

**SYLLABUS FOR THE POST OF MINING GRADUATE TRAINEE,
E-2 GRADE (INTERNAL)**

Circular No.CRP/PER/R/2024/276, DT.14.03.2024

PART-I (Subject related to the post)

<p>Mine Management, Legislation and General Safety.</p>	<p>The Mines Act, 1952; Mines Rules 1955, Mines Rescue Rules, 1985, Mine Vocational Training Rules, 1966, Coal Mine Regulation, 2017 and other rules and legislation as applicable to coal mines. Provisions of Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2023 applicable to mines.</p>
<p>Methods of coal Mining, Drilling Technology.</p>	<p>Opening of coal seams, Methods of boring, boring through disturbed strata; borehole survey; interpretation of geological maps.</p> <p>Methods of shaft sinking: mechanized sinking, in ordinary and water logged grounds and other special methods; shaft supports, temporary and permanent, mechanized stonedrifting etc.</p> <p>Underground Mining Methods: Choice of methods of mining coal seams and factors (depth, seam thickness, inclination, etc.) affecting the same; statutory provisions.</p> <p>Board and pillar method: statutory provisions, mechanized loaders, continuous miners etc., depillaring and applicable statutory provision; pillar extraction with caving and stowing; mechanization in depillaring; local fall and main fall; indications of roof weighting; air blasts and precautions against the same;</p> <p>Multi-section and continuous working; liquidation of developed pillars.</p> <p>Longwall mining: Longwall face-advancing and retreating faces; support system for longwall gate roads; powered support; face transfer, operation of shearer and plough;</p> <p>Thick seam mining: Board and pillar and longwall methods in multi-section; multi-slice methods; inclined slicing; horizontal slicing and cross slicing in ascending and descending orders; under-winning methods; sublevel caving; and descending shield methods; hydraulic mining; special methods of thick seam mining.</p> <p>Other special methods of mining: Wide stall method; method of mining thin seams; underground coal gasification, coal bed methane/ coal mine methane etc.</p>

Explosives and Blasting Techniques.	Types of explosives, explosive being used in underground mines and opencast mines, detonators and accessories, Transport and storage of explosive, solid blasting. Blasting patterns
Mine Ventilation, Mine Fires, Explosions, Inundations, Rescue and Recovery.	Mine Gases: Generation, Properties and Physiological Effects, Detection of Mine Gases, Methanometers and Multigas Detectors, Flame Safety Lamps. Mine fires and Hazards due to extraction of developed pillars, its mitigation,
	Inundation, Explosions in mines, risk of opencast mining near water bodies, rivers, and mitigation measures against risk from inrush of water Hazards due to Extreme weather condition in opencast mines and its mitigation Occupational hazards in surface mining and precautions.
	Rescue and recovery; investigations and reports; fire fighting plan; rescue equipment; resuscitation and reviving apparatus; selection and training for rescue work.
	Heat and humidity: Sources of heat in mines; geothermal gradient; effects of heat and humidity; heat transfer in board and pillar and long wall workings; methods of calculation of heat flow and temperature rise; heat load due to various machines; air cooling and conditioning.
	Air flow in mines: Laws of air flow; resistance of airways; resistance and splitting problems; equipment orifice; flow control devices; permissible air velocities. Natural ventilation: Seasonal variations; calculation of Natural ventilation pressure.
	Airborne dust: Generation, dispersion, measurement and control; suppression and treatment of coal dust; properties of stone dust; sampling and analysis of coal dust. Maintenance systems, Mechanical ventilation, fans in series and parallel, reversal of air flow; fan drift, diffuser and evasee; booster and auxiliary fans; standards of ventilation; ventilation calculation.
Rock Mechanics and Ground control.	Pressure arc theory, subsidence, types of roof, testing of roof, supporting materials, Types of support, mechanised support, Roof bolting, cable bolting, RMR.

Mining Machinery, Fundamentals of Electrical and Mechanical Engineering,	Material handling equipment in mines: Types, construction and operation; Safety devices; maintenance and calculations for rope haulages; locomotives, conveyors, systems, rope-ways, communication equipment, man riding systems; in-pit crushers, feeder breaker etc., use of diesel equipments in underground coal mines, free steered vehicles.
	Pumps: Types, Characteristics, motor power, capacity, laying of water mains, dealing with acid water; slurry, drainage; lodgements, storage, designs and layout of dams, sumps, pumping problems.
	Function and operation of blast hole drills, rippers, scrapers, shovels; draglines, dumpers, road graders, dozers, wheel loaders; Bucket Wheel Excavators; spreaders; surface continuous miners, rock breakers and their maintenance aspects, water-trucks, In-pit crushing conveying (IPCC)
	Generation, transmission and utilization of Power, Steam and compressed air: Air compressor and auxiliary equipment; air turbines and air engines; efficiency of power, steam system; safety aspects.
Fundamentals of Mining Geology.	Nature and occurrence of coal seams; description of Indian coalfields; features of coalfields; Mohr's scale of hardness
Fundamentals of Mine surveying.	Dip and strike problems: outcrop problems; borehole surveying and calculations. Types of plans and their preparation, care, storage and preservation: legislation concerning mine plans and sections; duties and responsibilities of surveyors. Application of computers in mine surveying and preparation of plans

PART-II (General Studies)

1. GENERAL KNOWLEDGE
2. GENERAL ENGLISH
3. QUANTITATIVE APTITUDE & NUMERICAL ABILITY
4. TEST OF REASONING
5. COMPUTER BASICS