

B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Seventh Semester

18CEE310T - SOLID AND HAZARDOUS WASTE MANAGEMENT*(For the candidates admitted during the academic year (2020-2021 & 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** and **Part - C** should be answered in answer booklet.

Time: 3 Hours**Max. Marks: 100****PART - A (20 × 1 = 20 Marks)****Marks BL CO**

Answer all Questions

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|---|---|---|---|---|
| 1. Which one of the following is not a source-based classification of waste?
(A) Residential waste
(C) Municipal waste | (B) Garbage waste
(D) Industrial waste | 1 | 1 | 1 |
| 2. Choose the correct statement.
(A) Hazardous waste cannot be sludge
(C) Hazardous waste cannot be liquid | (B) Hazardous waste cannot be gaseous
(D) Hazardous waste can be sludge. | 1 | 1 | 1 |
| 3. In India, waste management is governed by _____.
(A) Ministry of Environment alone
(C) Ministry of Environment, Forest and Climate Change | (B) Ministry of Forest and Climate change alone
(D) Central Public Works Department | 1 | 1 | 1 |
| 4. _____ helps in achieving the best possible benefit from every functional element of the solid waste management (SWM) system
(A) Waste processing
(C) Recovering energy | (B) Source reduction
(D) Recovering material | 1 | 1 | 1 |
| 5. In which year, Toxicity Characteristics Leaching Procedure Test was adopted by EPA?
(A) 1966, November 7
(C) 1986, November 7 | (B) 1976, November 7
(D) 1996, November 7 | 1 | 1 | 2 |
| 6. In the given characteristics, which does not belong to hazardous waste?
(A) Reactivity
(C) Corosivity | (B) Ignitability
(D) Erosivity | 1 | 2 | 2 |
| 7. Waste generation increases with reference to _____.
(A) Socioeconomic status
(C) Geo-location | (B) Topography
(D) less capita income | 1 | 1 | 2 |
| 8. Moisture content of waste is measured by _____.
(A) [(Wet weight - Dry weight)/Wet weight] * 100
(C) [(Wet weight - Dry weight)] * 100 | (B) [(Wet weight + Dry weight)/Wet weight] * 100
(D) (Wet weight + Dry weight) * 100 | 1 | 1 | 2 |
| 9. Containers used for contents to be transferred to transfer station for emptying before being returned to storage site is _____.
(A) Hauled containers
(C) Communal container | (B) Stationary containers
(D) Recycling container | 1 | 1 | 3 |

- | | | | |
|---|---|---|---|
| 10. _____ can define the specific path that each crew and collection vehicle will take each collection day. | 1 | 2 | 3 |
| (A) Micro Routing | | | |
| (B) Macro Routing | | | |
| (C) Distracting | | | |
| (D) Heuristic Route | | | |
| 11. Small to medium transfer stations have capacities generally less than | 1 | 2 | 3 |
| (A) 50 Tonnes/day | | | |
| (B) 100 Tonnes / day | | | |
| (C) 500 Tonnes/day | | | |
| (D) 1000 Tonnes/day | | | |
| 12. What is the percentage of storage capacity should be given as per hazardous waste storage? | 1 | 1 | 3 |
| (A) 5% of the annual capacity of the hazardous waste incinerator | | | |
| (B) 25% of the annual capacity of the hazardous waste incinerator | | | |
| (C) 35% of the annual capacity of the hazardous waste incinerator | | | |
| (D) 50% of the annual capacity of the hazardous waste incinerator | | | |
| 13. In composting technologies _____ is the least expensive and most common approach. | 1 | 1 | 4 |
| (A) Windrow | | | |
| (B) Anaerobic processing | | | |
| (C) Aerated static pile | | | |
| (D) In-vessel composting | | | |
| 14. Incineration of solid wastes reduces their volume to about | 1 | 1 | 4 |
| (A) 1/3 | | | |
| (B) 2/3 | | | |
| (C) 1/10 | | | |
| (D) 3/10 | | | |
| 15. In the given factor which is not influencing the composting process? | 1 | 2 | 4 |
| (A) Aeration of the file | | | |
| (B) The volume of the material being composed. | | | |
| (C) Characteristics of the pile | | | |
| (D) Temperature of the pile | | | |
| 16. In which method of composting, decomposition takes place in anaerobic condition? | 1 | 3 | 4 |
| (A) Bangalore method | | | |
| (B) Trench method | | | |
| (C) Indian method | | | |
| (D) Depression method | | | |
| 17. Among the statements given below, which is not relevant to leachate treatment process? | 1 | 2 | 5 |
| (A) Biological treatment | | | |
| (B) Natural treatment | | | |
| (C) Physio-Chemical treatment | | | |
| (D) Waste treatment | | | |
| 18. _____ comprises the major hazards associated with a landfill. | 1 | 1 | 5 |
| (A) Moisture content | | | |
| (B) Landfill gas | | | |
| (C) Temperature | | | |
| (D) pH | | | |
| 19. Unlike the non-engineered disposal, _____ is a fully engineered disposal option. | 1 | 3 | 5 |
| (A) Sanitary landfill | | | |
| (B) Incineration | | | |
| (C) Composting | | | |
| (D) Wasteland | | | |
| 20. How do you remove leachate from the landfill? | 1 | 3 | 5 |
| (A) By gravity | | | |
| (B) By sedimentation | | | |
| (C) By pumping from low points | | | |
| (D) By filtration | | | |

PART - B (5 × 4 = 20 Marks)

Answer **any 5** Questions

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|---|---|---|---|
| 21. How do you identify Hazardous Waste? Explain Briefly. | 4 | 3 | 1 |
| 22. What are the roles of stakeholders in Integrated Solid Waste Management system? | 4 | 1 | 1 |
| 23. Briefly describe about Extended Producer Responsibility (EPR) | 4 | 3 | 2 |
| 24. List out the importance of transfer and transport. | 4 | 3 | 3 |
| 25. Write short notes on Hazardous Waste Treatment. | 4 | 1 | 4 |

26. Why do we need systematic approach for site selection of landfill?
27. Classify the various types of landfill adopted in waste management.

4 3 5

4 2 5

PART - C (5 × 12 = 60 Marks)

Answer all Questions

Marks BL CO

28. (a) Explain in detail about the necessity of Integrated Solid waste management with their functional elements. 12 3 1
(OR)
(b) Elaborate in detail about the hazardous waste classification and its characteristics.
29. (a) Explain in detail about the various characteristics of solid waste. 12 3 2
(OR)
(b) Discuss in detail about the necessity of recycling and reuse in solid waste management system.
30. (a) Enumerate in detail about various parameters involved in the analysis of waste collection system. 12 4 3
(OR)
(b) Discuss in detail about hazardous waste storage and transportation.
31. (a) Explain in detail on the various material separation technologies involved in solid waste segregation. 12 4 4
(OR)
(b) Discuss about the processes involved in thermal treatment for solid waste.
32. (a) Explain in detail the essential components of landfill with a suitable sketch. 12 4 5
(OR)
(b) Discuss in detail on various disposal options adopted for hazardous and solid waste.

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