Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2021

Subject Code:3152107 Date:01/01/2022

Subject Name:Non Ferrous 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define extractive metallurgy.	**03**
	(b)	List different advantages & Limitations of pyrometallurgical extraction process.	**04**
	(c)	Discuss fluidized bed roasting process and describe importance of Fluidization curve.	**07**
Q.2	**(a)**	What is the purpose of roasting in Copper extraction?	**03**
	(b)	Differentiate in Matte smelting and Reduction smelting.	**04**
	(c)	Write a note on Gaseous reduction of aqueous solutions.	**07**
		OR	
	(c)	List factors lead to a lower current efficiency in electrolysis of fused salts. Suggest methods to minimize it.	**07**
Q.3	**(a)**	Why carbothermic reduction not used for extraction of Aluminium on commercial scale?	**03**
	(b)	How the metal losses in slag minimized in blast furnace smelting of lead ore.	**04**
	(c)	Explain importance of Ellingham diagrams diagram in pyrometallurgy.	**07**
		OR	
Q.3	**(a)**	Write limitations of Ellingham diagrams.	**03**
	(b)	Enlist the properties and function of a flux and slag in smelting process.	**04**
	(c)	Write a note on predominance area diagrams.	**07**
Q.4	**(a)**	Differentiate in horizontal and vertical retorts in pyrometallurgical extraction of Zinc.	**03**
	(b)	Explain the Pidgeon process for extraction of magnesium.	**04**
	(c)	Using suitable examples, describe theory of absolute reaction rate.	**07**
		OR	
Q.4	**(a)**	Why MgO cannot be reduced by carbon to produce magnesium?	**03**
	(b)	Describe the electrolytic refining of nickel.	**04**
	(c)	Discuss Bayer process for alumina production and give the flow sheet.	**07**
Q.5	**(a)**	Define: Drying and Calcination.	**03**
	(b)	Write a note on Electrowinning.	**04**
	(c)	Describe process flow sheet of Cu extraction with all important parameters involved in the process.	**07**
		OR	
Q.5	**(a)**	Discuss role of cryolite in Electrolysis of Aluminium.	**03**
	(b)	Discuss the different stages in copper converting.	**04**
	(c)	Using flow sheet explain process of tin extraction from its concentrate. Why tin is produced by three stages process?	**07**

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