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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Civil Engineering

Semester End Examination; July / Aug. - 2022

Solid Waste Management

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:

CO1: Understand the importance, source, classification of solid waste.

CO2: Learn different methods of collection, transportation and management of solid waste.

CO3: Learn different methods of treatment of solid waste like incineration composing, sanitary land filling and design of sanitary landfill.

CO4:Learn different disposal methods of solid waste, recycling and reusing of solid waste.

***Note**: I) **PART - A** is compulsory. **Two** marks for each question.*

*II) **PART - B**: Answer any **Two** sub questions (from a, b, c) for a Maximum of **18 marks** from each unit.*

Q. No.		Questions	Marks	BLs	COs	POs
		I : PART - A	**10**			
I	a.	List the sources of municipal solid waste.	2	L1	CO1	1,7
	b.	Define transfer station.	2	L1	CO2	3,4
	c.	Explain the important of 3T's in incineration.	2	L1	CO3	3.7
	d.	What are the advantages of sanitary landfills?	2	L1	CO3	3,7
	e.	List any four disposal methods of municipal solid waste.	2	L1	CO4	4,5,11
		II : PART - B	**90**			
		UNIT - I	**18**			
1	a.	Enumerate the functional elements of solid waste management with the help of a flow diagram	9	L2	CO1	1,7
	b.	Estimate the energy content of a solid waste sample on unit energy content, dry basis and ash flee dry basis based on 100 kg sample. Assume % ash content as 5%.	9	L3	CO1	1,7

Component	% Mass	% Moisture content	Energy (kJ/kg)
Food waste	15	70	4650
Paper	45	06	16750
Cardboard	10	05	16300
Plastic	10	02	32600
Garden Trimmings	10	60	6500
Wood	05	20	18600
Tin Cans	05	03	700

Contd... 2

c. Estimate the moisture content of the solid waste sample with the following composition based on 100 kg sample.

Component	% mass	% moisture content
Food waste	18	70
Paper	34	06
Cardboard	07	05
Plastic	15	02
Textile	12	10
Rubber	02	02
Leather	02	10
Miscellaneous	10	30

9 L3 CO1 1,7

UNIT - II **18**

2 a. With a neat sketch, enumerate the operational sequence of hauled container system. 9 L2 CO2 3,4

b. Explain briefly the following process techniques:

i) Mechanical volume reduction 9 L3 CO2 3,4

ii) Mechanical size reduction

c. Enumerate the various techniques of component separation. 9 L3 CO2 3,4

UNIT - III **18**

3 a. With a neat sketch, explain municipal incinerator. 9 L1 L2 CO3 3,7

b. Enumerate the design considerations for anaerobic compositing. 9 L1 CO3 3,7

c. Briefly explain the vermi composting. 9 L1 CO3 3,7

UNIT - IV **18**

4 a. Explain different land filling methods of disposal of solid waste with neat sketches. 9 L2 CO3 3,7

b. Enumerate the control of gas movement with vents and barriers in a sanitary landfill site. 9 L2 CO3 3,7

c. Explain various factors to be considered in selection of a site for sanitary land fill. 9 L1 CO3 3,7

UNIT - V **18**

5 a. Briefly explain the disposal waste by ocean disposal and feeding to hogs with the advantages and disadvantages. 9 L2 CO4 4,5,11

b. Define land pollution. Briefly explain the sources for causes of land pollution. 9 L2 CO4 4,5,11

c. Briefly explain the disposal of biomedical waste. 9 L2 CO4 4,5,11

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