

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV • EXAMINATION – SUMMER 2013****Subject Code: 142102****Date: 12-06-2013****Subject Name: Principles of Extractive Metallurgy****Time: 10:30am – 01:00pm****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 smelting? Differentiate between Matte smelting and Reduction smelting processes with suitable examples. **07**

(b) Define and Explain: a. Sintering b. Calcination c. Pelletizing **07**

Q.2 (a) Explain importance of oxide free energy diagram in pyrometallurgy. Write limitations of Ellingham diagrams. **07**

(b) What do you mean by rate of a reaction? Discuss various factors affecting rate of a reaction. **07**

OR

(b) Define: (i) Order of reactions (ii) Molecularity. **07**
Differentiate between order of reaction & molecularity. Give their importance.

Q.3 (a) Define Roasting. Discuss about Multiple Hearth roaster. Give drawbacks of Multiple Hearth roaster. **07**

(b) Write a note on sulphide free energy diagrams and their applications. **07**

OR

Q.3 (a) What is fluidized bed roasting? Discuss different process steps. Explain the importance of fluidization curve. **07**

(b) Why the smelting process is carried out in copper extraction? Explain flash smelting process for copper extraction. **07**

Q.4 (a) Define Leaching. Explain pressure leaching. List out advantage of pressure leaching. Why pressure leaching is carried out in autoclave? **07**

(b) Write a note on Solvent extraction process. **07**

OR

Q.4 (a) What is microbial leaching? Explain the effect of bacteria on leaching rate and extent of recovery. Mention the ways to increasing leaching rate. **07**

(b) What is Hydrometallurgy? Critically compare it with Pyrometallurgy in terms of advantages, limitations and applications. **07**

Q.5 (a) Discuss the electrochemical principle involved in electrorefining of metals using molten salts. Explain it in reference of aluminum refining. **07**

(b) Draw and explain process flow sheet of Zinc extraction with important parameters involved in the process. **07**

OR

Q.5 (a) Write a note on fused salt electrolysis. **07**

(b) Draw and explain process flow sheet of Aluminium extraction. Mention all the process parameters in flow sheet. **07**
