



**B.E DEGREE EXAMINATIONS: NOV/DEC 2023**

(Regulation 2018)

Seventh Semester

**CIVIL ENGINEERING**

U18CEE0015: Waste Management

**COURSE OUTCOMES**

- CO1:** Familiarize with various waste management problems  
**CO2:** Implement various resource recovery and safe treatment options  
**CO3:** Acquire rudiments in handling and disposal of Hazardous wastes  
**CO4:** Calculate the energy extraction potential from different types of wastes  
**CO5:** Device methods for safe dispose the E-Wastes

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Matching type item with multiple choice code

CO3 [K<sub>1</sub>]

List I		List II	
A. Yellow Plastic bag		i. Disposal in secure landfills	
B. Black plastic bag		ii. Incineration and deep burials	
C. Blue/White Plastic bag		iii. Autoclaving and chemical treatment	
D. Red Plastic bag		iv. Microwave treatment and destruction	

- |    | A   | B  | C   | D  |
|----|-----|----|-----|----|
| a) | ii  | i  | iii | iv |
| b) | iii | iv | ii  | i  |
| c) | ii  | iv | iii | i  |
| d) | iii | i  | ii  | iv |

2. The WHO has classified the bio-medical waste into \_\_\_\_\_ categories.

CO1 [K<sub>1</sub>]

- |      |      |
|------|------|
| a) 3 | b) 4 |
| c) 5 | d) 2 |

3. The waste given below was segregated into two groups :

CO3 [K<sub>2</sub>]

Group 1: Spoiled food, garden trimmings, paper, wood, and

Group 2: plastic bags, toys, bottles, glass. The segregation is on the basis of :

1. Group 1: Wet waste, Group 2: Dry Waste
2. Group 1: Dry waste Group 2: Wet Waste
3. Group 1 : Biodegradable waste, Group 2: Non-Biodegradable waste
4. Group 1: Non-Biodegradable waste , Group 2 : Biodegradable waste,
  - a) 1,2
  - b) Only 3
  - c) 2,3
  - d) Only 4
4. What is the hazardous pollutant released from batteries? CO3 [K<sub>2</sub>]
  - a) Arsenic
  - b) Cadmium
  - c) Barium
  - d) Cobalt
5. Assertion (A): Genetically engineered microorganisms can treat biomedical wastes. CO1 [K<sub>2</sub>]  
Reason (R): The microorganisms can be used to convert the toxic biomedical wastes to non-hazardous and non-toxic form.
  - a) Both A and R are Individually true and R is the correct explanation of A
  - b) Both A and R are Individually true but R is not the correct explanation of A
  - c) A is true but R is false
  - d) A is false but R is true
6. Which of the following element make e-waste hazardous in nature? CO5 [K<sub>2</sub>]
  - a) Lead
  - b) Glass
  - c) Iron
  - d) Plastic
7. Sequence the step-by-step procedure of solid waste management process. CO2 [K<sub>1</sub>]
  1. Transportation
  2. Segregation
  3. Collection
  4. Processing
  5. Disposal
  - a) 3-2-1-4-5
  - b) 1-3-2-4-5
  - c) 1-2-3-4-5
  - d) 4-1-3-2-5
8. Which of the following industrial process uses waste as a fuel? CO4 [K<sub>2</sub>]
  - a) Cement kilns
  - b) Lead manufacturing
  - c) Acid manufacturing
  - d) Sulphur manufacturing

9. Assertion (A): Energy cannot be recovered from all types of wastes. CO4 [K<sub>2</sub>]  
Reason (R): To enable energy recovery, the waste must have sufficient heating value to reach appropriate combustion temperatures without need for additional fuel.
- a) Both A and R are Individually true and R is the correct explanation of A      b) Both A and R are Individually true but R is not the correct explanation of A  
c) A is true but R is false      d) A is false but R is true
10. Energy recovery is typically via production of \_\_\_\_\_ CO4 [K<sub>2</sub>]  
a) Gas      b) Heat  
c) Light      d) Steam

**PART B (10 x 2 = 20 Marks)**  
**(Answer not more than 40 words)**

11. Explain why the generation of solid waste has increased over a period of 10 years CO1 [K<sub>2</sub>]  
12. Summarize the 3 R's that help to resolve the solid waste management issues. CO1 [K<sub>2</sub>]  
13. What is meant by recycling of solid waste? List few materials that can be recycled. CO2 [K<sub>2</sub>]  
14. How does processing of waste improve the efficiency of waste management process? CO2 [K<sub>2</sub>]  
15. Why are the wastes from hospital treated as hazardous waste? CO3 [K<sub>2</sub>]  
16. What are the major constituents of biomedical waste? CO3 [K<sub>2</sub>]  
17. Define gasifier. Classify various types of gasifiers. CO4 [K<sub>2</sub>]  
18. Define Syngas? How syngas is produced. CO4 [K<sub>2</sub>]  
19. What are the items that can be considered as an electronic waste? CO5 [K<sub>2</sub>]  
20. List the environmental impacts of e-waste. CO5 [K<sub>2</sub>]

**Answer any FIVE Questions:-**  
**PART C (5 x 14 = 70 Marks)**  
**(Answer not more than 350 words)**

21. a) Classify the solid waste based on sources. 7 CO1 [K<sub>2</sub>]  
b) Outline the key role of public in solid waste management. 7 CO1 [K<sub>2</sub>]
22. a) Discuss on the waste management concept. 7 CO2 [K<sub>2</sub>]  
b) Explain EPA - identification of hazardous and toxic waste. Write down the characteristics of hazardous waste. 7 CO2 [K<sub>2</sub>]

23.	a)	What are the various guidelines given by WHO for safe health-care waste management?	7	CO3	[K <sub>2</sub> ]
	b)	Explain the different categories of biomedical waste.	7	CO3	[K <sub>2</sub> ]
24.	a)	Explain the various stage by stage processes involved on solid waste management process.	7	CO4	[K <sub>2</sub> ]
	b)	Explain the following gasifier with neat sketches. (i) Updraft (ii) Down draft gasifier.	7	CO4	[K <sub>2</sub> ]
25.	a)	Discuss the process of pyrolysis in detail.	7	CO4	[K <sub>2</sub> ]
	b)	Explain the Bio-diesel production process.	7	CO4	[K <sub>2</sub> ]
26.	a)	Describe the methods of disposal of e-waste	7	CO5	[K <sub>2</sub> ]
	b)	Discuss about the E-waste Management Rules in India	7	CO5	[K <sub>2</sub> ]

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