Code No: **R164201C** **R16** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, June - 2022

SOLID AND HAZARDOUS WASTE MANAGEMENT

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1. a) Discuss the classification of solid waste based on sources. [2]
   b) What is the difference between refuse, garbage and sullage. [3]
   c) Mention the factors of consideration to compare different waste collections. [3]
   d) Explain about incinerators. [2]
   e) What are the essential components of a secured landfill. [2]
   f) Briefly mention about the sources of hazardous waste. [2]

PART–B *(4x14 = 56 Marks)*

2. a) What are the objectives of solid waste and classify various solid waste. [7]
   b) Explain the methods of sampling and characterization of solid wastes. [7]

3. a) Explain in detail the factors influencing solid waste generation. [7]
   b) Compare the functional elements in a typical solid waste management system. [7]

4. a) What are the common techniques for material separation. Explain its advantages. [7]
   b) Explain the necessity of source reduction in solid waste management. [7]

5. a) Classify the methods of waste transformation through combustion and composting. [7]
   b) List out various waste processing systems. Give their suitability for processing of different types of waste components. [7]

6. a) Design a leachate treatment system for a landfill receiving municipal solid waste. [7]
   b) What are the standards prescribed by CPCB for disposal of leachate on land, in river or in sewers. [7]

7. a) Discuss about treatment of Biomedical waste, by means of a flow chart. [7]
   b) Explain about the environmental law related to waste management. [7]

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Code No: **R164201C** **R16** **Set No. 2**

IV B.Tech II Semester Regular/Supplementary Examinations, June – 2022

SOLID AND HAZARDOUS WASTE MANAGEMENT

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1. a) Briefly mention about the physical and biological characteristics of solid waste. [2]
   b) Discuss about the optimization of collection routes. [2]
   c) How do you achieve the final disposal of hazardous waste [3]
   d) Discuss about the process of Pyrolysis [2]
   e) Mention the various precautions and parameters to be considered in a disposal yard. [3]
   f) What are the sources and collection methods of Biomedical waste. [2]

PART–B *(4x14 = 56 Marks)*

2. a) Explain about various objectives and priorities in the management of solid waste. [7]
   b) Discuss about the various environmental legislation for municipal solid waste [7]

3. a) Describe the operation of hauled container system of waste collection. [7]
   b) Write about the inter-relationship of the functional elements in a solid waste management system. [7]

4. a) Solid waste is collected from a locality using a stationary container system, provided with two containers each of size 4 cubic meters and utilization factor of 0.75 at each location. The truck takes 20 minutes to reach to the first container from garage. Six minutes are spent for unloading each container into the truck and average time taken by the truck to cover distance between consecutive container locations is also 6 minutes, the round trip hual distance is 60 Km and truck takes 15 minutes to reach the garage from the last container location. Calculate the required capacity of the truck if number of trips to disposal site per day is 2, (8 hours work day) speed limit of the truck is 40 kmph and collection vehicle compaction ratio is 2.5 [8]
   b) Present briefly source reduction and waste minimization methods. [6]

5. a) Explain various wastes processing systems. Give their suitability for processing of different types of wastes components. [7]
   b) Briefly present the anaerobic methods for material recovery and treatment. [7]

6. a) What are the adverse effects of a landfill leachate and list appropriate control measures. [7]
   b) Discuss about the environmental factors in sanitary landfill sites. [7]

7. a) Enumerate the methods of collection and transport of Hazardous waste. [7]
   b) Discuss about disposal methods of Electronic waste. [7]

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Code No: **R164201C** **R16** **Set No. 3**

IV B.Tech II Semester Regular/Supplementary Examinations, June – 2022

SOLID AND HAZARDOUS WASTE MANAGEMENT

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1. a) What are the sources of domestic solid waste. [2]
   b) Distinguish between solid waste and hazardous waste. [3]
   c) What is the role of transfer station in SWM. [2]
   d) Outline Pyrolysis and Incineration. [3]
   e) Mention the advantages of using geomembrane as a liner. [2]
   f) What are the environmental laws regarding hazardous waste. [2]

PART–B *(4x14 = 56 Marks)*

2. Enumerate the methods to determine the generation rates of solid waste and explain the factors affecting the generation rates. [14]

3. a) What are the methods of onsite storage and handling of solid waste. [7]
   b) What are the various points to be kept in mind while choosing the collection route of vehicle to pick up solid waste. [7]

4. a) Describe the reuse of materials from municipal solid waste. [7]
   b) Distinguish between hauled container system and stationary container system with a schematic diagram. [7]

5. a) Describe various types of incinerations. Also mention the factors affecting their efficiency. [7]
   b) Write short notes on [7]
      i) Bangalore method
      ii) Indore method

6. What do you understand by the term leachate. What problems are posed by leachate and how could we overcome them [14]

7. a) Discuss about methods of collection and transport of Biomedical waste. [7]
   b) Explain the impact of environmental laws in India regarding Hazardous waste management. [7]

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Code No: **R164201C** **R16** **Set No. 4**

IV B.Tech II Semester Regular/Supplementary Examinations, June – 2022

SOLID AND HAZARDOUS WASTE MANAGEMENT

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
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PART–A *(14 Marks)*

1. a) Describe solid waste and hazardous waste in simple terms [2]
   b) Outline the key role of public in solid waste management [2]
   c) Examine the segregation methods of solid waste. [2]
   d) Distinguish between Incineration and Pyrolysis [3]
   e) Prioritize the factors to be considered for the selection of disposal site. [3]
   f) How do you collect Biomedical and electronic waste. [2]

PART–B *(4x14 = 56 Marks)*

2. a) With a neat schematic diagram, explain the functional elements of the solid waste management. [7]
   b) Summarize the Future charges in waste composition, and legislation [7]

3. a) Explain the chemical transformation of solid waste. [7]
   b) What are the factors affecting the generation rate of solid waste in the society. [7]

4. a) What are the various facilities that must be available at transport station. [7]
   b) Describe the operation of hauled container system and stationary container system. [7]

5. a) Discuss the basic difference between pyrolysis and gasification. Mention the suitability of these techniques in practice. [7]
   b) Discuss advantages and disadvantages of [7]
      i) Anaerobic digestion
      ii) Refuse derived fuels

6. a) Explain in brief various methods of disposal of solid wastes. [7]
   b) What do you understand by the term "LEACHATE". What problems are posed by leachate and how would you overcome them. [7]

7. a) Explain briefly about treatment and disposal of electronic waste. [7]
   b) How do you collect and transport any hazardous waste. Explain by any standard method [7]

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