

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV • EXAMINATION – WINTER 2013****Subject Code: 142102****Date: 23-12-2013****Subject Name: Principles of 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.

- Q.1 (a)** Draw a neat flow sheet for extraction of 99.9% pure copper from its sulphide ore using pyrometallurgical route. **07**
- (b)** Draw a general flowsheet for metal extraction from ore. What is roasting ? Explain fluidized bed roasting process in brief. **07**
- Q.2 (a)** What is hydrometallurgy ? Give basic steps of hydrometallurgical operations in form of a flowsheet. **07**
- (b)** Name various leaching methods and explain them in brief. **07**
- OR**
- (b)** Justify the importance of Ellingham diagram for oxide system in extractive metallurgy using pyrometallurgical route. **07**
- Q.3 (a)** Write short notes on (i) Calcination (ii) Sintering (iii) Smelting **07**
- (b)** Explain in brief Ion Exchange , Solvent Extraction and Zone refining processes. **07**
- OR**
- Q.3 (a)** Draw flow sheet of extraction of iron. **07**
- (b)** What is Order of reactions and Molecularity? Differentiate between Order and Molecularity. **07**
- Q.4 (a)** What is electrometallurgy? Explain in brief electrometallurgical operation for any metal. **07**
- (b)** Draw a simple flow sheet for extraction of Aluminium from bauxite ore. **07**
- OR**
- Q.4 (a)** Draw flow diagram for extraction of Zinc from its sulphide ore. **07**
- (b)** Discuss collision theory of reaction kinetics. **07**
- Q.5 (a)** Derive equation for half life period of first order reaction. **07**
- (b)** What are advantages and disadvantages of Pyrometallurgical and Hydrometallurgical processes. **07**
- OR**
- Q.5 (a)** Differentiate between electro-winning and electro-refining **07**
- (b)** Explain in brief Converting and Fire Refining processes during copper extraction process. **07**
