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

CLASS: MSC/IMSC **SEMESTER : II/VIII**
BRANCH: PHYSICS/BIOTECH/CHEMISTRY **SESSION : SP/2025**

SUBJECT: CE578 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) Discuss the functional elements of solid waste management.	[5]	1	2
Q.1(b) Estimate the average moisture and average density of a 100 kg solid waste sample with the following composition:	[5]	1	3

Component	% by mass	Moisture content %	Typical density kg/m3
Food wastes	15	70	290
Paper	45	6	85
Cardboard	10	5	50
Plastics	10	2	65
Garden trimmings	10	60	105
Wood	5	20	240
Tin cans	5	3	90

Q.2(a) Discuss the hazards of Hazardous Waste.	[5]	2	2
Q.2(b) Discuss Hazardous waste biological treatment methods.	[5]	3	3
Q.3(a) Discuss the prevalent methods of Radioactive Waste Management in India	[5]	3	2
Q.3(b) Summarise the highlights of Bio-Medical Waste Management Rules, 2016 under the Environment (Protection) Act, 1986 (29 of 1986);	[5]	2	3
Q.4(a) Discuss methanol production, synthesis and generation from biomass.	[5]	4	3
Q.4(b) Determine the amount of oxygen required to oxidise 100 kg of MSW through composting completely. The chemical composition of waste is $C_{60}H_{95}O_{40}N$. Assuming the density of the air as 1.2928 Kg/m^3. $[C_aH_bO_cN_d + \left(\frac{4a+b-2c-3d}{4}\right)O_2 \rightarrow aCO_2 + \left(\frac{b-3d}{2}\right)H_2O + dNH_3]$[N=14, H=1, O=16, C=12]	[5]	4	3
Q.5(a) Discuss the activated sludge process with a labelled flow diagram.	[5]	5	2
Q.5(b) Discuss the pollution characteristics of Paper and pulp mills and suggest possible treatment with a flow chart.	[5]	5	3

::::::25/04/2025::::::E