

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

PhD -I Semester (CE/BT &BI)

COURSE CODE (CREDITS): 14M31CE115 (3)

MAX. MARKS: 35

COURSE NAME: Solid Waste Management

COURSE INSTRUCTORS: Dr. Rishi Rana Kalia

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q. No	Question	CO	Marks					
Q1	Estimate the required landfill area for a community with a population of 56,000 assuming the following conditions: Solid waste generation = 6.2 kg per capita per day, Compacted specific weight of solid wastes in landfill = 475 kg/m ³ . Average depth of compacted solid wastes = 9 m.	CO-2	5 Marks					
Q2	With neat sketches, discuss any two types of separation techniques.	CO-3&4	5 Marks					
Q3	(a) Estimate the moisture content, density, energy content as well as derive the chemical formula of a waste sample (1000 Kg) with following composition:	CO-3	7 Marks					
Component	Percent by mass	Moisture content (%)	Typical Density, Kg/m ³	Energy, Kj/Kg	Ultimate analysis			
					C	H	N	S
Food waste	25	65	4650	29036	45	2.5	86.2	0.01
Paper	35	11	16750	89457	32	12.9	55	0.8
Cardboards	20	1	16300	25015	9	5	23.7	2
Plastic	15	5	32600	20312	74	3.4	29	12
Garden	18	2	6500	1258	25	5.8	63.8	0.7
Wood	10	50	18600	6147	7	23	17.2	0.1
Inert	29	30	700	8530	9	25	30	12

	(b) Give at least four differences between combustion, gasification & pyrolysis.	CO-4	5 Marks
Q4	Solid waste from a society is to be collected in large container. Based on the traffic studies, it is estimated that the average time to drive from garage to first container and from last container to the garage each day is 15 and 30 minutes respectively. The time required to pick up loaded container and unload empty container is 1.12 h/trip. If the average time required to drive between the containers is 8 minutes and full way journey is 95 km, determine the number of containers that can be emptied per day based on a 12 h workday? Assume the value of a, b and s as 0.016, 0.011 and 0.133 respectively. The off-route factor can be taken as 0.15.	CO-2 &3	5 Marks
Q5	Explain Pretreatment and Co-digestion for Enhancement of Biogas Production?	CO-4	4 Marks
Q6	Discuss various issues related to land filling. Explain waste decomposition process in a landfill?	CO-3 &4	4 Marks