

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2021****Subject Code:3152107****Date:09/09/2021****Subject Name:Non Ferrous Extractive Metallurgy****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS	
Q.1	(a) Define extractive metallurgy. Give basic types of ores with examples.	03	
	(b) Classify unit processes/operations based on method of extraction.	04	
	(c) Enlist various reactors used in extraction of metals. Explain working principle of any one reactor in detail.	07	
Q.2	(a) Define Unit processes and Unit operations with examples.	03	
	(b) Enlist requirements of a good electrolyte for electrometallurgical extraction of metals.	04	
	(c) Explain Ellingham diagram and its applications in extractive metallurgy.	07	
OR			
Q.3	(c) Explain Bio leaching process. Enlist factors affecting bio leaching.	07	
	(a) What is calcination in pyro metallurgy?	03	
	(b) Explain criteria of choosing roasting process.	04	
Q.3	(c) Write a short note on Ion exchange operation in hydrometallurgy.	07	
	OR		
	(a) Define pyrometallurgy with its applications.	03	
Q.4	(b) Differentiate carbothermic reduction and metallothermic reduction process.	04	
	(c) Explain Matte smelting and Flash smelting operations.	07	
	(a) Define hydrometallurgy with its applications.	03	
Q.4	(b) Enlist advantages and limitations of hydrometallurgical processes.	04	
	(c) Explain In-situ leaching with its advantages and limitations.	07	
	OR		
Q.4	(a) List out ores of Aluminum with chemical formulae. Enlist applications of Al.	03	
	(b) Draw a flow sheet of Bayer process.	04	
	(c) Draw a flow sheets for recovery of precious metals from anode slimes.	07	
Q.5	(a) List out sources of copper with chemical formula and list out applications of copper.	03	
	(b) Enlist ores of Magnesium and its applications in engineering fields.	04	
	(c) Explain Mitsubishi process for copper smelting.	07	
OR			
Q.5	(a) List out ores of Tin (Sn) with chemical formula. Give applications of Tin.	03	
	(b) Draw a flow sheet for refining of Lead bullion.	04	
	(c) Draw a flow sheet of extraction of Nickel by INCO process.	07	
