

FOUNDATION OF COMPUTER SCIENCE

Paper Code: ETCS-203

Paper: Foundation of Computer Science

L	T/P	C
3	1	4

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To give basic knowledge of combinatorial problems, algebraic structures and graph theory.

UNIT- I

Formal Logic: Proposition, Symbolic Representation and logical entailment theory of Inferences and tautologies, Predicates, Quantifiers, Theory of inferences for predicate calculus, resolution. Techniques for theorem proving: Direct Proof, Proof by Contraposition, proof by contradiction.

[T1,T2][No. of hrs. 10]

UNIT- II

Overview of Sets and set operations, permutation and combination, principle of inclusion, exclusion (with proof) and pigeonhole principle (with proof), Relation, operation and representation of a relation, equivalence relation, POSET, Hasse Diagrams, extremal Elements, Lattices, composition of function, inverse, binary and n-ary operations.

[T1,T2][No. of hrs. 12]

UNIT- III

Principle of mathematical induction, principle of complete induction, solution methods for linear and non-linear first-order recurrence relations with constant coefficients, Graph Theory: Terminology, isomorphic graphs, Euler's formula (proof) ,chromatic number of a graph, five color theorem(with proof), Euler & Hamiltonian paths.

[T1,T2][No of hrs 11]

UNIT-IV

Groups, Symmetry, subgroups, normal subgroups, cyclic group, permutation group and Cayley's theorem(without proof), cosets Lagrange's theorem(with proof) homomorphism, isomorphism, automorphism, rings, Boolean function, Boolean expression, representation & minimization of Boolean function.

[T1,T2][No of hrs 11]

Text Books:

[T1] Norman L. Biggs, "Discrete Mathematics", Oxford, second edition.

[T2] Kenneth H. Rosen, "Discrete Mathematics and Its Applications", TMH, seventh edition.

Reference Books:

[R1] Kolman, Busby & Ross, "Discrete Mathematical Structures", PHI, 1996.

[R2] C.L. Liu, "Elements of Discrete Mathematics", TMH, 2000.

[R3] J. P. Trembly & P. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill, 1997.