Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 142102 **Date: 06/06/2017**

Subject Name: Principles Of 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.**

Q.1	**(a)**	What is extractive metallurgy? List out sources of metals. Draw basic flow diagram of extraction of metals.	**07**
	(b)	What is roasting ? Explain fluidized bed roasting process in brief.	**07**
Q.2	**(a)**	Justify the importance of Ellingham diagram for oxide system in extractive metallurgy using pyrometallurgical route.	**07**
	(b)	Write short notes on (i) Calcination (ii) Sintering (iii) pelletizing	**07**
		OR	
	(b)	Explain in brief Ion Exchange .	**07**
Q.3	**(a)**	Draw process flow sheet of Aluminum extraction. Label all important process parameters.	**07**
	(b)	What is Leaching? Write types of leaching. Explain briefly about pressure leaching	**07**
		OR	
Q.3	**(a)**	Draw a neat flow sheet for extraction of 99.9% pure copper from its sulphide ore using pyrometallurgical route.	**07**
	(b)	Explain in brief Solvent Extraction.	**07**
Q.4	**(a)**	What is Order of reactions and Molecularity? Differentiate between Order and Molecularity.	**07**
	(b)	Discuss collision theory of reaction kinetics.	**07**
		OR	
Q.4	**(a)**	Differentiate between electro-winning and electro-refining	**07**
	(b)	Define hydrometallurgy. Mention the advantages and limitations of Hydrometallurgical extraction processes.	**07**
Q.5	**(a)**	What is Arrhenius equation? Derive it.	**07**
	(b)	Explain briefly about fused salt electrolysis	**07**
		OR	
Q.5	**(a)**	Write a note on sulphide free energy diagram and their limitations .	**07**
	(b)	Draw flow sheet of extraction of iron and steel.	**07**

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