**Syllabus for General Aptitude (GA):**

1. **Verbal Ability:** English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.
2. **Numerical Ability:** Numerical computation, numerical estimation, numerical reasoning and data interpretation.

**Computer Science and Information Technology (CS):**

1. **Section-1: 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:**

1. **Section 2: Digital Logic**  
   Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).
2. **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).
3. **Section 4: Programming and Data Structures**  
   Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.
4. **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.
5. **Section 6: 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.
6. **Section 7: Compiler Design**  
   Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation.
7. **Section 8: Operating System**  
   Processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU scheduling. Memory management and virtual memory. File systems.
8. **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.
9. **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.

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