Syllabus for the post of Systems

Sections	Section name	Total Marks
	PAPER I	
Part-1	General Knowledge/ Awareness	25 Marks
Part-2	Numerical Ability	25 Marks
Part-3	Reasoning	25 Marks
Part-4	General English	25 Marks
	PAPER II	
Part-5	**<u>Domain Knowledge</u>** **Section 1: Digital Logic** Boolean algebra. Combinational and sequential circuits, minimization, number representations and computer arithmetic (fixed and floating point). **Section 2: 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 3: Programming and Data Structures** Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs. **Section 4: 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**.** **Section 5: 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 6: Compiler Design** Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation. **Section 7: 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.	100 Marks
Total		**200 Marks**