Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2025

CIVIL ENGINEERING (ENGLISH MEDIUM) BRANCH

Semester VI

CEM509 – Sustainable Waste Management for Circular Economy

(Regulation 2019)

Time: 3 hrs | Max. Marks: 100

CO1	Understand the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management
CO2	Explains the segregation of solid waste and the onsite storage methods
CO3	Explains the various transfer methods and to know the site condition for the transfer station
CO4	Select appropriate methods for processing and disposal of solid and hazardous wastes, taking into account the impact of the solutions in a sustainability context
CO5	Knowledge about selection of appropriate disposal methods and its handling in an efficient manner

BL – Bloom's Taxonomy Levels

(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

Q. No.	Questions	Marks	CO	BL
1	List any two sources of solid waste and their characteristics.	2	CO1	L1
2	Explain the significance of waste segregation in sustainable waste management.	2	CO1	L2
3	What are the various methods of on-site storage of solid waste?	2	CO2	L1
4	Describe the environmental impacts of improper waste storage.	2	CO2	L2
5	What are the main factors considered while selecting a collection vehicle for waste management?	2	CO3	L3
6	How does the selection of transfer station location impact waste management?	2	CO3	L4
7	What are the objectives of waste processing?	2	CO4	L3
8	Explain the process of biomethanation in solid waste management.	2	CO4	L4
9	Discuss the significance of selecting the right disposal method in waste management.	2	CO5	L5
10	How does a landfill bioreactor work and what benefits does it offer?	2	CO5	L6

PART- B (5 x 13 = 65 Marks)

Q. No.	Questions	Marks	CO	BL
11 (a)	Discuss the characteristics of municipal solid waste and the regulatory requirements in its management.	13	CO1	L1
	OR			
11 (b)	Explain the various types of solid wastes and the factors that influence their generation.	13	CO1	L1
12 (a)	Evaluate the different methods of waste segregation at the source and their impact on waste management.	13	CO2	L4
	OR			

12 (b)	Examine the challenges and solutions for proper on-site storage of waste in urban areas.	**13**	CO2	L4
13 (a)	Explain the role of transfer stations in solid waste management and describe the factors influencing their location and operation.	**13**	CO3	L2
	OR			
13 (b)	Discuss the various waste collection methods used in residential and commercial areas. What challenges are encountered?	**13**	CO3	L2
14 (a)	Analyze the benefits and limitations of different off-site processing methods such as composting, biomethanation, and thermal processing	**13**	CO4	L5
	OR			
14 (b)	Discuss case studies of resource recovery from solid waste in India, focusing on composting and biomethanation.	**13**	CO4	L5
15 (a)	Explain the design and operation of sanitary landfills. How do landfill liners and leachate management play a role?	**13**	CO5	L3
	OR			
15 (b)	Evaluate the concept of biomining in waste disposal and its environmental impact.	**13**	CO5	L3

PART- C (1 x 15 = 15 Marks)

(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16.	Discuss the concept of a circular economy in waste management. How can businesses adopt circular economy models for waste reduction and sustainability?	**15**	CO4	L6