Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 70301

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Sixth Semester

Civil Engineering

CE 6605 — ENVIRONMENTAL ENGINEERING – II

(Regulation 2013)

(Common to : PTCE 6605 – Environmental Engineering – II for B.E.(Part-Time) – Civil Engineering – Fifth Semester (Regulations – 2014)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   What are the various sources of waste water generation?

2.   Define BOD.

3.   What are the advantages of using a circular section for sewers?

4.   Mention the various pumps used to pump sewage.

5.   Mention the methods of onsite sanitation.

6.   Differentiate between COD and BOD.

7.   List out the different methods of aeration in ASP.

8.   What is Sewage sickness?

9.   How do you remediate sewage sickness?

10. What is meant by sludge conditioning?

PART B — (5 × 13 = 65 marks)

11. (a) (i)   Explain briefly different characteristics and composition of sewage.
                                                                          (6)

          (ii) Explain various factors influencing Dry weather flow.   (7)

Or

(b) (i) The BOD of Sewage incubated for one day at 30 °C has been found to be 400 mg/L. Estimate the 5 day 20 °C BOD. Assume $K_{10} = 0.12 /$ day at 20°C. (7)

(ii) A city with a population of 1,00,000 has an area of 100 hectares. Find the D.W.F and storm water flow for the sewer line for the following data: (6)

Rate of Water supply = 200 LPCD

Average runoff coefficient for the entire area = 0.5

Time of Concentration = 50 mm

Assume 75% of water supplied reaches the sewer.

12. (a) From a topographic map and field survey, the area of the drainage basin upstream was found out to be 35 hectares. Determine the maximum rate of run-off for a 10 year. The length of overflow slope is 45 meter with an average overland slope of 2%. The length of main basin channel is 700 meter with a slope of 1.8%. Ratio of area and perimeter is found out to be 0.6 meters. Take mannings roughness coefficient to be 0.09 and total runoff coefficient to be 0.35. (13)

Or

(b) A combined sewer was designed to serve an area of 60 sq. km with an average population density of 185 persons/hectare. The average rate of sewage flow is 350 L/Capita/day The maximum flow is 50% in excess of the average sewage flow. The rainfall equivalent of 12 mm in 24 h can be considered for design, all of which is contributing to surface runoff. What will be the discharge in the sewer? Find the diameter of the sewer if running full at maximum discharge and velocity of 0.9 m/s. (13)

13. (a) Assuming suitable criteria design a screen chamber with 20 mm spacing of bar for a proposed STP expected to treat 30 ML/d maximum flow. Draw a neat sketch of the unit. (13)

Or

(b) Explain the function of septic tank with a neat sketch. Also discuss the design criteria. (13)

14. (a) With neat flow Diagram explain ASP in treating wastewater Discuss the various Design Parameter involved in it. (13)

Or

(b) Determine the size of a high rate if for the following data. (13)

Sewage flow = 6 mld

Recirculation ratio = 1.5

BOD of Raw Sewage = 230 mg/L

BOD remove1 in PST = 30%

Final DOD effluent = 20 mg/L.

15. (a) Explain the self purification of streams with the help of an Oxygen sag curve. Explain the factors affecting the same. (13)

Or

(b) With the help of a diagram explain the working of a standard rate sludge digester. (13)

PART C — (1 × 15 = 15 marks)

16. (a) What do you mean by primary treatment for sewage treatment and write a short note on bar screens, grid chamber and primary sedimentation tanks.

Or

(b) What is septic tank? Discuss the design features of septic tank in detail.

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