

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

CLASS: BTECH
BRANCH: CHEMICAL ENGINEERING

SEMESTER : IV
SESSION : SP/2025

SUBJECT: CL227 MATERIALS SCIENCE AND ENGINEERING

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

		CO	BL
Q.1(a)	Mention the differences in the principle of solvent extraction and the leaching process. Mention the specific metals which are extracted by the acidic leaching. Write down the demerits of pyrometallurgy processes.	[4]	3 1
Q.1(b)	Explain the functions of flux and give example.	[1]	3 2
Q.2(a)	50 cc of water containing 0.1g of iodine is shaken with 25cc of CCl ₄ . The distribution coefficient between CCl ₄ and water at room temperature is 87. Calculate the weight of iodine remaining unextracted in the aqueous layer after i) one extraction with 25cc of CCl ₄ ii) three extractions with 25 cc of CCl ₄ .	[2]	3 4
Q.2(b)	Describe the steps of sinter roasting process. Explain the densification curve.	[2+1]	3 2
Q.3(a)	Titanic mishap is a metallurgical failure explain.	[2]	1 3
Q.3(b)	Explain the fact processing can affect the properties of materials. Draw (110) plane in cubic lattice.	[3]	2 2
Q.4(a)	Write the points for dense packing of Metals	[2]	1 1
Q.4(b)	Discuss Hume Rothery rule in solid solutions of metals. List the types of defects arises in solids.	[3]	2 1
Q.5(a)	Discuss the different phases appear in cooling of Cu Ni alloy at 35% Ni composition from its melts	[2]	2 2
Q.5(b)	Discuss the characteristics of grain boundary. Explain why FCC structure of Al shows ductile failure but HCP structure of Mg shows brittle fracture in tensile test.	[3]	3 4

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