

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2024****Subject Code:3152107****Date:28-11-2024****Subject Name:Non Ferrous 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.
4. Simple and non-programmable scientific calculators are allowed.

		<b>Marks</b>
<b>Q.1</b>	(a) What are the important ores of copper? Mention places where copper deposits occur in India.	<b>03</b>
	(b) Write the advantages and disadvantages of Hydrometallurgy.	<b>04</b>
	(c) Discuss the important properties of copper. Explain the main steps in the production of copper from its sulphide ores by pyrometallurgical process.	<b>07</b>
<b>Q.2</b>	(a) What is smelting? Why smelting of roasted copper ore is done?	<b>03</b>
	(b) Enlist the important ores of lead and write the main applications of lead.	<b>04</b>
	(c) Write a note on predominance area diagrams.	<b>07</b>
<b>OR</b>		
	(c) What is anode effect in an aluminium refining? Give the reasons for anode effect & remedies for it.	<b>07</b>
<b>Q.3</b>	(a) What are the important ores of Zinc? List out the main applications of Zinc.	<b>03</b>
	(b) Explain the differences between general roasting and flash roasting.	<b>04</b>
	(c) What is leaching? What are the different types of leaching process? Explain them.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Discuss various properties and applications of aluminium.	<b>03</b>
	(b) What are the differences between 'ore' and Mineral?	<b>04</b>
	(c) Discuss Kroll's process of Ti production.	<b>07</b>
<b>Q.4</b>	(a) Discuss the commercial ores, applications and properties of Titanium.	<b>03</b>
	(b) Define the concept of reaction rate. Write the factors affecting the rate of reaction.	<b>04</b>
	(c) Describe Pidgeon process of Magnesium Production.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) What is rate law and half-life of a reaction??	<b>03</b>
	(b) Illustrate the flow sheet for Extraction of Nickel.	<b>04</b>
	(c) Describe Ellingham diagrams and its applications in extractive metallurgy.	<b>07</b>
<b>Q.5</b>	(a) What is blister copper? Name the elements present in it as impurities.	<b>03</b>

- (b) Discuss the Parke's process for silver recovery from lead. **04**
- (c) Describe the Bayer process for preparation of pure  $\text{Al}_2\text{O}_3$ . Explain various reactions involved in the process. **07**

**OR**

- Q.5** (a) What are the sources of Magnesium? **03**
- (b) Differentiate between Electrowinning and Electro refining. **04**
- (c) Discuss in detail the Hall-Heroult process for production of Aluminium. **07**

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