D 114551 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2024

(CBCSS)

Computer Science

CSS 1C 01—DISCRETE MATHEMATICAL STRUCTURES

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

Part A

Answer any **four** *questions.*
Each question carries 2 *weightage.*

1. Let $a = \{1, 3\}$, $b = \{1, 5, 9\}$, $c = (1, 3, 5, 7, 9)$ be the sets. Determine the symbol $(\in, \notin)$ should be placed between the pairs (i) A and B ; and (ii) A and C.
2. Define Tautology. Give example
3. Define equivalence relation. Give example
4. State De Morgan's theorem in Boolean Algebra.
5. State any *two* properties of a group.
6. Describe Circuit.
7. What is a Hamiltonian path ?

(4 × 2 = 8 weightage)

Part B

Answer any **four** *questions.*
Each question carries 3 *weightage.*

8. Write predicates for the following sentences :
   (i) Everyone loves himself.
   (ii) Everyone who sees Mary loves Mary.

Turn over

9. Obtain DNF of $(P \wedge Q) \vee (\sim P \wedge R)$.

10. List the order of precedence of Boolean operators AND, OR, NOT and parenthesis.

11. What is a Coset ?

12. Make a note on a semigroup.

13. Define Hamiltonian cycles.

14. Write Dijikstra's algorithm.

(4 × 3 = 12 weightage)

Part C

Answer any **two** *questions.*
Each question carries 5 *weightage.*

15. Obtain CNF and DNF for $(\sim P \rightarrow Q) \wedge (Q \Leftrightarrow P)$.

16. Describe composition of Relations with example

17. Simplification of Boolean Expression :

    (i) $AB + A(B + C) + B(B + C)$.

    (ii) $A\bar{B} + A\overline{(B + C)} + A\overline{(B + C)}$.

    (iii) $XYZ + XYZW + XZ$.

18. Explain Prim's algorithm to find the minimum spanning tree.

(2 × 5 = 10 weightage)