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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

August 2024 Supplementary Examinations

Programme: B.E.

Branch: Civil Engineering

Course Code: 20CV6PESWM

Course: Solid Waste Management

Semester: VI

Duration: 3 hrs.

Max Marks: 100

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I			CO	PO	Marks																															
1	a)	Explain with schematic diagram, the classification of functional elements of a solid waste management system.	<i>CO1</i>	<i>PO1</i>	08																															
	b)	Estimate the energy content of a solid waste sample in unit energy content on dry basis and ash free dry basis. Assume Ash 5 %	<i>CO1</i>	<i>PO2</i>	08																															
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Component</th> <th>% by mass</th> <th>% moisture content</th> <th>Energy (kJ/kg)</th> </tr> </thead> <tbody> <tr> <td>Food Waste</td> <td>15</td> <td>70</td> <td>4650</td> </tr> <tr> <td>Paper</td> <td>45</td> <td>06</td> <td>16750</td> </tr> <tr> <td>Cardboard</td> <td>10</td> <td>05</td> <td>16300</td> </tr> <tr> <td>Plastic</td> <td>10</td> <td>02</td> <td>32600</td> </tr> <tr> <td>Garden Trimmings</td> <td>10</td> <td>60</td> <td>6500</td> </tr> <tr> <td>Wood</td> <td>05</td> <td>20</td> <td>18600</td> </tr> <tr> <td>Tin cans</td> <td>05</td> <td>03</td> <td>700</td> </tr> </tbody> </table>	Component	% by 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		
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	c)	Discuss Route Optimization	<i>CO2</i>	<i>PO3</i>	04																															
		OR																																		
2	a)	With schematic diagram explain operational sequence of Hauled container system.	<i>CO2</i>	<i>PO3</i>	10																															
	b)	Outline the factors to be considered in the design of transfer stations.	<i>CO2</i>	<i>PO3</i>	10																															
UNIT - II																																				
3	a)	Discuss the 3T'S of Incineration process	<i>CO1</i>	<i>PO4</i>	05																															
	b)	Explain the Mechanical volume reduction and chemical volume reduction	<i>CO1</i>	<i>PO4</i>	10																															
	c)	Eneumarate the design criteia for incineration	<i>CO1</i>	<i>PO4</i>	05																															

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - III					
4	a)	Explain the important factors for the design considerations in aerobic composting	<i>CO1</i>	<i>PO4</i>	10
	b)	Explain Bangalore method and indore method of composting	<i>CO3</i>	<i>PO6</i>	10
UNIT - IV					
5	a)	Explain the various ways of control of gas movement in landfills.	<i>CO3</i>	<i>PO6</i>	08
	b)	Explain the area method and trench method of lanfilling techniques stating merits and demerits.	<i>CO3</i>	<i>PO6</i>	08
	c)	Determine the landfill area required for municipality with a population of 50,000, given that: Solid waste generation = 350gm/person/day Compacted density of landfill = 504 kg/m ³ Average depth of compacted solid waste = 3 m	<i>CO3</i>	<i>PO6</i>	04
UNIT - V					
6	a)	Explain the principles and application of SEM and TEM	<i>CO3</i>	<i>PO6</i>	10
	b)	Define XRD. Explain the diffraction principle and applications of XRD .	<i>CO3</i>	<i>PO6</i>	10
OR					
7	a)	Define XRF. Explain the working principle and application of XRF	<i>CO3</i>	<i>PO6</i>	10
	b)	Define Raman Spectroscopy. Explain the working principle and application of XRF	<i>CO3</i>	<i>PO6</i>	10
