

**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 : Systems/IT(Post Code 19)**

**Digital Logic**

Boolean algebra. Combinational and sequential circuits. Minimization. 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 path

**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 and 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.