Coal India Management Trainee Complete Syllabus

Coal India Management Trainee Exam Pattern

The duration of Computer Based Online Test will be for 3 hours (in one sitting) consisting of two papers (Paper-I & Paper-II) of 100 marks each. Paper-I will consist of General Knowledge/Awareness, Reasoning, Numerical Ability and General English and Paper-II will consist of Professional Knowledge (Discipline related) with 100 multiple choice questions (MCQ) in each paper. Each question will carry 1 mark and there is no penalty for wrong answer. No marks will be awarded for un-attempted questions. The question paper shall be bilingual i.e. in English and Hindi only.

Coal India Management Trainee Paper-I Syllabus

Coal India Management Trainee (Reasoning Aptitude)

The test would include verbal & non-verbal questions. The component may include questions on analogies, similarities and differences, space visualization, spatial orientation, problem solving, analysis, judgment, decision making, visual memory, discriminating observation, relationship concepts, arithmetical reasoning and figural classification, arithmetic number series, non-verbal series, coding and decoding, statement conclusion, syllogistic reasoning, etc. The topics are semantic analogy, symbolic/number analogy, figural analogy, semantic classification, symbolic/number classification, figural series, number series, problem solving, word building, coding & decoding, numerical operations, symbolic operations, trends, space orientation, space visualization, venn diagrams, drawing inferences, punched hole pattern folding & unfolding, figural pattern folding classification, date and city matching, classification of centre codes/roll numbers, small and capital letters/numbers coding, decoding and classification, embedded figures, critical thinking, emotional intelligence, social intelligence and other topics, if any.

Coal India Management Trainee (English Language)

Synonyms, Substitution, Error Correction, Sentence Arrangement, Joining Sentences, Para Completion, Sentence Improvement, Prepositions, Active Voice and Passive Voice, Fill in the Blanks, Spelling Errors, Idioms and Phrases, Antonyms, Sentence Completion, Passage Completion. In addition to the testing of candidates understanding of English language, its vocabulary, grammar, sentence structure, synonyms, antonyms and their correct usage etc., writing ability would also be tested.

Coal India Management Trainee (Numerical Aptitude)

This paper will include questions on problems relating to Number Systems, Computation of Whole Numbers, Fundamental Arithmetical Operations, Percentages, Ratio and Proportion, Averages, Profit and Loss, Discount, Use of Tables and Graphs, Mensuration, Time and Distance, Ratio and Time, Time and Work, Simple & Compound Interest, Simplification, Problem On Ages, HCF & LCM, Trigonometry, Data.
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Interpretation, Pie Chart, Algebra, Geometry, Area, Bar Graph, Average, Investment, Mensuration, Time & Speed, Pictorial Graph, Statistical Charts etc.

Coal India Management Trainee (General Awareness)

Countries and Capitals, Geography, Inventions and Discoveries, Famous Days & Dates, Environmental Issues, Artists, Indian Parliament, Current Affairs, Indian Economy, General Science, Famous Places in India, Indian Politics, Civics, Rivers, Lakes and Seas, Indian History, Heritage, Sports, Tourism, Famous Books & Authors. Questions will be designed to test the candidate’s General awareness of the environment around him/her and its application to the society. Questions will also be designed to test the knowledge of current events and of such matters of everyday observation and experience in their scientific aspects as may be expected of an educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining to Sports, History, Culture, Geography, Economic Scene, General Polity including Indian Constitution and scientific research etc. These questions will be such that they do not require a special study of any discipline.

Coal India Management Trainee Paper- II Syllabus

Coal India Management Trainee (HR) Syllabus

1. Personnel Management: Functions, Job analysis, Job Description, Job Evaluation, Organization Structure, Manpower Planning, Recruitment & Selection, Placement and Induction
2. Principles and Practices of Management
3. HRM concepts and functions, Performance appraisal, Career planning, Succession Planning
4. Job Specification, Competency Development, Communication
5. Training and Development, Management Development
6. Compensation Management
7. Organizational Behavior: Concepts, Importance, Evolution, Group Dynamics, Motivation, Morale, Leadership, Job satisfaction, Organizational Change, Organizational Development, Organizational Climate
8. Industrial Relations: concept, scope, IR systems, Industrial disputes, Machinery for settlement of industrial disputes, workers participation in management, code of discipline, ILO, Grievance handling and Disciplinary action
9. Trade Unions: Meaning, objectives, functions, theories, trade union movement in India, trade union leadership, inter and intra union rivalry, role of different parties, Bi-party, Tripartism
Coal India Management Trainee Complete Syllabus

11. Right to Information Act, 2005
12. Sexual Harassment of Women at Work Place (Prevention, Prohibition of Redress Act ) 2013

Coal India Management Trainee (Material Management) Syllabus

1. Business Economics
2. Accounting & Finance
3. Legal aspects of Contracts-sale of Goods Act, Indian Contracts Act, etc.
4. Goods and Services Tax
5. Customs Duty
6. Contract Securities – Bank Guarantees
7. Project Planning & Schedule
8. Concept and basic principles of e-procurement/e-Tendering, auction/Reverse Auction.
9. Dispute resolution mechanism available in India
10. Consequences of breach of contract and remedies available to Purchaser
11. Export-Import policy and procedures, legal framework of exportimport, customs classification.
12. Inco-terms 2010
13. Customs clearance- Sea, Air, post procedure and documentation.
14. Inventory control- ABC analysis. General principles of provisioning and procurement of common use items, fixing of minimum, maximum and re-order levels.
15. Material handling- Handling of compressed gases, inflammable, toxic substances, chemicals and hazardous materials, strategic items etc.
16. Emerging trends in Materials Management
17. Third Party Logistics and Supply Chain Management.

Coal India Management Trainee (Finance & Accounts) Syllabus

1. Double entry bookkeeping and principles.
3. Accounting standards
4. Principles & Knowledge of Income Tax, VAT, CST, Service Tax, Central Excise and Customs Duties & Filing of returns and TDS
6. Statutory & Internal Audit
7. Purchase procedures applicable for PSUs and Inventory control for Material Management
8. Principles of Costing / elements of cost analysis

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9. Budget & Budgetary Control
10. Sources and capital structure for infrastructure projects
12. Debt Market and role of intermediaries in debt issues
13. Servicing of investors

Coal India Management Trainee (Mining Engineering Syllabus)

Mine Development and Surveying
Mine Development- Methods of access to deposits; Underground drivages; Drilling methods and machines; Explosives, blasting devices, and practices
Mine Surveying- Levels and leveling, theodolite, tachometry, triangulation, Contouring, Errors and adjustments; Correlation, Underground surveying, Curves, Photogrammetry, Field astronomy, EDM and Total Station, Introductory GPS

Geomechanics and Ground Control
Engineering Mechanics- Equivalent force systems, Equations of equilibrium, Two-dimensional frames and trusses; Free body diagrams, Friction forces, Particle kinematics and dynamics; Beam analysis +
Geomechanics- Geo-technical properties of rocks; Rock mass classification; Instrumentation and stress measurement techniques; Theories of rock failure; Ground vibrations; Stress distribution around mine openings, Subsidence, Rock bursts and coal bumps; Slope stability.
Ground Control- Design of pillars, Roof supporting systems; Mine filling

Mining Methods and Machinery
Mining Methods- Surface mining; layout, development, loading, transportation and mechanization, continuous surface mining systems; Underground coal mining, bord and pillar systems, room and pillar mining, longwall mining, thick seam mining methods, highwall mining, Underground metal mining; open, supported and caved stoping methods, stoping mechanization, ore handling systems.
Mining Machinery- Generation and transmission of mechanical, hydraulic and pneumatic power; Materials handling; Haulages, conveyors, face and development machinery, hoisting systems, pumps, crushers.

Surface Environment, Mine Ventilation, and Underground Hazards

Coal India Management Trainee (Civil Engineering)


Building Construction: Building components (substructure, superstructure), type of structure (load bearing, framed and composite structures).
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Building Materials: Masonry materials (stones, bricks, and mortars), Timber and miscellaneous materials (glass, plastic, fiber, aluminum steel, galvanized iron, bitumen, PVC, CPVC, and PPF).

Construction of substructure - Job layout, earthwork, foundation (types, dewatering, coffer dams, bearing capacity).

Construction of superstructure - Stone masonry, brick masonry, Hollow concrete block masonry, composite masonry, cavity wall, doors and windows, vertical communication (stairs, lifts, escalators), scaffolding and shoring.

Building Finishes - Floors (finishes, process of laying), walls (plastering, pointing, painting) and roofs (roofing materials including RCC).

Building Maintenance - Cracks (causes, type, repairs- grouting, gutting, epoxy etc.), settlement (causes and remedial measures), and re-barrel techniques.

Building Drawing: Conventions (type of lines, symbols), planning of building (principles of planning for residential and public buildings, rules and byelaws), drawings (plan, elevation, section, site plan, location plan, foundation plan, working drawing), perspective drawing.

Concrete Technology: Properties of various types, grades of cement, properties of coarse and fine aggregates, properties of concrete (water cement ratio, properties of fresh and hardened concrete), Concrete mix design, testing of concrete, quality control of concrete (batching, formwork, transportation, placing, compaction, curing, waterproofing), extreme weather concreting and chemical admixtures, properties of special concrete (ready mix RCC, pre-stressed, fiber reinforced, precast, high performance).

Surveying: Types of survey, chain and cross staff survey (principle, ranging, triangulation, chaining, errors, finding area), compass survey (principle, bearing of line, prismatic compass, traversing, local attraction, calculation of bearings, angles and local attraction) leveling (trammel level, recording in level book, temporary adjustment, methods of reduction of levels, classification of leveling, tilting level, auto level, sources of errors, precautions and difficulties in leveling), contouring (contour interval, characteristics, method of locating, interpolation, establishing grade contours, uses of contour maps), area and volume measurements, plane table survey (principles, setting, method), theodolite survey (components, adjustments, measurements, traversing), Tacheometric survey, curves (types, setting out), advanced survey equipment, aerial survey and remote sensing.

Computer Aided Design: CAD Software (AutoCAD, Auto Civil, 3D Max etc.), CAD commands, generation of plan, elevation, section, site plan, area statement, 3D view.

Geo Technical Engineering: Application of Geo Technical Engineering in design of foundation, pavement, earth retaining structures, earthen dams etc., physical properties

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of soil, permeability of soil and seepage analysis, shear strength of soil, bearing capacity of soil, compaction and stabilization of soil, site investigation and sub soil exploration.

Hydraulics: properties of fluid, hydrostatic pressure, measurement of liquid pressure in pipes, fundamentals of fluid flow, flow of liquid through pipes, flow through open channel, flow measuring devices, hydraulic machines.

Irrigation Engineering: Hydrology, investigation and reservoir planning, percolation tanks, diversion head works.

Mechanics of Structures: Stress and strain, shear force and bending moment, moment of inertia, stresses in beams, analysis of trusses, strain energy.

Theory of structures: Direct and bending stresses, slope and deflection, fixed beam, continuous beam, moment distribution method, columns.

Design of Concrete Structures: Working Stress method, Limit State method, analysis and design of singly reinforced and doubly reinforced sections, shear, bond and development length, analysis and design of T Beam, slab, axially loaded column and footings.

Design of Steel Structures: Types of sections, grades of steel, strength characteristics, IS Code, Connections, Design of tension and compression members, steel roof truss, beams, column bases.

Transportation Engineering: Railway Engineering (alignment and gauges, permanent way, railway track geometries, branching of tracks, stations and yards, track maintenance), Bridge engineering (site selection, investigation, component parts of bridge, permanent and temporary bridges, inspection and maintenance), Tunnel engineering (classification, shape and sizes, tunnel investigation and surveying, method of tunneling in various strata, precautions, equipment, explosives, lining and ventilation).

Highway Engineering: Road Engineering, investigation for road project, geometric design of highways, construction of road pavements and materials, traffic engineering, hill roads, drainage of roads, maintenance and repair of roads.

Environmental Engineering: Environmental pollution and control, public water supply, domestic sewage, solid waste management, environmental sanitation, and plumbing.

Advanced Construction Techniques and Equipment: Fibers and plastics, artificial timber, advanced concreting methods (under water concreting, ready mix concrete, tremix concreting, special concretes), formwork, pre-fabricated construction, soil reinforcing techniques, hoisting and conveying equipment, earth moving machinery (exaction and compaction equipment), concrete mixers, stone crushers, pile driving equipment, working of hot mix bitumen plant, bitumen paver, floor polishing machines.
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**Estimating and Costing:** Types of estimates (approximate, detailed), mode of measurements and rate analysis.

**Contracts and Accounts:** Types of engineering contracts, Tender and tender documents, payment, specifications.

**Coal India Management Trainee (Mechanical Engineering)**

**Engineering Mechanics:** Resolution of forces, Equilibrium and Equilibrant, parallelogram law of forces, triangle law of forces, polygon law of forces and Lami's theorem, couple and moment of a couple, condition for equilibrium of rigid body subjected to number of coplanar non-concurrent forces, definition of static friction, dynamic friction, derivation of limiting angle of friction and angle of repose, resolution of forces considering friction when a body moves on horizontal plane and inclined plane, calculation of moment of inertia and radius of gyration of : (a) T-Section (b) channel section (c) T-Section (d) L-Section (Equal & unequal lengths) (e) Z-Section (f) Built up sections (simple cases only), Newton's laws of motion (without derivation), motion of projectile, D'Alembert's principle, definition law of conservation of energy, law of conservation of momentum.


**Strength of Materials:** Stress, strain, stress strain diagram, factor of safety, thermal stresses, strain energy, proof resilience and modules of resilience. Shear force and bending moment diagram – cantilever beam, simply supported beam, continuous beam, fixed beam. Torsion in shafts and springs, thin cylinder shells.

**Machining:** Working principle of lathe. Types of lathes – Engine lathe – construction details and specifications. Nomenclature of single point cutting tool, geometry, tool signature, functions of tool angles. General and special operations – (Turning, facing, taper turning, thread cutting, knurling, forming, drilling, boring, reaming, key way cutting), cutting fluids, coolants and lubricants. Introduction to shaper, slotter, planer, broaching, milling and manufacture of gears, heat treatment process applied to gears.

**Welding:** Welding – Introduction, classification of welding processes, advantages and limitations of welding, principles of arc welding, arc welding equipment, choice of electrodes for different metals, principle of gas (oxy-acetylene) welding, equipment of gas welding, welding procedures (arc & gas), soldering and brazing techniques, types and applications of solders and fluxes, various flame cutting processes, advantages and limitations of flame cutting, defects in welding, testing and inspection modern welding methods, (submerged, CO2, atomic – hydrogen, ultrasonic welding), brief description of MIG & TIG welding.
Coal India Management Trainee Complete Syllabus

**Grinding & Finishing Process:** Principles of metal removal by grinding, abrasives, natural and artificial, bonds and binding processes, vitrified, silicate, shellac rubber, grinding machines, classification: cylindrical, surface, tool & cutter grinding machine, construction details, relative merits, principles of centreless grinding, advantages & limitations of centreless grinding work, holding devices, wheel maintenance, balancing of wheels, coolants used, finishing by grinding, honing, lapping, super finishing, electroplating, basic principles – plating metals, applications, hot dipping, galvanizing tin coating, parkerising, anodizing, metal spraying, wire process, powder process and applications, organic coatings, oil base paint, lacquer base enamels, bituminous paints, rubber base coating.

**Metrology:** Linear measurement – Slip gauges and dial indicators, angle measurements, bevel protractor, sine bar, angle slip gauges, comparators (a) mechanical (b) electrical (c) optical (d) pneumatic. Measurement of surface roughness, methods of measurements by comparison, tracer instruments and by interferometry, collimators, measuring microscope, interferometer, inspection of machine parts using the concepts of shadow projection and profile projection.

**Fluid Mechanics & Hydraulic Machinery:** Properties of fluid, density, specific weight, specific gravity, viscosity, surface tension, compressibility capillarity, Pascal's law, measurement of pressures, concept of buoyancy, concept of Reynolds number, relation of pressure and kinetic energy of fluids, total energy, laws of conservation, mass, energy and momentum, velocity of liquids and discharge, Bernoulli's equation and assumptions, venturimeters, pitot tube, current meters. Working principle & constructional details of centrifugal pumps, efficiencies – manometric efficiency, volumetric efficiency, mechanical efficiency, and overall efficiency, cavitation and its effect, working principle of jet & submersible pumps with line diagrams.

**Industrial Management:** Job analysis, motivation, different theories, satisfaction, performance reward systems, production, planning and control, relation with other departments, routing, scheduling, dispatching, PERT and CPM, simple problems. Materials in industry, inventory control model, ABC Analysis, Safety stock, re-order level, economic ordering quantity, break even analysis, stores layout, stores equipment, store records, purchasing procedures, purchase records, B between Cardex, Material handling, Manual lifting, hoist, cranes, conveyors, trucks, fork trucks.


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*Coal India Management Trainee (Electrical Engineering)*

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**Basic concepts:** Concepts of resistance, inductance, capacitance, and various factors affecting them. Concepts of current, voltage, power, energy and their units.

**Circuit law:** Kirchhoff's law, Simple Circuit solution using network theorems.

**Magnetic Circuit:** Concepts of flux, mmf, reluctance. Different kinds of magnetic materials, Magnetic calculations for conductors of different configuration e.g. straight, circular, solenoidal, etc. Electromagnetic induction, self and mutual induction.

**AC Fundamentals:** Instantaneous, peak, R.M.S. and average values of alternating waves, Representation of sinusoidal wave form, simple series and parallel AC Circuits consisting of R.L. and C. Resonance, Tank Circuit. Poly Phase system – star and delta connection, 3 phase power, DC and sinusoidal response of R-Land R-C circuit.

**Measurement and measuring instruments:** Measurement of power (1 phase and 3 phase, both active and re-active) and energy, 2 wattmeter method of 3 phase power measurement. Measurement of frequency and phase angle. Ammeter and voltmeter (both moving oil and moving iron type), extension of range wattmeter, Multimeters, Megger, Energy meter AC Bridges. Use of CRO, Signal Generator, CT, PT and their uses. Earth Fault detection.

**Electrical Machines:** (a) D.C. Machine – Construction, Basic Principles of D.C. motors and generators, their characteristics, speed control and starting of D.C. Motors. Method of braking motor, Losses and efficiency of D.C. Machines. (b) 1 phase and 3 phase transformers – Construction, Principles of operation, equivalent circuit, voltage regulation, O.C. and S.C. Tests, losses and efficiency. Effect of voltage, frequency and wave form on losses. Parallel operation of 1 phase/3 phase transformers. Auto transformers (c) 3 phase induction motors, rotating magnetic field, principle of operation, equivalent circuit, torque-speed characteristics, starting speed control of 3 phase induction motors. Methods of braking, effect of voltage and frequency variation on torque speed characteristics, Fractional Kilowatt Motors and Single Phase Induction Motors. Characteristics and applications.

**Synchronous Machines:** Generation of 3-phase e.m.f. armature reaction, voltage regulation, parallel operation of two alternators, synchronizing, control of active and reactive power. Starting and applications of synchronous motors.

**Generation, Transmission and Distribution:** Different types of power stations, Load factor, diversity factor, demand factor, cost of generation, inter-connection of power stations. Power factor improvement, various types of tariffs, types of faults, short circuit current for symmetrical faults. Switchgears and Protection: Rating of circuit breakers, Principles of arc extinction by oil and air, H.R.C. Fuses, Protection against earth leakage/over current, etc. Buchholz relay, Merz-Price system of protection of generators & transformers, protection of feeders and bus bars. Lightning arresters, various transmission and distribution.
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**Estimation and costing:** Estimation of lighting scheme, electric installation of machines and relevant IE rules. Earthing practices and IE Rules.


**Basic Electronics:** Working of various electronic devices e.g. P N Junction diodes, Transistors (NPN and PNP type), BJT and JFET. Simple circuits using these devices.

**Coal India Management Trainee (Coal Preparation)**

**Process Calculations and Thermodynamics:** Laws of conservation of mass and energy; use of tie components; recycle, bypass and purge calculations; degree of freedom analysis. First and Second laws of thermodynamics. First law application to close and open systems. Second law and Entropy. Thermodynamic properties of pure substances: equation of state and departure function, properties of mixtures: partial molar properties, fugacity, excess properties and activity coefficients, phase equilibria: predicting VLE of systems; chemical reaction equilibria.

**Fluid Mechanics and Mechanical Operations:** Fluid statics, Newtonian and non-Newtonian fluids, Bernoulli equation, Macroscopic friction factors, energy balance, dimensional analysis, shell balances, flow through pipeline systems, flow meters, pumps and compressors, packed and fluidized beds, elementary boundary layer theory, size reduction and size separation; free and hindered settling; centrifuge and cyclones; thickening and classification, filtration, mixing and agitation, conveying of solids.

**Heat Transfer:** Conduction, convection and radiation; heat transfer coefficients, steady and unsteady heat conduction, boiling, condensation and evaporation, types of heat exchangers and evaporators, and their design.

**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 to stage and continuous contacting and stage efficiencies, HTU & NTU concepts; design and operation of equipment for distillation, absorption, leaching, liquid-liquid extraction, drying, humidification, delamination 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.

**Instrumentation and Process Control:** Measurement of process variables; sensors, transducers and their dynamics, transfer functions and dynamic responses of simple systems, process reaction curve, controller modes (P, PI, and PID); control valves; analysis of closed loop systems including stability, frequency response and controller tuning, cascade, feed forward control.

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**Plant Design and Economics:** Process design and sizing of chemical engineering equipment such as compressors, heat exchangers, multistage contactors, principles of process economics and cost estimation including total annualized cost, cost indexes, rate of return, payback period, discounted cashflow, optimization in design.

**Chemical Technology:** Inorganic chemical industries; sulfuric acid, NaOH, 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.

**Coal India Management Trainee (Marketing & Sales)**

**MARKETING MANAGEMENT:** Introduction to marketing, concepts, marketing environment; segmentation, targeting & positioning, marketing mix (4Ps, 7Ps, etc.), Marketing Research, PLC, New product development process, pricing, pricing methods, promotion basics, promotion methods & strategies, Demand forecasting.

**PRODUCT MANAGEMENT:** Product Life Cycle, levels of a product, product mix, product portfolio decisions, BCG matrix, and its applications. Product planning, new product development process, Innovation and Creativity, product testing, product placement & commercialization.

**CONSUMER BUYING BEHAVIOUR & INTEGRATED MARKETING COMMUNICATIONS:** Consumer personality & brand personality, buying influences, buying process, factors influencing buying decisions, models of buying behavior, post-purchase behavior. Marketing research, methods, data collection techniques, sources of secondary data for marketing decisions. IMC definition, elements, IMC and brand communication process, role of advertising in branding process BTL, OOH, etc., promotions in IMC – consumer, trade sales, co-branding, in-branding, etc., packaging and labeling in IMC. PR, Consumer Protection in India. List of Consumer Rights, Consumer Protection Act 1986.

**ADVANCED MARKETING TECHNIQUES:** Global marketing, Strategic Marketing Process, value chain, value creation. Nature & scope of rural markets, marketing to cooperatives, channels of distribution in rural India, Inbound marketing, reverse marketing, upselling, down-selling and cross-selling techniques, CSR.


**Coal India Management Trainee (Systems)**

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Digital Logic
Number representations and computer arithmetic (fixed and floating point).

Computer Organization and Architecture
Machine instructions and addressing modes. ALU, data-path and control unit.
Instruction pipelining. Memory hierarchy: cache, main memory and secondary storage;
I/O interface (interrupt and DMA mode).

Programming and Data Structures
Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary
search trees, binary heaps, graphs.

Algorithms
Searching, sorting, hashing. Asymptotic worst case time and space
complexity. Algorithm design techniques: greedy, dynamic programming and divide-
and-conquer. Graph search, minimum spanning trees, shortest paths.

Theory of Computation
Regular expressions and finite automata. Context-free grammars and push-
down automata. Regular and context-free languages. Pumping lemma. Turing machines
and undecidability.

Compiler Design
Lexical analysis, parsing, syntax-directed translation. Runtime environments.
Intermediate code generation.

Operating System
Processes, threads, inter-process communication, concurrency and
synchronization. Deadlock. CPU scheduling. Memory management and virtual memory.

File systems.

Databases
ER-model. Relational model. Relational algebra, tuple calculus, SQL. Integrity
constraints, normal forms. File organization, indexing (e.g., B and B+ trees).

Transactions and concurrency control.

Computer Networks
Concept of layering. LAN technologies (Ethernet). Flow and error control
techniques, switching, IPv4, IPv6, routers and routing algorithms (distance vector, link
state). TCP/UDP, sockets, congestion control. Application layer protocols (DNS,
SMTP, POP, FTP, HTTP). Basics of Wi-Fi. Network security: authentication, basics of
public key and private key cryptography, digital signatures and certificates, firewalls.

Coal India Management Trainee (Community Development)

Need for training and development, role of development offices, administrators,
consultants, designers and instructors - determining training needs, potential macro
needs, usefulness of training, development of competency, based training programs,
Methods of training. On the job training, off the job training, choosing optimum
method, the lecture, field trips, panel discussion, behaviour modeling, interactive
demonstrations, brainstorming, case studies, action mazes, incident process, jigsaws,
in-baskets, team tasks, buzz-groups and syndicates, agenda setting, buzz groups, Role
plays, reverse role plays, doubling role plays, rotation role plays, finding metaphors,
simulations, business games, clinics, critical incidents, fish bowls, Tgroups, hot role

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plays, data gathering, grouping methods, transactional analysis, expectation analysis, Need for development, differences between training and development Management development, concepts, assumptions, process and methods, organization of management programs, evaluation of training and development program, employee appraisal methods. Competency Mapping, Bench Marking

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