to maintain the residual of 0.2mg/lit. The disinfectant used may be bleaching powder or sodium hypochlorite which contains 30% and 95% available chlorine.**[6]**

SECTION- II

Q7) a) Explain demineralization of water softening. Differentiate clearly between a cation exchanger and an anion exchanger. **[6]**

b) Explain Reverse Osmosis. **[4]**

c) Analysis of water shows the following free CO_2:3 ppm. alkalinity: 65ppm, non-carbonate hardness 90ppm, total magnesium: 10 ppm. Assume that it is possible to remove all but 30 ppm of carbonate hardness with lime and that the finished water is to have total hardness of 80 ppm. Determine the amount of chemical required per million liter of water. **[8]**

OR

Q8) a) Explain the adsorption process for odor and color removal. **[6]**

b) Explain advantages and disadvantages of lime soda process of water softening. **[4]**

c) Explain the Ion exchange method of water softening. **[8]**

Q9) a) Define rain water harvesting. Write different types of rain water harvesting system and explain any one in detail. **[6]**

b) State the requirements which are considered while designing the distribution system. **[4]**

c) Explain in detail the following layout system for distribution: **[6]**

i) Dead end system

ii) Radial system

OR

Q10)a) What are the functions of ESR. **[4]**

b) Elaborate components of domestic rain water harvesting system. **[6]**

c) Differentiate between continuous and intermittent system. **[6]**

Q11)a) Write short note on: **[6]**

i) Green House Effect

ii) Acid Rain

b) Explain the source of noise. **[6]**

c) Define: **[4]**

i) Ecology

ii) Air Pollution

OR

Q12)a) Define: **[4]**

i) Sound Intensity

ii) Decibel Sound Pressure Level

b) What are the different methods of Noise control. **[6]**

c) Determine the cumulative SPL for a factory having four machines with 70db, 63db, 75db, 76db SPL's respectively. **[6]**

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