53 (CE 404) ENEN-I

2018

ENVIRONMENTAL ENGG I

Paper : CE 404

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer ***any five*** *questions.*

1. *(a)* Explain *any one* type of automatic rain gauge. 5

(b) What do you understand by mass inflow curve and how is it prepared ? 5

(c) In a town, it has been decided to provide 180 litres per head per day in the 21st century. Estimate the domestic water requirement of this town in the year 2000 by projecting the population of the town by incremental increase method.

Year	**Population**
1950	2, 37, 98, 624
1960	4, 69, 78, 325
1970	5, 47, 86, 437
1980	6, 34, 67, 823
1990	6, 90, 77, 421

5

(d) Derive an expression for determination of permeability in a well with an unconfined aquifer. 5

2. (a) Discuss in brief various methods of water distribution. Which method do you prefer? 9

(b) Differentiate between permanent and temporary hardness. How do you remove temporary hardness? 9

(c) A city has a population of 100,000 with an average rate of demand of 160 litres per head per day. Find the area of rapid sand filter. 2

3. (a) Why the population forecast is necessary in the design of public water supply scheme? Discuss the different methods employed for the purpose and their comparative merits and demerits. 10

(b) Describe in brief various tests conducted for physical examination of water. 10

4. (a) Design completely a rapid sand filter for a town having a total filtered water requirement of 5 million litres of water per day, assume rate of filtration as 5000 litres/h/m^2 also assume 30 minutes are lost every day in washing the filter. 15

(b) Explain the mechanism of floc floc formation. 5

5. (a) Describe how you would arrive at the total quantity of water to be supplied to a metropolitan area. 6

(b) Explain the various treatment processes that are generally adopted in water treatment plant. 10

(c) A tube well of 30*cm* diameter penetrates fully in an artesian aquifer. The strainer length is 15 *cm*. Calculate the yield from the well under a drawdown of 3 *m*. The aquifer consists of sand of effective size of 0·2 *mm* having coefficient of permeability equal to 50*m/day*. Assume $R = 150m$. 4

6. (a) Describe in brief various important tests conducted for chemical examination of water. 10

(b) Design a plain sedimentation tank to treat 6 million litres water per day. Take a detention period of 8 hours and assume a depth of 3·5 *m*. 5

(c) Compare Lime Soda and Zeolite process. 5
