

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**M.Sc. (IT) (Sem-3)**  
**DISCRETE STRUCTURES & OPTIMIZATION**

Subject Code : PGCA-1917

M.Code : 78393

Date of Examination : 10-06-2023

Time : 3 Hrs.

Max. Marks : 70

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

**SECTION-A**

1. Write short notes on :

- a) Combination of sets
- b) Hashing functions
- c) Partial order relations
- d) Boolean sub-algebra
- e) Euclidean domains
- f) Principles of recurrence relations
- g) Pigeon hole principle
- h) Morphism
- i) Cyclic semigroups
- j) Graph coloring.

## SECTION-B

2. Write the various properties of relations and functions with suitable examples.
3. Explain the various characteristics of Boolean rings.
4. Discuss the various steps to solve expression using K-map of 3 variables.
5. Find the number of permutations of the letters of the word ALLAHABAD.

## SECTION-C

6. Differentiate between monoid and semigroup using suitable examples.
7. *“A dihedral group is the group of symmetries of a regular polygon, which includes rotations and reflections”*. Justify.
8. Discuss the various applications of graphs in detail.
9. Explain the cut vertex, cut edge and cut set with respect to connected graphs.

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**