12-12-22 - AN.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 90604

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Fifth / Sixth Semester

Environmental Engineering

EN 8592 — WASTEWATER ENGINEERING

(Common to : Civil Engineering)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List any two types of sewer.
2. What is the difference between one pipe system and two pipe system?
3. Draw the outline of treatment of domestic wastewater.
4. Mention the types of screens.
5. Mention the objective of secondary treatment.
6. Define algal symbiosis.
7. Mention the Indian standard for disposal of BOD and COD in inland surface water.
8. Define sewage sickness.
9. Mention the objective of sludge treatment.
10. Compare sludge thickening and sludge dewatering.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the chemical characteristics of wastewater and their significance in wastewater treatment. (13)

Or

(b) Illustrate the important sewer appurtenances and their usage. (13)

12. (a) Design a grit chamber with proportionate weir for treating 10MLD of wastewater. (13)

Or

(b) Discuss the types, operation and maintenance of primary sedimentation tank. (13)

13. (a) Explain the working of sequencing batch reactor with neat diagram and discuss its merits and demerits. (13)

Or

(b) Explain the principles and functions of activated sludge process. Discuss its importance in biological treatment and factors influencing its performance. (13)

14. (a) Illustrate the different zones of self-purification and sketch oxygen sag curve. (13)

Or

(b) Discuss the factors and conditions to be considered for the disposal of sewage on land and water. (13)

15. (a) Explain the stages in anaerobic sludge digestion process and mention the types of digesters. (13)

Or

(b) Illustrate the components of a sludge drying bed. Mention its advantages and disadvantages. (13)

PART C — ($1 \times 15 = 15$ marks)

16. (a) A combined sewer of circular section is to be laid to serve a particular area. Design the diameter of the sewer from the following data. Area to be served : 100 hectares, population : 90000, Impermeability factor : 0.5, time of entry 3 min, time of flow: 17 min, rate of water supply 240lpcd, Maximum permissible flow velocity: 3m/s. assume any other data if necessary. (15)

Or

(b) Design a dimension of a septic tank for a small colony of 250 persons, with assured water supply of 135 litres per person per day. (15)

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