

Enrolment No./Seat No \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2024**

**Subject Code:3152107**

**Date:18-05-2024**

**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.**

		<b>MARKS</b>
<b>Q.1</b>	(a) List out ore/minerals of Iron, Aluminum and Magnesium with their name and chemical compositions.	<b>03</b>
	(b) Compare between sintering and palletizing.	<b>04</b>
	(c) Write note on Ellingham diagram for oxides.	<b>07</b>
<b>Q.2</b>	(a) What is Extractive Metallurgy? List out basic extraction processes.	<b>03</b>
	(b) Write note on calcination process.	<b>04</b>
	(c) What is Roasting. Discuss mechanism of roasting in detail.	<b>07</b>
	<b>OR</b>	
	(c) Discuss Hall Heroult process.	<b>07</b>
<b>Q.3</b>	(a) List out merits and demerits of Pyro metallurgy and Hydro metallurgy	<b>03</b>
	(b) Differentiate electro winning and electro refining.	<b>04</b>
	(c) Short note on Bayer process for $Al_2O_3$ production.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Explain Arrhenius equation and activation energy.	<b>03</b>
	(b) Explain Solvent extraction process.	<b>04</b>
	(c) Derive the relation between reaction rate and concentration for first and second order.	<b>07</b>
<b>Q.4</b>	(a) Why Aluminum cannot be reduced by carbon ?	<b>03</b>
	(b) Explain extraction process for production of Magnesium.	<b>04</b>
	(c) Discuss bacterial leaching with suitable example..	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Draw flow diagram of refining of Tin.	<b>03</b>
	(b) Compare Unit processes and Unit operations.	<b>04</b>
	(c) Discuss Mitsubishi process with line diagram.	<b>07</b>
<b>Q.5</b>	(a) How Imperial smelting process of Zinc is done?	<b>03</b>
	(b) Explain production of Ti by any extraction process.	<b>04</b>
	(c) Explain in brief on bacterial leaching.	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) Draw flow diagram of Recovery of Precious metals from Anode slime.	<b>03</b>
	(b) Discuss Pyro metallurgical extraction of Nickel.	<b>04</b>
	(c) List out process for production of Lead and Explain any one.	<b>07</b>