

VADODARA MUNICIPAL CORPORATION

Server and Network Administrator Syllabus

Total Marks: 100

સામાન્ય જ્ઞાન :- ૨૦ ગુણ (માધ્યમ:-ગુજરાતી)

- તાજેતરના મહત્વના રાષ્ટ્રીય અને આંતરરાષ્ટ્રીય બનાવો.
- ભારત અને વિશ્વ ભૂગોળ.
- ભારતની રાજનીતિ.
- ભારતની અર્થવ્યવસ્થા.
- ભારતનું બંધારણ.
- ગુજરાતની ભૌગોલિક બાબતો અને કુદરતી સંપત્તિ
- ગુજરાતનો સાંસ્કૃતિક વારસો, સાહિત્ય, કલા, ધર્મ
- ભારત અને ગુજરાતનો ઇતિહાસ
- ખેલ જગત

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Theory: - 40 Marks

Practical: - 40 Marks

Section 1: 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.

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 context-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.