PAPER-II
DISCRETE MATHEMATICS

TIME: 3 hours

Max. Marks: 100

UNIT-I

Formal logic– Statement, Symbolic Representation and Tautologies, Quantifiers, Predicate validity, Propositional logic.

Semi groups and monoids, Relations and ordering. Functions definitions and examples of semi– groups and monoids (including those pertaining to concatenation operation). Homomorphism of semi groups and monoids. Quotient subgroups, sub semigroups and sub monoids. Direct products. Basic Homomorphism theorem.

UNIT-II

Lattices: - Lattices as partially ordered sets. Their properties. Lattices as Algebraic systems. Sub lattices, direct products and Homomorphism complete, Complemented and distribution lattices.

Boolean Algebras:- Boolean Algebras as lattices. Various Boolean identities. The switching Algebras examples. Sub Algebras. Direct products and Homeomorphisms, Join- irreducible elements, Atoms and miterms, Boolean forms and their equivalence. Minterms Boolean forms. Minimization of Boolean functions. Application of Boolean Algebras to switching theory (usj and, OR and not gates).The karnaugh map method.

UNIT-III

Graph theory: Definition of (Undirected) graphs, Paths, Circuits, Cycles and Sub graphs. Indeed subgroups... Degree of vertex. Connectivity. Planner graphs and their properties.

Trees. Euler's formula for connected planar graphs complete and complete Bipartite graphs. Non Planer graph Kuratoueskis theorem (Statematonly). Spanning trees. Cut sets, Fundamental cut–sets, and Cycles. Minimal spanning trees and kruskal's Algerian. Euler's theorem on the existence of eulerian paths and circuits. Directed graphs. In degree and out degree of a vertex. Weighted undirected graphs, Dijkstra's Algorithm. Strong connectivity and marshal's Algorithm. Directed trees. Surch trees. Tree traversals.

UNIT-IV

Introductory computability Theory – Finite state machines and their Transition Table Diagrams. Equivalence of finite state machines. Reduced machines. Homomorphism. Finite Automata. Acceptors. Non- deterministic Finite Automata and equival ends of it are power to that of Deterministic Finite Automata.

UNIT-V

Phrase structure Grammar. Rewriting Rules. Derivations, Sentential forms. Language generated by a Grammar. Regular context – free, and context sensitivity Grammars and Languages. Regular sets, Regular expressions and pumping Lemna Kleene's Theorem stamens.

Books recommended:

1. J.P. Tremblay & R. Manohar : Discrete Mathematical structure with applications to computer science.
2. J.L. Gerstling : Mathematical Structures for Computer Science, (3rd edition).
3. N. Arsing Deo : Graph theory with applications to Engineering and Computer Science.
4. K.D. Joshi : Foundation of Discrete Mathematics
5. S. Wiitala : Discrete mathematics – A Unified Approach
6. C. L. Liu : Elements of Discrete Mathematics.