# Syllabus for General Aptitude (GA)

## *(COMMON TO ALL PAPERS)*

**Verbal Ability:** English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

**Numerical Ability:** Numerical computation, numerical estimation, numerical reasoning and data interpretation.

*Sample Questions*

**Verbal Ability**

**Q.1.** Choose the appropriate answer to complete the following sentence:

To those of us who had always thought him timid, his --------- came as a surprise.

(A)    intrepidity (B)    inevitability (C)    inability (D)    inertness

**Ans. (A)**

**Q.2.** Choose the appropriate answer to complete the following sentence:

Medicine is to illness as law is to _____

(A)    discipline (B)    anarchy (C)    treason (D)    etiquette

**Ans. (B)**

**Q.3**. Read the following paragraph :

"The ordinary form of mercury thermometer is used for temperature ranging from $-40^oF$ to $500^oF$. For measuring temperature below $-40^oF$, thermometers filled with alcohol are used. These are, however, not satisfactory for use in high temperatures. When a mercury thermometer is used for temperature above $500^oF$, the space above the mercury is filled with some inert gas, usually nitrogen or carbon dioxide, placed in the thermometer under pressure. As the mercury rises, the gas pressures is increased, so that it is possible to use these thermometers for temperatures as high as $1000^oF$."

With what, besides mercury, would a thermometer be filled if it was designed to be used for measuring temperature of about $500^oF$?

(A) Pyrometer    (B)  Inert gas      (C) Iron and brass       (D) Gas

**Ans. (B)**

| CS | Computer Science and Information Technology |
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## Section1: Engineering Mathematics

**Discrete Mathematics:** Propositional and first order logic. Sets, relations, functions, partial orders and lattices. Groups. Graphs: connectivity, matching, coloring. Combinatorics: counting, recurrence relations, generating functions.

**Linear Algebra:** Matrices, determinants, system of linear equations, eigenvalues and eigenvectors, LU decomposition.

**Calculus:** Limits, continuity and differentiability. Maxima and minima. Mean value theorem. Integration.

**Probability:** Random variables. Uniform, normal, exponential, poisson and binomial distributions. Mean, median, mode and standard deviation. Conditional probability and Bayes theorem.

Computer Science and Information Technology

## Section 2: Digital Logic

Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).

## Section 3: 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).

## Section 4: Programming and Data Structures

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

## Section 5: 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.

## Section 6: Theory of Computation

Regular expressions and finite automata. Context-free grammars and push-down automata. Regular and contex-free languages, pumping lemma. Turing machines and undecidability.

## Section 7: Compiler Design

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

## Section 8: Operating System

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

## Section 9: 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.

## Section 10: 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.