

AU – 2839

Seventh Semester B. E. (Civil Engineering) Examination

ENVIRONMENTAL ENGINEERING – I

Paper – 7 CE 04

(USC – 10216)

P. Pages : 4

Time : Three Hours]

[Max. Marks : 80

- Note :** (1) Separate answer book must be used for each section in the subject Geology, Engineering material of Civil branch and separate answer book must be used for Section A and B in pharmacy and Cosmetic Tech.
- (2) Answer **Three** questions from Section A and **Three** questions from Section B.
- (3) Due credit will be given to neatness and adequate dimensions.
- (4) Assume suitable data wherever necessary.
- (5) Diagrams and chemical equations should be given wherever necessary.
- (6) Illustrate your answer wherever necessary with the help of neat sketches.
- (7) Discuss the reaction, mechanism wherever necessary.
- (8) Use pen of Blue/Black ink/refill only for writing book.

SECTION A

1. (a) Enlist various types of water demand and explain any one. What is per capita demand and how is it arrived at ? 8
- (b) In two periods of each of 20 years, a city has grown from 30,000 to 1,70,000 and then to 3,00,000. Determine :—
- (i) the saturation population ;
- (ii) the equation of the logistic curve
- (iii) the expected population after the next 20 years. 6

OR

2. (a) What is an "intake structure" ? Enumerate the various types of intakes and discuss any one of them. 6

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- (b) Enlist various methods of population forecasting. Estimate the population for a city in the year 2000 by any two methods using following data :—

Year	1930	1940	1950	1960	1970
Population	25000	28000	34000	42000	47000

8

3. (a) List different physical, chemical and bacteriological test conducted on water sample to decide its suitability as a source for water supply. Describe the test procedure of determination of "total solids" in the given water sample. 7
- (b) What are the water borne diseases and how can they be prevented ? 6

OR

4. (a) What are the undesirable effects of these if :—
- (i) Turbidity
 - (ii) Chlorides and
 - (iii) Total hardness are present in excess in water ?
- State the desirable limit of the above in drinking water as per I standards. 6
- (b) Draw typical flow diagram treating turbid surface water with organics. 7
5. (a) State different types of areators and explain any one with neat sketch. 6
- (b) Design a rectangular sedimentation tank for maximum daily demand as 12MLD. Assume detention period 6hrs and velocity of flow as 20cm/minute. 7

OR

6. (a) Explain how optimum dose of coagulant is determined. 6
- (b) What is flocculation ? Explain with neat sketch, working of flocculator. 7

SECTION B

7. (a) Differentiate between slow sand filter and rapid sand filter. 7
- (b) Design the dimension of a set of rapid sand gravity filters for treating water required for a population of 50,000 ; the rate of supply being 180 lpcd. The filters are rated to work 5,000 Lit./m²/hr. Assume any data if necessary. 7

OR

8. (a) Explain the operating difficulties and trouble in filter operation. 7
- (b) Explain with neat sketch :—
- (i) Dual media filters
- (ii) Upflow filters. 7
9. (a) State the various methods of disinfection and state requirements of good disinfectant. 7
- (b) It is required to supply water to a population of 20,000 at 150 lpcd. The bleaching powder contain 30% of available chlorine. Determine how much of bleaching powder is required annually at the water works, if 0.30 ppm of chlorine dose is required for disinfection. 6

OR

10. (a) Explain :—
- (i) Pre – Chlorination
- (ii) Break point chlorination
- (iii) Dechlorination. 9
- (b) Explain "Reverse Osmosis". 4
11. (a) List various Layouts of distribution systme. Explain Grid – Iron system along with its advantages and disadvantages. 7
- (b) What is stand pipes ? Explain in detail with neat sketch. 6

OR

12. (a) Describe the various methods of distribution of water. What are the specific advantages of gravity system of distribution ? 6
- (b) A town with a population of 1 million has a continuous water supply. Average supply is 270 lpcd. the water being supplied by direct pumping. The total supply of 270 lpcd is phased as follows :—

Time	LPC
5 a. m. to 11 a. m.	90
11 a. m. to 3 p. m.	54
3 p. m. to 9 p. m.	81
9 p. m. to 12 mid – night	27
12 mid – night to 5 a. m.	18

Water is supplied from the treatment plant at uniform rate of 11.25 million Lit. per hour for all the 24 hrs. Find the capacity of the reservoir required for distribution of water. Assume no loss or drawal from trunk main. 7



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