# COAL INDIA LIMITED

## RECRUITMENT OF MANAGEMENT TRAINEES 2016-17
## SYLLABUS FOR PAPER-I :COMMON FOR ALL DISCIPLINES

### General Knowledge/awareness

Everyday Science, Scientific Research, Sports, Indian Culture, Indian History, Indian national movement, World & Indian Geography, Natural resources Indian Economy, Indian Polity, Indian Constitution,National & International current affairs, Environment, India's Agriculture, Trade & Commerce, Basic Information technology.

### Numerical ability

Number System,decimals,fractions and relationships between numbers, Percentage. Ratio & Proportion, Square roots, Averages, Interest, Profit and Loss, Discount, Mixture and Allegation, Time and distance, Time & Work, Basic algebraic identities of School Algebra, , Factor, Heights and Distances. A.P. & G.P.Series

### Reasoning

Analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgement, decision making, Visual memory, discrimination, observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non- verbal series, coding and decoding, Word Building statement conclusion, syllogistic reasoning ,puzzle, Venn Diagrams , Space Visualization , Symbolic/Number Classification, Figural Classification etc.

### General English

Error recognition, fill in the blanks (verbs,Preposition etc.) synonyms, antonyms, spelling/detecting Mis-spelt words, idioms & phrases, one word substitution, sentences structure, Sentence completion, shuffling of sentence parts, shuffling of sentences in a passage, comprehension passage

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**SYLLABUS FOR PAPER-II : CHEMICAL/MINERAL-Coal Preparation(Post Code 15)**

## Heat Transfer

Steady and unsteady heat conduction, convection and radiation, thermal boundary layer and heat transfer coefficients, boiling, condensation and evaporation; types of heat exchangers and evaporators and their process calculations. Design of double pipe, shell and tube heat exchangers, and single and multiple effect evaporators.

## Mass Transfer

Fick's laws, molecular diffusion in fluids, mass transfer coefficients, film, penetration and surface renewal theories; momentum, heat and mass transfer analogies; stage-wise and continuous contacting and stage efficiencies; HTU & NTU concepts; design and operation of equipment for distillation, absorption, leaching, liquid-liquid extraction, drying, humidification, dehumidification and adsorption

## Chemical Reaction Engineering

Theories of reaction rates; kinetics of homogeneous reactions, interpretation of kinetic data, single and multiple reactions in ideal reactors, non-ideal reactors; residence time distribution, single parameter model; non-isothermal reactors; kinetics of heterogeneous catalytic reactions; diffusion effects in catalysis.

## Chemical Technology

Inorganic chemical industries (sulfuric acid, phosphoric acid, chlor-alkali industry), fertilizers (Ammonia, Urea, SSP and TSP); natural products industries (Pulp and Paper, Sugar, Oil, and Fats); petroleum refining and petrochemicals; polymerization industries (polyethylene, polypropylene, PVC and polyester synthetic fibers).

## Mechanical Operations

Particle size and shape, particle size distribution, size reduction and classification of solid particles; free and hindered settling; centrifuge and cyclones; thickening and classification, filtration, agitation and mixing; conveying of solids.

## Instrumentation and Process Control

Measurement of process variables; sensors, transducers and their dynamics, process modeling and linearization, transfer functions and dynamic responses of various systems, systems with inverse response, process reaction curve, controller modes (P, PI, and PID); control valves; analysis of closed loop systems including stability, frequency response, controller tuning, cascade and feed forward control.

## Plant Design and Economics

Principles of process economics and cost estimation including depreciation and total annualized cost, cost indices, rate of return, payback period, discounted cash flow, optimization in process design and sizing of chemical engineering equipments such as compressors, heat exchangers, multistage contactors.

**Momentum Transfer operations**

Continuity equation for compressible and incompressible fluids, Bernoulli's equation, Euler's equation, Introduction to Navier-stoke's equation, steady and unsteady, laminar and turbulent flows, Relationship between shear stress and pressure gradient, Hagen-Poiseuille equation,

Prandlt's mixing length theory and eddy diffusivity losses in pipes and fittings, Venturimeter and rota meter, Moddy diagram

**Fuel & Energy**

Solid, Liquid and gaseous Fuel, and their utilization, renewable energy sources

**Particulate Technology**

Size reduction, Principles of crushing and grinding, Determination of mean particle size and size distribution, Laws of crushing and grinding, Energy required for size reduction, crushing and grinding equipment, closed and open circuit grinding, Types of screens, mesh number, different types of screening, effectiveness of screen, Particle size analysis, separation efficiency and screening equipment, Solid-Liquid separation, Theory of filtration, filtration equipment, equation for compressible and incompressible cakes, Constant volume and constant pressure filtration, press filter, rotary drum and vacuum filter, Fibre and fabric filter, Sedimentation, classifiers and thickness, Centrifuges-Principles and applications, Solid-Gas separation, Cyclone Separators and electronic precipitators-Principle and application