

B.E. Civil Engineering (Model Curriculum) Semester - IV
PCCCE405 - Environmental Engineering

P. Pages : 2

Time : Three Hours



GUG/S/23/13719

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Discuss various factors that affect the rate of demand. 8
- b) The following data shows the variation in population of a town from 1950 to 2000. Estimate the population of town in the year 2020 by Geometrical increase method and Incremental increase method. 8

| Year | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 |
|------------|-------|--------|--------|--------|--------|--------|
| Population | 85000 | 115000 | 145500 | 185800 | 225500 | 290500 |

OR

2. a) Describe the different types of intake with neat sketches. 8
- b) Explain the common impurities in water. 8
3. a) Draw a flow chart of conventional water treatment plant and discuss the function each unit. 8
- b) A water supply project has to supply water a town having population of 50,000. Design a suitable sedimentation tank with following details. 8
- i) Per capita demand = 150 lits/day
- ii) Peak demand = 1.5 x average demand
- iii) Velocity of flow = 30 cm/min
- iv) Detention period = 4 hours

OR

4. a) What is aeration? Explain objectives of aeration. 8
- b) Enumerate theory of coagulation and flocculation. 8
5. a) Describe with help of sketch the construction, working, cleaning, rate of filtration and efficiency of slow sand filter. 8
- b) Calculate dimension of rapid sand filter for a population of 3 lakh and rate of water supply is 180 LPCD. Consider design flow 1.8 times the average demand flow. Assume 3% of water being used for back washing. 8

OR

6. a) What is disinfection of water? Write down the methods of disinfection of water. 8
- b) Explain break point chlorination. 8
7. a) Explain various features of sanitary works. 8
- b) Design the diameter of combined sewer having following data. 8
- i) Area = 500 hectares
- ii) Population = 1,00,000
- iii) Water supply = 150 lits/capita/day
- iv) Intensity of rainfall = 15 mm/hr
- v) Impermeability factor = 0.50
- vi) Maximum permissible velocity = 2 m/sec.

OR

8. a) Describe the physical properties of sewage. 8
- b) Draw a flow chart of conventional primary treatment plant of sewage and discuss the function each unit. 8
9. a) What is activated sludge? Describe activated sludge process with help of neat sketch. 8
- b) Design of septic tank having following data 8
- i) Number of users = 200
- ii) Rate of demand = 150 lit/head/day
- iii) Detention period = 18 hours
- iv) Percolating capacity of filter media = 1250lits / m³.

OR

10. a) Describe trickling filter with help of neat sketch. 8
- b) Enumerate theory, construction and operation of oxidation pond. 8
