Paper Code: BCA 102
Paper ID: 20102 **L T C**
Paper: Mathematics – II **3 1 4**

Aim: To understand the basics concepts of Discrete Mathematical Structures.

Objectives

- To get the Knowledge about sets, relations and functions.
- To study the basics of lattices and graphs.
- To get familiar with propositional logic.

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, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

UNIT I

SETS: Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

RELATIONS AND FUNCTIONS: Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions, Hashing functions, Recursive function. [T1][T2] **[No. of Hrs: 11]**

UNIT – II

PARTIAL ORDER RELATIONS AND LATTICES: Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices & Algebric Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattices. [T1][T2] **[No. of Hrs: 10]**

UNIT-III

Graphs: types and operations(bipartite graph. Subgraph, distance of a graph, cut-edges & cut vertices, isomorphic and homomorphic graphs), degree of graphs, adjacent and incidence matrices, path circuit(Floyd's and Warshall algorithms), hamiltonian graph, graph colouring. [T1][T2] **[No. of Hrs: 12]**

UNIT – IV

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers. [T1[T2] **[No. of Hrs: 11]**

TEXT BOOKS:

[T1]Rosen, K.H., Discrete Mathematics and its Applications, McGraw Hill, (2006) 6th ed.
[T2]Kolman, Busby and Ross, "Discrete Mathematical Structure", PHI, 1996.
[T3]Babu Ram, "Discrete Mathematics", Pearson Education

REFERENCE BOOKS:

[T1]S.K. Sarkar, "Discrete Maths"; S. Chand & Co., 2000.

[T2]Tremblay, J.P. and Manohar, R., Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, (2007).