53 (CE 717) DWST

2016

DESIGN OF WATER SUPPLY AND TREATMENT SYSTEM

Paper : CE 717

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions.*

1. *(a)* Draw a neat sketch of a inner intake on the straight reach of a river for supplying water to a township. Name the components on the sketch and briefly state the function of each. 10

(b) Describe operating problems of Rapid Sand filter. 10

2. (a) What is meant by dual system of water distribution ? Mention its advantages and disadvantages. 10

(b) Discuss with the help of a neat flow diagram, physico-chemical method of waste water treatment. 10

3. (a) Describe in brief the mechanism by which coagulation is accomplished. 10

(b) Discuss the logistic curve method for determining the future population of a locality. Derive a standard equation for such a curve and explain its use for determining the future population. 10

4. Design a rapid sand filter unit for 4 million litres per day of supply, with all its principal components. 20

5. *(a)* Primary settling basins with $26m$ in diameter and $2{\cdot}1m$ water depth. Single effluent weirs located on the peripheries of the tank. For water flow of 13,000 m^3/day. Calculate : 12

   (i) Surface area and volume.

   (ii) Overflow rate in $m^3/m^2.d$.

   (iii) Detention time in hours.

   (b) Write a short note on flow mass curve and their use in determining the storage capacity of a dam reservoir. 8

6. *(a)* Show that the settling velocity of a spherical particle in a liquid under condition when Reynold's number is less than 0·5 may be given by expression $V_S = \frac{g}{18}(S_S - 1)\frac{d^2}{\nu}$. 12

(b) With the help of the following data estimate by intremental increase method, the population of a city for the year 2010 AD. 8

Year	Population
1880	25,000
1890	27,500
1900	34,100
1910	41,500
1920	47,050
1930	54,500
1940	61,000