

B.E. / B.Tech. (Civil Engineering) Model Curriculum Semester-IV
PCC-CE405 - Environmental Engineering

P. Pages : 2

Time : Three Hours



GUG/W/24/13719

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. Diagrams and Chemical equation should be given wherever necessary.
 5. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Enlist the various types of water demand. Discuss various factors that affect the rate of demand. 8

- b) Determine the population of city in 2031 by Arithmetic method and Geometric increase method the data from census record for the city is as follows. 8

Year	1961	1971	1981	1991	2001
Population (In Thousand)	87	110	145	180	210

OR

2. a) Explain the common impurities in water. 5

- b) What are intake structures? Explain with the help of neat sketch “Canal intake”. 6

- c) What are the different source of water? Explain any two source with the help of neat sketch. 5

3. a) Design the dimensions of a sedimentation tank to treat a demand of 12 million litres per day. Assume a detention time of 6 hours and velocity of flow as 20 cm/minute. 8

- b) Draw a flow chart of conventional water treatment plant and discuss function of each unit. 8

OR

4. a) Derive an equation for setting velocity of discrete particles freely falling in a sedimentation tank. 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) Determine the dimensions of Rapid sand filter for 20 MLD. Assume filtration rate is 5000 lit/hr/m^2 . 8

OR

6. a) What is disinfection? Write down the methods of disinfection of water. 8
- b) Explain break point chlorination. 8
7. a) Design a main sewer line for a colony of population 20,000 the per capita demand of water supply is 135 LPCD. The sewer line is to be laid at a slope of $\frac{1}{600}$. Use Mannings coeff 'n' = 0.012 the design discharge is 1.5 times the average discharge and the sewer is to be designed as a half full section. 8
- b) Discuss the various stages followed in the construction of sewer. 8

OR

8. a) 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 = 15mm/hr.
 - v) Impermeability factor = 0.50.
 - vi) Maximum permissible velocity = 2m/sec.
- b) Draw a flow chart of conventional primary treatment plant of sewage and discuss the function of each unit. 8
9. a) 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 = 1250 lit/m³.
- b) What is activated sludge? Describe activated sludge process with the help of neat sketch. 8

OR

10. a) Explain the working of Trickling filter with neat sketch. 8
- b) Enumerate theory, construction and operation oxidation pond. 8
