Tamil Nadu Public Service Commission
Syllabus
Mining Engineering
(Diploma Standard)

Code: 605

Unit I: Basic Concepts of Mining and Geology (20 Questions)

Basic Concepts of Mining: Terminology, Mineral and energy resources of Tamil Nadu , India and World, Resources of minerals in Tamil Nadu and India, Export policy of minerals, problems in mining industries – Critical minerals and rare Earth minerals occurrence in Tamil Nadu and India.

Geology: Basic terminology of engineering and economic geology; Prospecting and exploration-Principles and techniques; types of rocks; Classification of minerals and their properties; Study of topographic maps; Ore and gangue; Processes of ore formation; Major and Minor Indian mineral deposits- distribution and mode of occurrence; Earthquakes, volcanoes and seismicity, Seismic zones of India.

Unit II: Mine Planning and Mine Management (20 Questions)

Mine Planning: Sampling methods, practices and interpretation; Reserve estimation techniques: Basics of geo-statistics and quality control; cutoff grade; bench geometry; Pit planning and design; Production scheduling; Work-study, Feasibility report, Detailed project report.

Mine Management: Personnel management, training, productivity, PERT,CPM, purchase and store management, Inventory control, budget & budgetary control.

Unit III: Mine Developments (20 Questions)

Mine Development: Methods of access to deposits; Underground driveage; Drilling: principles, patterns, methods and machines; Explosives, Initiation systems, blast design, controlled blasting practices; fragmentation assessment, blasting monitoring and Instrumentations.

Unit IV: Mine Surveying (20 Questions)

Mine Surveying: Levels and levelling, theodolite, tacheometry, triangulation; Contouring; Errors and adjustments; Correlation; Dip fault problems; Underground surveying; Curves; Photogrammetry; EDM and Total Station; Application of GPS, DGPS; GIS and Remote sensing in mining; Drone survey and its application in Mining

Unit V: Mining Methods (20 Questions)

Mining Methods: Surface mining: layout, development, loading, transportation and mechanization, continuous surface mining systems; Dimensional stone mining methods, machineries and end product process; Underground coal mining: bord and pillar systems, longwall mining, Underground metal mining: open, supported and caved stopping methods.

Unit VI: Mining Machinery (20 Questions)

Generation and transmission of mechanical, hydraulic and pneumatic power; Materials handling: haulages, conveyors, face and development machinery, hoisting systems, pumps, crushers, continuous miners and associated machineries.

Unit VII: Rock Mechanics and Slope Stability (20 Questions)

Stress, strain –compressive and tensile, shear strength, uni-axial and tri-axial strength, Poisson's Ratio, Young's Modulus, convergence, elasticity, litho static and hydrostatic pressure, rock mass classifications, protection of surface structures, design and stability of structures in rock, dynamic and static loading, measuring instruments, subsidence ; monitoring of rock mass performance; mechanics of rock fragmentation, slope stability and dump stability, dump management.

Unit VIII: Mine Ventilation (20 Questions)

Mine Ventilation : Mine atmosphere, Mine gases, flame safety lamp, methanometers and multi-gas detectors, gas chromatograph, methane layering; monitoring of different gases, tele-monitoring, coal bed methane/coal mine methane, Heat and humidity, geothermal gradient, Air-flow in mines, Natural Ventilation and Mechanical Ventilation, Airborne dust, Mine fires and dealing with it, Mine explosions, Fire extinguishers, Mine inundation, rescue and recovery in mines, rescue apparatus, organization of rescue work, emergency preparedness and response system.

Unit XI: Mine Environment (20 Questions)

Environment: Air, water and soil pollution: Standards of quality, causes and dispersion of contamination, and control; Noise; Land reclamation, Role of Pollution Control Boards, Ministry of Environment and Forest - mine closure plan, R&R (rehabilitation and re-settlement).

Unit X: Mine Legislation (20 Questions)

Prerequisite for Starting of a Mine: Approval of Mining Plan and Mine Closure Plan, Grant of Mining Lease, Environment and Forest Clearances, Safety, Rehabilitation of project affected families, welfare of workers etc., - Regulatory Frame work for the Exploration and Extraction of Mineral Resources: National Mineral Policy 2019;Mineral Concession Rules; Mineral Conservation and Development Rules; Mineral (Auction) Rules 2015; Mines Act-1952, Coal Mine Regulation-2017, Metalliferous Mine Regulation-1961; Mines and Minerals (Contribution to DMF) Rules -2015; Regulatory authorities; DGMS circulars.

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