

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (CSE) (Sem-4)**  
**DISCRETE STRUCTURES**

Subject Code : BTCS-402

M.Code : 71106

Date of Examination : 10-06-2023

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Answer briefly :**

- a) Define reflexive closure.
- b) What is Poset?
- c) List two applications of recurrence relation.
- d) Define semi group.
- e) Differentiate between path and trail.
- f) What is chromatic number?
- g) What is graph homomorphism?
- h) List two applications of generating functions.
- i) What is Coset?
- j) Define Sum Of Products (SOP) form.

### SECTION-B

- Determine the numbers of integers between 1 and 260, which are divisible by any of the integers 2, 3, 5, 7.
- Prove that a field is an integral domain.
- In how many ways can 5 male and female be seated on round table so that no two ladies are together?
- Prove that a given connected graph  $G$  is an Euler graph if all vertices of  $G$  are of even degree.
- Draw a graph which contains an Euler Circuit but not hamilton circuit.

### SECTION-C

- Show that the edge chromatic number of a graph must be at least as large as the maximum degree of a vertex of the graph.
- Consider the group  $G = \{1, 5, 7, 11, 13, 17\}$  under multiplication modulo 18.
  - Build the multiplication table of  $G$ .
  - Finds  $5^{-1}, 7^{-1}, 17^{-1}$
  - Identify whether  $G$  is cyclic.
  - Find the order and group generated by 5 and 13.
- Solve the recurrence relation  $a_n = 4a_{n-1} - 4a_{n-2} + (n + 1) + 2^n$ .

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