Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV • EXAMINATION – WINTER 2013

Subject Code: 142102 **Date: 23-12-2013**

Subject Name: Principles of Extractive Metallurgy

Time: 02:30 pm to 05:00 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)**	Draw a neat flow sheet for extraction of 99.9% pure copper from its sulphide ore using pyrometallurgical route.	**07**
	(b	Draw a general flowsheet for metal extraction from ore. What is roasting ? Explain fluidized bed roasting process in brief.	**07**
Q.2	**(a)**	What is hydrometallurgy ? Give basic steps of hydrometallurgical operations in form of a flowsheet.	**07**
	(b	Name various leaching methods and explain them in brief.	**07**
		OR	
	(b	Justify the importance of Ellingham diagram for oxide system in extractive metallurgy using pyrometallurgical route.	**07**
Q.3	**(a)**	Write short notes on (i) Calcination (ii) Sintering (iii) Smelting	**07**
	(b	Explain in brief Ion Exchange , Solvent Extraction and Zone refining processes.	**07**
		OR	
Q.3	**(a)**	Draw flow sheet of extraction of iron.	**07**
	(b	What is Order of reactions and Molecularity? Differentiate between Order and Molecularity.	**07**
Q.4	**(a)**	What is electrometallurgy? Explain in brief electrometallurgical operation for any metal.	**07**
	(b	Draw a simple flow sheet for extraction of Aluminium from bauxite ore.	**07**
		OR	
Q.4	**(a)**	Draw flow diagram for extraction of Zinc from its sulphide ore.	**07**
	(b	Discuss collision theory of reaction kinetics.	**07**
Q.5	**(a)**	Derive equation for half life period of first order reaction.	**07**
	(b	What are advantages and disadvantages of Pyrometallurgical and Hydrometallurgical processes.	**07**
		OR	
Q.5	**(a)**	Differentiate between electro-winning and electro-refining	**07**
	(b	Explain in brief Converting and Fire Refining processes during copper extraction process.	**07**

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