

## Technical Syllabus for Exam Group – Chemical and Metallurgical Supervisor

Below is the Syllabus for Chemical and Metallurgical Supervisor Exam Group:

- **Fuels**– Classification – Solid. Liquid & Gaseous fuels. Coal, Metallurgical coke, Petroleum. Producer Gas, Water Gas, Coal Oven Gas, Blast Furnace Gas and Natural Gas.
- **Material Science**– Atomic Arrangement in Materials, Bonding in Metals, Corrosion, Ferrous metals: Mild steel, high carbon steel, stainless steel, high silicon steel, molybdenum and tungsten steel.
- **Nonferrous metals**– copper, aluminium, lead, chromium, tin, brass, bronze and Monel. Non-metals: Glass, Enamels, chemical stone wares. graphite, wood, plastics, rubber, ebonite lining materials.
- **Engineering Polymers**– Polymers. Polymerization, Industrial Polymers – Manufacturing and Industrial applications.
- **Thermodynamics**– Laws of thermodynamics and their applications. Heat transfer by Conduction, Convection. Radiation. Refrigerating cycles. Combustion cycle for I.C. engines.
- **Applied Chemistry**– Water, Cement. Lubricants. Explosives and Propellants.
- **Important Industrial Chemicals**– Industrial Method of preparation, properties and major industrial uses of: Ammonium Chloride. Ammonium Nitrate. Ammonium Sulphate. Calcium Phosphate (Super phosphate), Benzene (Benzol). Carbon Tetrachloride. Cresol, Ethyl Alcohol (Ethanol), Glycerine (glycerol) and Melamine.
- **Applied Physics**– Friction, Equilibrium of Forces and Couples. Concepts of stress & Strain, Optics. Basic Digital Electronics, Nuclear Physics. Radio-activity. Solid State Physics, Semiconductor, Diodes. Transistors, D.C. Motor. Transformers.
- **Basic Computer Science**– Hardware & Software: Hardware, Operating System, Data base Management System, Programming Languages. Networking. Internet & World Wide Web.
- **Instrumentation & Measurement**– Temperature & Pressure Measurement.
- **Energy, Environment & Ecology**– Sources of Energy – Renewable & Non-Renewable, Ecosystem and its cycles & biodiversity. Pollution – Air, Water. Sound. Soil/Land and its management.
- **Basic Mechanical Engineering**–
  - Mechanism: Velocity analysis: Transmission of Motion by direct contacts: Gears trains various types. Belt drives stepped pulley; chain drive.
  - Strength of Materials: Stress, Strain and Elasticity. Thermal Stress. Torsion of a circular shaft. Shearing force and bending moment in beams.
  - Fluid Mechanics: Fluid Properties. Bernoulli's equation and its applications. Losses in pipe fittings: flow measurements.
  - Manufacturing Processes like Casting, Machining. Forging. Plastic deformation and metal forming.
- **Welding**– Gas & Arc welding.
- **Foundry**– Pattern making, types & pattern allowances. Core box and core prints. Properties & Composition of good mould, sand, Moulding defects.
- **Basic Electrical Engineering**– Basic laws of Electricity, Various uses and effects of Electricity, Fuses. Relays etc. Principle of Generation of Electricity. Electrical circuit analysis. Transformers. Basics of AC (three & single phase) and DC machines.
- **Semi-Conductors**– Diodes, Transistors including junction transistors. Basic Knowledge on Rectifiers, filters, amplifiers. Modulation and Demodulation. Basic Digital Electronics.

- **Basic Civil Engineering–**

- Building Materials like Stones, bricks. cement, lime, timber- types, properties, test & uses, laboratory tests. Concrete and mortar Materials.
- Building Construction: Foundations, RCC footings, brick masonry walls, plastering and pointing, floors, roofs, Doors, windows, lintels, staircases. R.C.C. and Steel Structures
- Surveying: Instruments. Measurement of distances, directions. elevations. Mapping details and contouring.

**\*\*\*\* End of Syllabus - Chemical and Metallurgical Supervisor \*\*\*\***

**\*\*\*\* End of Syllabus – CBT - II \*\*\*\***

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