

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: CE474

Course Name: MUNICIPAL SOLID WASTE MANAGEMENT

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1 a) Classify solid waste based on source and define each. (10)
 b) What are the physical characteristics of MSW? (5)
- 2 a) Using the data for a MSW sample provided below, find the average moisture content of the sample. Base your calculations on a 100 kg sample size. (5)

Component	Moisture content (%)	Weight (%)
Paper waste	7	25
Yard waste	55	18
Food waste	65	20
Plastic	2	5
Wood	20	8
Glass	3	7
Metals	3	9
Textiles	12	8

- b) What are the advantages of estimating the quantity of waste generated? (5)
 c) Write the impact of industrial waste on environment (5)
- 3 a) Estimate the energy content on dry and ash free dry basis of a solid waste sample (10)
 with the following compositions. Assume over all moisture and ash content of solid wastes is 21% and 5% respectively. Assume a mass of 100kg.

Component	Food waste	paper	Card board	plastics	Garden Trimming	Wood	Tin can
% by weight	15	45	10	10	10	5	5
Energy kJ/kg	4650	16750	16300	32600	6500	18600	700

- b) What are the impacts of C&D waste on environment? (5)

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) Write a note on mechanical volume reduction. (5)
b) With a flow chart, explain recovery of resources from solid waste. (10)
- 5 a) What is the role of transfer station in solid waste management? (5)
b) Explain the procedure adopted for chemical and biological conversion of solid waste. (10)
- 6 a) What is the significance of component separation in solid waste management? (5)
b) Describe magnetic separation and the equipment used for it. (5)
c) What are the various collection systems in MSWM? (5)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Write the Indore process and its advantages. (8)
b) With neat sketch explain the various parts of an Incinerator. (8)
c) Explain the composition of Incinerator effluent gas. (4)
- 8 a) Explain vermi composting. (7)
b) Define incineration and its merits and demerits (8)
c) What are the benefits of composting? (5)
- 9 a) Explain the components of Sanitary landfill with neat sketch. (14)
b) Write briefly on anaerobic digestion of waste? (6)

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Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1 a) What are the various categories of waste? (5)
 b) Write the factors affecting the generation of municipal solid waste (5)
 c) What are the components of agricultural waste? How are they stored? (5)
- 2 a) Determine the average moisture content of municipal solid waste of a typical Indian city from the following data. (5)

Description	Weight (%)	Moisture Content (%)
Food Waste	40	70
Yard Waste	3.5	60
Paper	.75	6
Plastic	.9	2
Glass	0.5	2
Metal	.7	2
Textile	2	8
Leather	.4	10
Miscellaneous	8.25	10
Stone/Brick	43	8

- b) What are the physical characteristics of municipal solid waste? (5)
 c) Write the important points to be considered while storing the hazardous waste (5)
- 3 a) How solid wastes from Industries are managed? (5)
 b) Write a brief note on radioactive waste. (5)
 c) Explain any one method of estimation of generation rate of municipal solid waste. (5)

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) What are the factors that have to be considered while fixing collection route? (5)
b) Explain the operations carried out in a transfer station. (5)
c) Explain the relevance of resource conservation. (5)
- 5 a) What are the types of compactors employed for mechanical volume reduction? (5)
b) Component separation enhances the municipal solid waste management system. (5)
True or false? Justify your answer.
c) What is the major cause for the inefficiency of waste to energy projects in India? (5)
How can it be overcome?
- 6 a) What is the collection services employed to collect residential solid waste. (5)
b) Describe chemical volume reduction with advantages and disadvantages. (7)
c) What are the advantages of reducing size of solid waste? (3)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Compare area method and trench method of land fill with suitable sketches. (10)
b) Draw the neat sketch of an incinerator and describe the functions. (8)
c) What are the components of effluent gas from an incinerator (2)
- 8 a) Compare Indore process and Bangalore process of composting with advantages (10)
and disadvantages.
b) Explain biogas digester with the help of a neat sketch (10)
- 9 a) What are the types of incinerators? Which one is most common type? (7)
b) What are the advantages of composting (6)
c) Explain the different stages of anaerobic digestion of waste. (7)
