

12. MINING ENGINEERING

PAPER - I

- 1. General Mechanical Engineering:** Strength of material and power transmission, elements of Hydraulics, Internal combustion Engines (OTTO cycle, Diesel Cycle) Power Transmission (Belt, Chain, Rope, Drive) compressor, pneumatic Machines.
- 2. Geology:** Structural Geology: Definition and scope. Recognition of faults, folds, joints, unconformities etc., Primary and induced structures, their importance in Mining, Bedding, Lamination, foliation, fracture, Cleat etc., field Geology; importance and scope of field Geology, field techniques, geological mapping.
- 3. Principles of Stratigraphy.**
- 4. Exploratory Drilling:** Principles, selection of site, lay outs, details of equipment, methods of drilling and their variation, interpretation of bore hole data.
- 5. Explosives and Blasting:** Classification, types and use of explosives storage and transport. Blasting techniques in UG and open cost mines.
- 6. Supports:** Objectives, limitations of mine supports, Types of mine supports and systematic timbering, Power supports, roof stitching, roof bolting.
- 7. Mineralogy:** Physical, chemical and optical characteristics of common rock forming silicate mineral groups. Structural classification of silicates. Minerals of Carbonate, Phosphate and sulphide groups.

PAPER - II

- 1. Opening and Choice of Mining Methods:** Opening, development of mineral deposits, classification of mining methods, merits, demerits and application. Bord and pillar mining. Long wall mining. Open cast mining and their variations. Design of suitable methodology of mining for specific conditions like thickness, depth, inclination, annual production etc., thick seam mining, stowing, bench parameters, box-cut.
- 2. Metal Mining:** Scope and limitations of U/G metal mining methods, Classification of U/G metal mining systems and their applications in different conditions.

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3. **Mine Surveying:** Principles of surveying. Different methods and their importance. Chaining, compass surveying, theodolite surveying, plane tabling, levelling, triangulation, correlation. Astronomical terms and definitions. Mine plans and sections. Regulations pertaining to plans and sections.

4. **Mining Machinery:** Elements of transport system, classification and techno economic indices. Rope haulage, locomotive haulage, conveyers, Aerial ropeways, trackless haulage, Winding. Drainage and pumping.

5. **Mine Environmental Engineering:** Mine air and environment. Natural and mechanical ventilation, Types, design variables, selection, installation and maintenance. Mine fires, explosions and inundations, Rescue and recovery.

6. **Mine Legislation and safety:** Regulations pertaining to conservation's, exploitation of mineral deposits. Safety welfare and hygiene of mine workers.