

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. Sem. – IV - Examination –June- 2011****Subject code: 142102****Subject Name: Principle of Extractive Metallurgy****Date: 08/06/2011****Time: 10.30 am – 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.

- Q.1** (a) Give outline of various possible steps of hydro metallurgy. Give merit and demerits of hydro metallurgy. **07**
- (b) List out different pyro metallurgical processes. Explain each in brief. **07**

- Q.2** (a) Draw Standard free energy diagram for oxides for metals. Explain use of O₂, CO/CO₂ and H₂/H₂O scale. **07**
- (b) Differentiate between homogeneous and heterogeneous reactions. **07**

OR

- (b) Draw flow sheet for production of iron and steel. **04**
Differentiate between sintering and pelletizing **03**

- Q.3** (a) With flow diagram discuss the extraction of Aluminum from its oxide Ore and extraction of lead from its sulphide Ore. **07**
- (b) Differentiate between electro winning and electro refining. **07**

OR

- Q.3** (a) What is Order of reactions and Molecularity? Differentiate between Order and Molecularity. **07**
- (b) Find out the molecularity and order of the following elementary reactions. **04**
When a) $A+2B \rightarrow C+D+2E$ and
b) When concentration of A and B are comparable.
Differentiate between drying and calcinations. **03**

- Q.4** (a) Explain purification processes of leach liquors. **07**
- (b) Discuss collision theory of reaction kinetics. **07**

OR

- Q.4** (a) Explain theory of absolute reaction rate. **07**
- (b) Derive Arrhenius Equation. **03**
- (c) Short note on Zone refining. **04**

- Q.5** (a) What is leaching? Explain in brief about different leaching techniques. **07**
- (b) Draw flow diagram of extraction of Zinc. **03**
- (c) What are advantages and disadvantages of pyro Metallurgy? **04**

OR

- Q.5** (a) What are various Ores of Cu and Al. Draw neat flow diagram for extraction of copper from its sulphide Ore. **07**
- (b) Draw Ellingham diagram for metal sulphide and metal chlorides. **07**
