

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. - SEMESTER – IV • EXAMINATION – WINTER 2012

Subject code: 142102**Date: 28/12/2012****Subject Name: Principles of Extractive Metallurgy****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Define and explain: 1. Calcination 2. Pelletizing 3. Converting **07**
(b) What are Ellingham diagrams? Explain how Ellingham diagrams can be useful in the extractive metallurgical process. **07**

- Q.2** (a) Discuss different steps of fluidized bed roasting process. Mention the importance of Fluidization curve. **07**
(b) Draw process flow sheet of Aluminum extraction. Label all important process parameters. **07**

OR

- (b) Write a note on sulphide free energy diagram and their limitations. **07**
- Q.3** (a) “Blast furnace smelting is not used for extraction of copper, whereas blast furnace smelting is extensively used for extraction of iron.” Examine the statement critically and justify. **07**
(b) Explain the Solvent extraction process. **07**

OR

- Q.3** (a) Draw a neat flow sheet for extraction of 99.9% pure copper from its common ore using pyrometallurgical route. **07**
(b) Describe about microbial leaching. Explain the effect of bacteria on leaching rate and extent of recovery. **07**

- Q.4** (a) Define hydrometallurgy. Mention the advantages and limitations of Hydrometallurgical extraction processes. **07**
(b) Write a note on Electrowinning. Discuss its applications. **07**

OR

- Q.4** (a) Define pressure leaching. Discuss the requirements of pressure leaching. Why pressure leaching is carried out in autoclave? **07**
Q.4 (b) Discuss the electrochemical principle involved in electrorefining of metals using molten salts. Explain the principle in reference to refining of aluminum. **07**

- Q.5** (a) Draw process flow sheet of Zinc extraction with important parameters involved in the process. **07**
(b) What do you mean by reaction rate? Discuss various factors affecting rate of a reaction. **07**

OR

- Q.5** (a) What are flux and slag? List the properties and function of a flux and slag in smelting process. **07**
(b) Discuss collision theory of reaction kinetics. **07**
