

B.Tech III Year II Semester (R13) Regular & Supplementary Examinations May/June 2017

ENVIRONMENTAL ENGINEERING

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- What is the role of an environmental engineer?
 - Define design period.
 - Draw the layout of a conventional water treatment plant showing various units.
 - Compare the continuous and intermittent types of water supply systems.
 - What are sewer appurtenances? Name any two of them.
 - Define 'time of concentration'.
 - What do you mean by primary treatment? State an example.
 - Define sludge and state the types.
 - Name the functional elements of solid waste management system.
 - State the air quality standards referring to any two air pollutants.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 (a) Explain the factors influencing per capita water demand.
 (b) Estimate the water demand expected during 2041, for a town having the past population details given below. Assume the per capita water demand as 155 lpcd. Adopt any two methods.

Year	1961	1971	1981	1991	2001	2011
Population	22500	29000	37500	47000	57000	66500

OR

- 3 (a) What are the biological analyses of water? Explain any one method.
 (b) Brief the objectives and necessity of protected public water supply systems.

UNIT – II

- 4 Design a rectangular sedimentation tank and suitable inlet & outlet arrangements for the following data:
 Volume to be treated = 1.5 MLD
 Detention period = 4.00 hours
 Surface overflow rate = 30,000 lit/m².day

OR

- 5 (a) The inflow of water to the service reservoir is maintained at a uniform rate by pumping for 10 hours during the hours of 04 – 10 hours and 16 – 20 hours. Calculate the storage capacity of service reservoir to supply water demand shown below.

Time (hours)	00 - 04	04 - 06	06 - 10	10 - 16	16 - 20	20 - 24
Demand in m ³	280	770	1430	900	1220	400

- (b) Write short notes on air relief valve.

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UNIT – III

6 A main combined sewer is to be designed to serve an area of 12 sq.km with a population density 300 persons/hectare. The average rate of sewage contribution is 135 liters/capita/day. Take the time of concentration as 25 minutes, impermeability factor as 0.65 and peak flow as storm flow plus 2 times DWF. Design the sewer running 0.7 times full taking slope as 1 in 400.

OR

7 Explain the experimental procedure of estimating BOD and state its limitations.

UNIT – IV

8 Design the size of a single-stage high rate trickling filter for treating 2.0 MLD of sewage adopting the following data:

Recirculation ratio = 1.4

BOD of raw sewage = 300 mg/lit

BOD removal in PST = 30%

BOD of final effluent required = 30 mg/lit

Organic loading rate may be taken as 8000 kg BOD/ha. m

OR

9 Explain the construction and working mechanism / principle of a septic tank and soak pit.

UNIT – V

10 (a) Name the different R's of solid waste management system and state example for each.

(b) Describe the air pollution control by settling chambers and cyclones.

OR

11 (a) Explain the different noise control measures.

(b) State the general composition of municipal solid waste.
