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**Question Paper Code : 40574**

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

Fifth/Seventh Semester

Civil Engineering

EN 8591 – MUNICIPAL SOLID WASTE MANAGEMENT

(Common to Environmental Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the functional elements of Integrated solid waste management.
2. How to avoid improper disposal of municipal waste and list its effect on surroundings?
3. Give three examples of waste reduction that you might be able to implement in your daily life.
4. Distinguish between reuse and recycling.
5. List the types of trucks used in Hauled container systems.
6. List the general steps involved in establishing collection routes in a particular city.
7. State the objectives of waste processing.
8. What is meant by co-processing of MSW?
9. Enumerate the sources of leachate in Landfills.
10. What is meant by land fill bioreactor?

PART B — (5 × 13 = 65 marks)

11. (a) (i) The following table provides the composition of a MSW generate in a town. Calculate the density and moisture content of MSW. (5)

Component	Mass (%)	Typical Density (kg/m <sup>3</sup> )	Moisture content (%)
Food waste	22	290	76
Paper	28	85	5
Cardboard	17	50	8
Plastics	13	65	4
Garden Trimmings	10	105	48
Wood	6	240	25
Tin Cans	4	90	2

- (ii) Discuss the physical and chemical characteristics of MSW. (5)
- (iii) A 10 g sample of mixed MSW is combusted in a calorimeter having a heat capacity of 8850 cal/°C. The temperature increase on combustion is 3.35°C. Calculate the heat value of the sample. (3)

Or

- (b) Explain the different methods for sampling MSW. What are the advantages and disadvantages of each? Consider accuracy, feasibility and cost. (13)
12. (a) State the effect of source reduction with the aid of a case study. (13)

Or

- (b) List out and explain the methods and equipments used for the processing and the recovery of Individual Waste components from MSW. (13)
13. (a) Discuss the benefits of transfer stations to a community in terms of economics, time savings, and environmental quality. (13)

Or

- (b) Explain the types of collection systems with suitable diagram. (13)
14. (a) Enumerate and explain the various composting methods with suitable sketches. (13)

Or

- (b) Draw a neat sketch of biomethanation plant and explain the operational issues associated with it. (13)

15. (a) How to landfill MSW? Explain in detail with a help of suitable diagram. (13)

Or

- (b) List out and explain the important factors to be considered in the design of Landfills. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Discuss the various issues associated with dumpsite rehabilitation with the help of a case study. (15)

Or

- (b) Explain the various thermal processing options for resource recovery from municipal solid waste with the help of a case study. (15)

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