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B.Tech. DEGREE EXAMINATION, JUNE 2023

Fifth to Seventh Semester

18CEO306T – MUNICIPAL SOLID WASTE MANAGEMENT

(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

Note:

(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

(ii) **Part - B & Part - C** should be answered in answer booklet.

Time: 3 hours Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer **ALL** Questions

	Marks	BL	CO	PO
1. Which wastes include large household appliances such as refrigerators, washing machines etc? (A) Bulky (B) Street (C) Garbage (D) Ashes and residue	1	1	1	1
2. The proximate analysis is used to determine the (A) Physical (B) Chemical (C) Biological (D) Physio-chemical	1	1	1	6
3. Which of the following is an example of E-waste? (A) Syringes (B) Glass bottles (C) Mobile phones (D) Fruit peels and leftover	1	1	1	1
4. The quantities of wastes generated in a family indicating a strong correlation between (A) Volume of waste and type of waste (B) Type and physical characteristics of waste (C) Type of waste and its chemical properties (D) Waste production and per capital income	1	1	1	7
5. Information on waste quality and composition is important in evaluating alternatives in terms of (A) Equipment (B) Planning and management programmes (C) Systems (D) Control	1	1	2	6
6. Which one of the following is not a source reduction method? (A) Double side copying (B) Bulk purchase (C) Use of disposable plates (D) Use of electronic items	1	1	2	7
7. One of the best ways to reduce the amount of solid wastes is to limit the (A) Consumption of raw materials (B) Manufacturing (C) Secondary manufacturing (D) Processing	1	1	2	6

8. The MSW quantities are the amount of waste generated usually based on 1 1 2 7
   (A) ppm (B) kg
   (C) Tonnes (D) Per person per day

9. _____ consists of dividing the total collection area into routes and sized to represent a collection for each crew. 1 1 3 1
   (A) Micro routing (B) Macro routing
   (C) Specific routing (D) Path routing

10. When the disposal site is far away from the generation point, it is necessary to provide 1 1 3 1
   (A) Compact truck (B) More number of crew
   (C) Transfer station (D) More number of vehicles

11. Small to medium transfer stations have capacities generally less than 1 2 3 1
   (A) 50 tonnes/day (B) 100 tonnes/day
   (C) 200 tonnes/day (D) 300 tonnes/day

12. Which technique is adopted to observe and estimate the movement of the collection crew with the help of stop watches? 1 2 3 1
   (A) Motion time measurement technique (B) Measurement time motion technique
   (C) Manual time motion technique (D) Speed time motion technique

13. Composting can occur at a range of temperatures, and the optimum temperature range is between 1 1 4 1
   (A) Below 10°C (B) 12° and 30°C
   (C) 32° and 60°C (D) Above 60°C

14. By which method of composting that the piles are mechanically aerated? 1 1 4 1
   (A) Windrow composting (B) In vessel composting
   (C) Anaerobic composting (D) Aerated static pile composting

15. The process of thermal degradation of carbonaceous material to gaseous, liquid and solid fraction in the absence of oxygen is 1 1 4 1
   (A) Pyrolysis (B) Incineration
   (C) Sterilization (D) Composting

16. In the policy of MSW to apply 3R principle or indicates _____. 1 3 5 7
   (A) Reuse, Reduce and Recover (B) Reduce, Reuse and Recover
   (C) Recycle, Reuse and Recover (D) Reuse, Reduce and Recycle

17. The method of land filling in the areas where an adequate depth of cover material is available at the site and water table is not clear the surface 1 2 5 1
   (A) Trench method (B) Area method
   (C) Depression method (D) Canyon method

18. Clay soil used in lining systems in waste containment barriers as an impermeable barrier having the permeability value less than 1 3 5 1
   (A) 10^{-6} cm/sec (B) 10^{-10} cm/sec
   (C) 10^{-2} cm/sec (D) 10^{-1} cm/sec

19. Which among the following material using for manufacturing the geomembranes as liners in landfill system? 1 2 5 1

(A) Terylene (B) Polyamide
(C) Thermoplastic (D) Polyvinyl chloride

20. _____ lines consist of a thin clay layer between two layers of a geotextile. 1 2 5 1

(A) Geonet (B) Geomembrane
(C) Geosynthetic clay liner (D) Geotextile

PART – B (5 × 4 = 20 Marks) Marks BL CO PO
Answer **ANY FIVE** Questions

21. Differentiate between the ultimate and proximate analysis of wastes. 4 1 1 6

22. How does the inadequate and improper waste management causes the adverse environmental effects of visual and noise pollution? 4 2 1 7

23. What are the factors involved under material recovery facilities? 4 1 2 6

24. Write a short note on collection vehicle routing. 4 1 2 6

25. What are the factors that affect the waste collection system? 4 1 3 6

26. Write short note on composting of wastes. 4 2 4 7

27. List out the environmental effects of landfill. 4 2 5 7

PART – C (5 × 12 = 60 Marks) Marks BL CO PO
Answer **ALL** Questions

28. a. Explain the different sources and type based on solid waste. 12 1 1 6

(OR)

b. What are the objectives of sampling and explain in detail about the methods of sampling? 12 1 1 6

29. a. Explain the onsite segregation and resource recovery of solid waste. 12 3 2 2

(OR)

b. Write about the recycling process, requirements and its significance in solid waste management. 12 3 2 2

30. a. Write about the collection and transfer of solid waste. 12 2 3 1

(OR)

b. Explain the different transfer stations and its design considerations. 12 2 3 1

31. a. Explain the process of incineration with neat sketches. 12 4 4 6

(OR)

b.	Explain about air separation, magnetic separation and screening with the neat sketches.	12	4	4	6
32. a.	Explain the essential components of sanitary landfill and their functions with neat sketch.	12	2	5	7
	(OR)				
b.	Describe about the different options for solid waste disposal and its relative merits of disposal options.	12	3	5	7

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