MTPC2003 ELEMENTS OF PROCESS METALLURGY (3-0-0)

MODULE-I (08 hrs)

Overview of Extractive Metallurgy processes; Pyro-metallurgy, Hydrometallurgy and Electrometallurgy; Thermodynamic and Kinetic Principles of metal extraction; Ellingham diagrams, Calcinations; Roasting; Predominance Area Diagram, Roasting Practices, Smelting, Formation and function of slag and their calculations,

MODULE-II (08 hrs)

Metallo-thremic and carbothermic reduction of oxides, Smelting Furnaces, Matte Smelting, Pyro metallurgical processes using vacuum Hydrometallurgy: Leaching; Theory of Leaching; Role of oxygen in leaching operation; Bacterial and microbial leaching; Contact reduction of metals in aqueous solutions;

MODULE-III (08 hrs)

Gaseous reduction of metals in aqueous solutions; Ion exchange, Solvent Extraction and Electrolysis, Electrometallurgy: laws of electrolysis, electrolyte Structure of solvent media; Electrolysis of aqueous solution; Electrolysis of fused salts; Cell design; Electro refining

MODULE-IV (08 hrs)

Halide Metallurgy and Halogenation., Basic approaches of refining, preparation of pure compounds; Purification of crude metals produced in bulk

MODULE-V (08 hrs)

Concept of activity, chemical potential, fugacity, real and idle solution, and the significance in metal extraction, Numerical problems relevant to Pyro, Hydro and Electrometallurgical processes

Books:

[1] Principles of Extractive Metallurgy: A. Ghosh & H.S. Ray, IIN Publications, Kolkata 1984

[2] Principles of Extractive Metallurgy: Rosenquist, T., McGrawhill - Kogakusha International – 1983 [3] Mineral Processing and Extractive Metallurgy by Corby G. Anderson (Editor), Robert C. Dunne (Editor), John L. Uhrie (Editor)

[4] Metallurgy a Brief Outline of the Modern Processes for Extracting the More Important Metals by W. Borchers