PGQP54

Entrance Test for the Course(s): M.Tech. (Computer Science & Technology (Cyber Security)) [CUPUN], (Computer Science & Technology) [CUJHD], [CUPUN], [CUJAM], (Computer Science & Engg.) [CURAJ], [CUASM], (Computer Science (Cyber-Physical Systems)) [CURAJ], (Artificial Intelligence and Data Science) [CUAPH]

1. PART-A will consist of **25 objective questions** (MCQs) and will include English, General Awareness, Mathematical Aptitude and Analytical Skills.

2. PART-B will consist of **75 objective questions** (MCQs) from the following syllabus:

Engineering Mathematics

1. **Theory of Probability:** Axiomatic definition of Probability, Conditional Probability Baye's Theorem, Random Variables Functions of random variables; Probability distributions: Binomial Poisson, Exponential and Normal distribution and their moment generating functions.
2. **Set Theory & Algebra:** Sets; Relations; Functions; Composition of function and relations, Groups; Partial Orders; Boolean Algebra.
3. **Combinatorics:** Permutations; Permutations with and without repetition; Combinations; generating functions; recurrence relations.
4. **Graph and Trees:** Introduction to graphs, Directed and Undirected graphs, Homomorphic and Isomorphic graphs, Subgraphs, Cut points and Bridges, Multigraph and Weighted graph, Paths and circuits, Shortest path in weighted graphs, Eurelian path and circuits, Hamilton paths and circuits, Planar graphs, Eulers' formula, Trees, Spanning trees.
5. **Linear Algebra:** Algebra of matrices, determinants, systems of linear equations, Eigen values and Eigen vectors.
6. **Calculus:** Limit, Continuity & differentiability, Mean value Theorems, Theorems of integral calculus, evaluation of definite & improper integrals, Partial derivatives, Total derivatives, maxima & minima.
7. **Theory of Computation:** Finite Automata and Regular Expressions, Non-determinism and NFA, Properties of Regular Sets, Context free grammar: Chomsky Normal Form (CNF), Griebach Normal Form (GNF), Push-down automata, Moore and mealy Machines, Turing machines,
8. **Digital Logic:** Number representation and computer arithmetic (fixed and floating point), Logic functions, Minimization, Design and synthesis of combinational and sequential circuits, A/D AND D/A CONVERTERS.
9. **Computer Organization and Architecture:** Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage.
10. **Microprocessors and Interfacing:** instruction set, Addressing modes, Memory interfacing, Interfacing peripheral devices, Interrupts. Microprocessor architecture,

Instruction set and Programming (8085), Microprocessor applications, DMA, Interrupt and Timer.

11. **Programming and Data Structures:** Programming in C; Functions, Recursion, Parameter passing, Definition of data structure. Arrays, stacks, queues, linked lists, trees, priority queues and heaps, Binary search trees.
12. **Algorithms:** Algorithm concepts, Analyzing and design, asymptotic notations and their properties, Worst and average case analysis; Design: Greedy approach, Dynamic programming, Divide-and- conquer; Tree and graph traversals, Spanning trees, Shortest paths; Hashing, Sorting, Searching.
13. **Compiler Design:** Assemblers, linkers, loaders, compilers and translators, the structure of a compiler, different states in the construction of a compiler, Lexical analysis, Parsing, Syntax directed translation, Runtime environments, Intermediate and target code generation, Basics of code optimization.
14. **Operating System:** Main functions of operating systems, Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, I/O scheduling, Resource scheduling. Deadlock and scheduling algorithms, Banker's algorithm for deadlock handling. Memory management and virtual memory, File systems, I/O systems, DOS, UNIX and windows.
15. **Databases:** Database Concepts, ER-model, Data Models, Relational model (relational algebra, tuple calculus), RAID, Database design (integrity constraints), Normalization (up to 4th Normal forms), BCNF (Boyce code normal forms), Query languages (SQL), Data mining & data warehousing, Transactions and concurrency control, Database security: Database security issues, Discretionary access control, Mandatory & role based access control, Database audit.
16. **Computer Networks:** OSI model, TCP/IP model, LAN technologies (Ethernet, Token ring), Transmission media - twisted pair, coaxial cables, fibre-optic cables, Flow and error control techniques, Routing algorithms, Congestion control, IP(v4), Application layer protocols (icmp, dns, smtp, pop, ftp, http); sliding window protocols; Internetworking: Switch/Hub, Bridge, Router, Gateways, Concatenated virtual circuits, Firewalls; Network Security: Cryptography - public key, secret key. Domain Name System (DNS) - Electronic Mail and World wide Web (WWW).

Web technologies: HTML, XML, basic concepts of client-server computing