राष्ट्रीय प्रौद्योगिकी संस्थानश्रीनगर
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR
(An autonomous Institute of National Importance under the aegis of Ministry of Education, Govt. of India)
हजरतबल, श्रीनगर , जम्मू-कश्मीर, 190006,भारत
Hazratbal, Srinagar Jammu and Kashmir, 190006, INDIA

SYLLABUS FOR TECHNICAL ASSISTANT

(Department of Computer Science Engineering, Department of Information Technology and Computer Services Centre)

GENERAL APTITUDE SYLLABUS

Verbal Aptitude Basic English grammar: Tenses, articles, adjectives, prepositions, conjunctions, verb-noun agreement, and other parts of speech Basic vocabulary: words, idioms, and phrases in context Reading and comprehension Narrative sequencing

Quantitative Aptitude: Data interpretation: data graphs (bar graphs, pie charts, and other graphs representing data), 2- and 3-dimensional plots, maps, and tables Numerical computation and estimation: ratios, percentages, powers, exponents and logarithms, permutations and combinations, and series Mensuration and geometry Elementary statistics and probability

Analytical Aptitude: Logic: deduction and induction ; Analogy Numerical relations and reasoning Spatial Aptitude : Transformation of shapes: translation, rotation, scaling, mirroring, assembling, and grouping Paper folding, cutting, and patterns in 2 and 3 dimensions

CORE BRANCH SYLLABUS

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, pipeline hazards, Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

Programming, Data Structures and Operating System –
Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs, System calls, processes, threads, inter-process communication, concurrency and synchronization, Deadlock. CPU and I/O scheduling. Memory management and virtual memory. File systems.

Algorithm: Searching, sorting, hashing. Asymptotic worst case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph traversals, minimum spanning trees, shortest paths, Theory of Computation – Regular expressions and finite automata. Context-free grammars and push-down automata. Regular and contex-free languages, pumping lemma. Turing machines, Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation. Local optimisation, Data flow analyses: constant propagation, liveness analysis, common subexpression

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.

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Computer Networks: OSI and TCP/IP Protocol Stacks, Basics of packet, circuit and virtual circuit-switching; framing, error detection, Medium Access Control, Ethernet bridging; shortest path, flooding, distance vector and link state routing; Fragmentation and IP addressing, IPv4, CIDR notation, Basics of IP support protocols (ARP, DHCP, ICMP), Network Address Translation (NAT); flow control and congestion control, UDP, TCP, sockets; Application layer protocols: DNS, SMTP, HTTP, FTP