53 (CE 404) ENEN

2014

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 in brief various tests conducted for physical examination of water. 10

   (b) Discuss in brief various methods of water distribution. 10

2. *(a)* A city has a population of 150,000. Water is to be supplied at the rate of 160*litre*/head/day. If the static lift of the pump is 40*metres*, calculate the BHP of motor. The rising main is 30*m* long and diameter is 50*cm*. Assume that combined efficiency as 51%, $f = 0 \cdot 04$ and the peak hour demand is 1·5 times the Average demand. 10

(b) Describe with the help of sketch, a rapid sand filter. Explain its working. 10

3. (a) Explain the various factors affecting per capita demand. 5

(b) The following data have been noted from the census department : 5

Year	1960	1970	1980	1990
Population	18,000	12,000	17,000	22,500

Calculate the probable population for the year 2000 by Geometric increase method.

(c) Derive Stoke's law for settlement of discrete particle in water. Find the settling velocity of silica particles of specific gravity 2·65 at 20°*C* if the diameter of particle is 0·005*cm*. 10

4. (a) Derive an expression for discharge from a well fully penetrating a confined aquifer. 10

(b) Find the dimensions of a circular sedimentation basin for the following data :

(i) volume of water to be treated = 3 *million litres* per day.

(ii) Detention period = 4 *hours*

(iii) Velocity of flow = 10*cm/min*

(iv) effective depth = 3*m* 10

5. (a) Differentiate between : 2×5=10

(i) temporary and permanent hardness

(ii) flocculation and coagulation

(iii) continuous and intermittent system

(iv) disinfection and sterilization

(v) confined aquifer and unconfined aquifer.

(b) Compare lime-soda and zeolite process. 2×5=10

6. (a) Explain the various forms of chlorination. 10

(b) Name various disinfecting agent and explain the action of *any one* in detail. 5

(c) Explain the nitrogen cycle with the help of neat sketch. 5

7. (a) Explain various filter troubles and its remedial measures. 6

(b) Describe the chemical reaction involved when coagulant is used. 4

(c) Describe various methods of application of coagulant and explain in brief *any one of* them. 10
