Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 152102 **Date: 16-05-2013**

Subject Name: Non-Ferrous Extractive Metallurgy

Time: 10.30 am - 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.**

Q.1	**(a)**	List Important ores / minerals with their chemical formula of Aluminum, Lead, Zinc, Copper, Tin, Silver and Magnesium.	**07**
	(b)	With the help of flow sheet explain the process of tin extraction from its concentrate. Explain with thermodynamic reasons that why tin is produced by three stages process?	**07**
Q.2	**(a)**	Explain the process for lead extraction from its ore. Draw the flow sheet with important parameters involved in the process.	**07**
	(b)	Discuss Bayer process for alumina production and give the flow sheet. Why high pressure is used in Bayer process? **OR**	**07**
	(b)	What is Blister copper? Explain the Electrolytic refining process of Blister copper. How the harmful impurities in electrical grade copper are eliminated during copper electrolytic refining?	**07**
Q.3	**(a)**	Explain Hall-Heroults process of Al extraction. Discuss the Factors affecting current efficiency in Hall-Heroults process.	**07**
	(b)	Explain the WORCRA process for Copper production. Mention the factors affecting efficiency of WORCRA process.	**07**
		OR	
Q.3	**(a)**	Explain the ALCOA process for Aluminum production. Mention that why does the ALCOA process consume less energy than the Hall-Héroult process.	**07**
	(b)	Differentiate between Single step and multistep continuous processes for copper extraction. Explain Mitsubishi process for Copper production in brief.	**07**
Q.4	**(a)**	Explain the pyrometallurgical process of nickel extraction from its sulphide ore. Draw the flow sheet with important parameters involved in the process.	**07**
	(b)	Explain the hydrometallurgical process of zinc from its ores and draw the process flow sheet. Give the advantages of hydrometallurgical extraction of Zinc on pyrometallurgical extraction.	**07**
		OR	
Q.4	**(a)**	Explain the Imperial Smelting process for production of zinc with necessary sketches.	**07**
	(b)	Give the ores of nickel with their chemical formula. Explain the carbonyl process for refining of nickel.	**07**
Q.5	**(a)**	Write a note on Occurrence of gold. Discuss the amalgamation and chlorination process for gold extraction.	**07**
	(b)	With the help of line diagram, explain the Pidgeon process for extraction of magnesium mentioning the thermodynamic reasons.	**07**
		OR	
Q.5	**(a)**	With the help of a flow sheet explain briefly the fire refining of tin.	**07**
	(b)	Explain the DOW process for extraction of magnesium	**07**