[4263] - 209

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) *Answers 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, electronic pocket calculator and steam tables is allowed*
6) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Discuss the various demands of water. Mention these demands per capita basis. **[5]**

b) A river water supply is treated by the sequence of unit operations and chemical additions in the following list. **[2 × 5 = 10]**

State the purpose or purposes for each unit process and chemical addition.

i) Presedimentation with polymer addition

ii) Mixing and Flocculation with addition of alum and polymer.

iii) Addition of Activated Carbon.

iv) Granular Media Filtration

v) Post Chlorination

. c) What do you mean by design period. Explain the factors affecting the design period. **[3]**

OR

Q2) a) Forecast the future population of a town for the year 2021 by the incremental increase method with the help of following census data:**[9]**

Year	1931	41	51	61	71	81	91
Population	30000	34500	40800	77900	52700	57500	62500

b) Give the standards as per IS 10500 for the following for drinking water. Also state the ill effects if they are in excess. **[9]**

i) pH

ii) Chlorides

iii) Iron

iv) Fluorides

v) MPN

vi) Turbidity

Q3) a) What is intake structures? Discuss the general design consideration of intake. Describe the river intake with structures neat sketch. **[10]**

b) Discuss the various methods of aeration with neat sketch and state its limitations. **[6]**

OR

Q4) a) Explain the principle of plane sedimentation tank. **[4]**

b) A water treatment plant treats 200 m^3/hr of water. Workout the following with respect to flocculator. **[12]**

i) Dimensions of flocculator unit.

ii) Power input by paddles to water.

iii) Size and Number of paddles.

Assume water temp. = $25°C$ and absolute viscosity = 0.89×10^{-3} N-S/mt^2.

Detention time = 30 minutes.

Given that velocity of water in inlet pipe = 1.2 mt/sec. Drag coefficient C_D= 1.8, G = 40 sec^{-1}.

Velocity at tip of paddle = 0.5 mt/sec.

Q5) a) Explain different mechanisms of filtration. **[4]**

b) The population of a city is 50,000 and per capita water consumption is 135lit/ray. Calculate the following with despect to rapid sand filter for the above data. **[12]**

i) Total area of filters

ii) Number and dimensions of each filter.

iii) Depth of sand bed.

Assume break through index as 4×10^{-4}

OR

Q6) a) Explain Chlorine-Ammonia treatment of what are its advantages? **[4]**

b) Discuss the effect of **[4]**

i) pH of water and

ii) Organic matter of water on efficiency of disinfection by chlorine.

c) Chlorine usage in the treatment of 20,000 m^3/day is 8 kg/day. The residual Chlorine after 10 min. contact is 0.2 mg/lit. Calculate the dosage in milligram per litre and chlorine demand of water. **[6]**

d) Explain the importance of disinfection in Public Water Supplies. **[2]**

SECTION - II

Q7) a) Write note on the wastage of water in public water supplies. State various methods of detection and prevention of wastage. Enumerate the causes of such wastage. **[8]**

b) What do you know about Rain Water harvesting? Draw a sketch of Roof-Top Rain Water harvesting system for a bungalow **[10]**

OR

Q8) a) The designed demant is 4 MLD water is pumped into a elevated service reservoir from 5 am to 1 pm. The supply to the community is from 5 a.m. to 10 a.m. and 5 p.m. to 10 p.m. at a uniform rate. Design the balancing capacity of the reservoir **[9]**

b) Write a short note on following[All] **[9]**

    i) Pressures in the distribution system

    ii) Noise enduced permanent threshold shift.

    iii) Noise controlled techniques

Q9) a) Discuss the benefits of rain water harvesting system. **[2]**

b) Describe the various methods of distributing water and discuss the advantages and disadvantages of each. **[6]**

c) What is a service reservoir? Give the importance of distribution system. Draw the neat sketch of an elevated tank and show on it all of its component parts and appurtenances. **[8]**

OR

Q10) a) Discuss the factors affecting the efficiency of disinfection, Enlist at least four disinfectants used in water treatment plaint and discuss the theory of chlorination in details. **[12]**

b) Discuss the various method of removal of Iron and Manganese from water why their removal is necessary. **[4]**

Q11) a) What is inversion condition? Explain the types of invasion. How inversion does affect the dispersion of air pollutants in the atmosphere. **[6]**

b) Draw a neat sketch of electrostatic precipitator and explain its working principle. Write the advantage and disadvantages of it. **[10]**

OR

Q12) a) What do you understand by desalination? Why it is necessary? Explain the electrodialysis method of desalination. **[8]**

b) What are the causes of tastes and odours in water available from various sources? Enumerate the methods of their removal **[6]**

c) Discuss the various natural and man made air pollutants and their major sources. **[2]**

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