B. Tech-5th MME

**Principles of Extractive Metallurgy**

Full Marks: 70

Time: 3 hours

**Q.No.1** which is compulsory and answer and five from the rest of the question

The figure in the right –hand margin indicates marks.

**1.** Answer the following [ 2 x 10]

(a) Define roasting and calcination?
(b) What is leaching and it types
(c) Differentiate between pyro, hydro and electrometallurgy
(d) What is matte smelting?
(e) What is Ellingham diagram and it significance in metal extraction?
(f) What is extraction coefficient and segregation coefficient?
(g) What is basicity of slag? And what is the main function of flux in smelting operation
(h) Explain the fluidisation curve for FBR with a suitable graph.
(i) What is sublimation and distillation techniques of refining?
(j) What is flash smelting?

**2.** write short notes on the following [5 x 2]

(I) Metallothermic reduction
(II) halide metallurgy

**3.** (a) What are the difference between extraction of aluminium and iron. And why aluminium cannot be extracted through pyro metallurgy suggest some good points. [6]

(b). What is liquation refining and fire refining of metals? Explain in brief with suitable example. [4]

**4.** What is flash smelting? and explain its advantages with a suitable diagram of a flash smelter [ 10]

**5.** (a) What are the different chemical methods [6]
of purification of leach liquor, explain one of them in details
(b) In a copper ore chalcopyrite is 34 %, pyrite 30 % [4]
and sio2 36 %. Determine the percentage of iron copper and sulphur.

**6.** (a) What is solvent extraction? Explain each [6]
Steps of extraction.
(b) what is cementation process explain in details. [4]

**7.** (a). what the different law of electrolysis define it with expression [6]

(b) Explain the kinetics of ion exchange process [4]
in details.

**8.** (a) What are ion exchange resins explain [6]
their characteristic and function and types.

b. write short notes on the following [4]
i. Ellingham diagram
ii. Predominance area diagram