BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.TECH **SEMESTER: IV/VI**
BRANCH: CIVIL **SESSION : SP/2023**

SUBJECT: CE421 SOLID WASTE MANAGEMENT

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Explain ultimate analysis and its application in solid waste management.	[5]	1	2
Q.1(b)	A residential area consisting of 2500 houses has an average of 3 residents per house. For estimating the quantity of solid waste generated, the following conditions apply. Determine the unit rate of solid waste generation.	[5]	1	5

Type of vehicle	Number of trips	Volume m^3	Specific weight kg/m^3
I	10	18	300
II	12	5	150
III	30	1	100

Q.2(a)	Differentiate between HCS and SCS systems of collection of MSW.	[5]	2	5
Q.2(b)	Explain the needs of transfer stations and its utility for MSW management.	[5]	2	2
Q.3(a)	Discuss the environmental emission management of thermal processing centers of MSW.	[5]	3	3
Q.3(b)	Calculate the energy required by a size reduction plant with following characteristics: A comingled municipal solid waste having particles of average size 250mm, is to be reduced to a final size of 30mm in a plant having capacity of 90ton/h. specific energy of 30 hp-h/ton is required to reduce MSW of size 150mm to 30mm.	[5]	2	6
Q.4(a)	Draw and explain different components of landfill.	[5]	4	3
Q.4(b)	Determine the volume of methane and carbon dioxide produced. The specific weights of methane and carbon di oxide is 0.0448 and.1235 kg/m^3, respectively. Dry wt. of rapidly decomposable waste 44.8 kg, dry wt of slowly decomposable waste 7.3 kg. The equations are as follows $C_{68}H_{111}O_{50}N=16H_2O=35CH_4+33CO_2+NH_3$ RAPIDLY DECOMPOSABLE $C_{20}H_{29}O_9N+9H_2O=11CH_4+9CO_2+NH_3$ SLOWLY DECOMPOSABLE	[5]	4	6
Q.5(a)	Discuss landfill leachate management in detail.	[5]	5	4
Q.5(b)	Brief environmental monitoring systems of landfill after closure of landfills.	[5]	5	3

::::::28/04/2023::::::M