DEPARTMENT OF MINING ENGINERRING
Syllabus for Pre- Ph.D. Test (MPET)

Mineral and Energy Resources

Mineral and Energy resources of Rajasthan, India and World.

Prospecting & Exploration

Prospecting & Exploration: Reconnaissance, Principles and Methods, Trenching & Pitting, boring methods, drilling muds, directional drilling.

Mine Entries and Under Ground Mine Development

Different mode of entries into a deposit to be worked out by underground mining, Their merits, demerits and suitability. Optimum location of an entry.

Horizontal Development: Shape, size and gradient of drives and tunnels. Drilling, blasting, loading, transport of muck and supports with conventional methods of driving small and medium size drifts and tunnels. Ventilation and drainage. Fast driving of tunnels using jumbos, borers. Trackless mucking and transportation units. Driving of large size drives and tunnels.

Vertical Development: Conventional methods of raising, Raise climbers, long hole raising of driving.

Mining Machinery

Compressor : Types, principle, construction and use.

Rope Haulage : Types, construction, installation, operation and comparison.

Locomotives : Different types, construction, operation and comparison.

Wire Ropes : Types, construction, installation, maintenance and tests, space factor, rope splicing, different rope capels and capping process.

Winding: Shaft fittings, different types of winding systems and winders, braking, safety devices, detaching hooks, Comparison of drum winding and koepe winding systems.

Methods of Work

Underground Coal: Development & extraction of coal by "Board & pillar method" and longwall method", variants of board & pillar method, depillaring, various machines used.

Opencast Mining : General details, basic definitions, determination of main parameters, opening of surface mines, disposal of overburden, major operations in surface mining viz. ground preparation, drilling, blasting, excavation, loading & transportation, Reclamation, machines used.

Underground Metal Mining: Basic information, details of various excavations and structures required for different purposes,

Stopping methods : Classification, development work required, stope preparation, haulage, dumping, ventilation, loading, hoisting and possible recovery from each method.

Ventilation

Mine Atmosphere : Composition, pollution, physiological affects of mine gases, their detection, heat and humidity in mines, their effect on mine workers, measurement and control, comfort conditions, geothermic gradient.

Ventilation : Necessity and standards of ventilations, laws of ventilation, mine resistance.

Natural Ventilation: Cause, initiation, measurement, motive coloumn.

Mechanical Ventilation: Mine fans, principle types, construction and working, booster and auxiliary fans.

Coursing: Distribution and regulation of air current, splitting, dead end ventilation, forcing v/s exhaust, accessional v/s descensional, homotropal v/s antitropal systems.

Ventilation Survey : Types, instruments used, methods, booking etc.

Mine Environment

Environmental issues in mineral industry, Various pollutions caused by mining activities, their control and mitigation measures viz. Land, Air, Water, Noise, Social, Ground & Air vibration, etc. their measurement & permissible limits

Mine Legislation.

National Mineral policy, Statutory laws concerned with development and conservation of minerals, Mine and Minerals (Regulation and Development) Act, Mineral Concession Rules, Mineral Conservation and Development Rules, Mines Act, Coal Mines and Metalliferous Mines Regulation.

Rock Mechanics

Application of rock mechanics in mining.

Stress and strain in rocks, physico-mechanical properties of rock and their determination, Failure criteria of rock and rock mass, ground water, its influence on rock and mining, measurement of ground water flow and pressure.

Mine Economics & Management

Mine Sampling: Theory, methods, precautions, estimation and calculations, mine valuation, life of mine

and its present value, capital and operating cost, standard cost, budget and budgetary control.

Personnel management, training, human resources, job evaluation and incentives, work study, production planning, scheduling and control, productivity, PERT & CPM, purchase and store management, inventory control, value analysis.

Mine Surveying

Theodolites, traversing, closing error, omitted measurements, leveling, tachometric surveying, contouring, interpolation of contours, curve ranging, correlation.

Stope and face surveying, minor instruments, mine plan and sections, enlargement of plans, dip fault problems, total stations.