PCE8J001 MINERAL PROCESSING

Module I:

Introduction andscope of mineral processing in extractive metallurgy. Ores and mineralresources in India and worldwide for basic metals like iron, copper, aluminium, lead, and zinc. Physical and chemical characteristics of industrial minerals.

Liberation and its significance. Size reduction:Crushing laws and crushing and grindingequipments. Screening theory and equipments. Classifiers: mechanical and hydraulic.

Module II:

Gravity concentration methods: tabling, jigging, heavy media separation,hydrocyclones, and spiral concentrators. Flotation: theory and equipments. Magnetic separation: HGMS, WHIMS, and SC-HGMS. Electrostatic separation: ion-bombardment and triboelectrostatic separators. Sedimentation theory and equipments - Thickeners and clarifiers.

Module III:

Thermal methods in processing of ores: Roasting, sintering, calcination, pelletisation, and briquetting. Chemical and electrochemical methods in mineral processing: Leaching – acid and bacterial leaching, amalgamation and cyanidation.

Module IV:

Beneficiation flow sheets of coal and simple ores of copper, lead, zinc, and iron with reference to Indian deposits.

Reference Books:

1. Handbook of Mineral Dressing: Ores and Industrial Minerals by A F Taggart, John Wiley.
2. Principles of Mineral Dressing by AMGaudin, McGraw-Hill.
3. Perry's Chemical Engineers' Handbook, 8th ed. by D W Green and R H Perry, McGraw-Hill.
4. Mechanical Operations, 1st ed. by A K Swain, H Patra, and G K Roy, McGraw-Hill.
5. Extraction of Nonferrous Metals by HSRay, R Sridhar, and KPAbraham, East West Press.
6. Mineral Processing Technology, 7th ed. by B A Wills and T J Napier-Munn, Butterworth-Heinemann.