

M.Tech. (Computer Science/Software Engineering/Information Technology/VLSI Design)

Section A : Logical Reasoning

Duration : 2 hrs.

Section B : Mathematics

Section C : Computer Fundamentals

**Section D : Computer Sc. (for CS/SE/IT)
Electronics (for VLSI)**

Note : - (i) 1/4 Marks will be deducted for each wrong answer.

(ii) Each candidate has to score 40% in each section and 50% in aggregate to be considered for merit.

Section A – Logical Reasoning

Section B –Mathematics

Algebra: Permutation and Combination, Application of Binomial Theorem. Exponential and Logarithmic Series.

Trigonometric problems on heights and distance, Complex numbers and their properties.

Coordinate Geometry: Strength Line, Circle, Ellipse, Parabola and Hyperbola.

Vectors and Matrice: Vectors, Matrices and Determinants with their basic properties and operations, Eigan values.

Calculus: Successive differentiation, Leibnitz Theorem, Empoison of Functions, Definite integration. Differential equations of first order and first degree. Partial diffentiation, maxima and minima, Linear programming (Similar method, Big-M and two phase methods).

Transformation: Laplace and Fourier Transforms with their basic properties.

Numerical Methods: Floating point Arithmetic, Solution of Linear and Non-linear equations (Gauss Elimination Matrix Inversion, Bi-section, Regula Falsi and Newton Raphson Methods)

Statistics: Probability, Random Variables, Probability Distributions – Uniform, Normal, Poisson, and Binomial. Measures of Central Tendency, Dispersion and Correlation.

Section C – Computer Fundamentals

Computer Organization and Architecture: Basic concepts of computer organization & Architecture, Data Representation, Number System (Binary Octal, Hexadecimal) Inter conversion and Arithmetic, Boolean Algebra, Combinational & Sequential Circuits. CPU, Memory, Input/ Output Devices.

Microprocessor (Intel 8085) and Assembly Language : Intel-8085 μ p, Introduction Set, Interrupts, DMA, Stacks and Subroutine, Concept of Assembler, Interpreter, Compiler, Linker, Loader.

C-programming Language: Tokens, Language Constructs, Arrays, Structures, Union, Pointer, File handling, Preprocessors, Bit level programming.

Computer Networks: Communication Concepts, Transmission Media, OSI Model, Communication Protocols, ISDN, TCP/IP and Internet Services, WAN Technologies.

Section D – Computer Science for M.Tech. (CS, SE, and IT)

Operating Systems and Basics of UNIX: Services, Multi-programming, Multi-tasking, Time Sharing, Buffering, Spooling, Memory Management, Process Management, Deadlocks.

Basic of UNIX: - File System, Device Queue, Linked lists, Tree, Graph, space Matrix.

Data Structures: Abstract data types, Stack, Queue, Linked lists, Tree, Graph, Sparse matrix.

Algorithms: Complexity Measures, Order Notation, Design Approaches-Recursion, Divide & Conquer, Dynamic Programming, Basic Tracing, Branch and Bound, Greedy Method.

Database Management System: Basic Concepts, Data Models, Normal Forms and Storage & Access Methods, Concurrency Control, SQL.

Discrete Mathematics: Set, Relation, Function, and lattices, Graph Theory, Generating Function, Recurrence Relation and Propositional & Predicate Logic.

Theory of Computation: Finite Automata, Regular Language, Context Free Grammar and Language, Push Down Automata & Turing Machine.

Section D – Electronics for M.Tech. (VLSI)

Semi Conductors: Mobility, conductivity, Intrinsic Semiconductors, Impurities, Charge densities, Diffusion, pn Junction, Rectifiers, V-I Characteristic.

Diodes: Load line, clipping circuits, clamping circuits

Junction Transfer: Current components, transistor as an amplifier, Transistor configuration (CE, CB, CC), transistor hybrid model, h parameters.

Field effect transistors: Junction FET, pinch off voltage, V-I characteristics.

Amplifiers: Classification, frequency response, RC coupled.

Oscillators: Feed back concept- Voltage shunt, current series, current shunt, voltage series, phase shift, RC coupled, crystal oscillators.

Operational Amplifiers: Basic operation, Differential amplifiers, offset voltages-current, Integration and Differentiation, Inverting and non-inverting amplifiers, Active filters, sample and hold circuit.