Roll No. 52400010060007

BCAS2611

BCA., Semester Second, Examination-2024-2025

COMPUTER SCIENCE

PAPER - First

(Discrete Mathematics)

[Time : 3 Hrs.] [Maximum Marks : 70]

Note : The Question paper contains two sections. Section A contains 08 short type questions. Attempt any 05 questions from this section. Each question carries 05 marks. Section B contains 05 long answer type questions. Attempt any 03 question from this section. Each question carries 15 marks.

SECTION - A

(Short Answer Type Questions)

(5×5=25)

Note: Attempt any 05 of the following 08 questions.

1. Construct the truth table for $\sim p \vee q$.

2. Define arguments and validity of arguments with an example.

3. Define relation and its various types and properties with suitable example.

4. If (L, ≤) is a lattice, then show that (L, ≥) is also a lattice.

5. Prove that the function $f : R \to R$, defined by $f(x) = 3x^3 + 5, \forall x \in R$ is a bijection.

6. If R be a relation in the set of integers Z defined by $R=\{(x,y):x,y \in Z,(x-y)$ divisible by $6\}$. Then prove that R is an equivalence relation.

7. Define semigroup and state and prove its any two properties.

8. Define cosets and state Lagrange's theorem with an example.

SECTION - B

(Long Answer Type Questions)

(3×15=45)

Note : Attempt any 03 of the following 05 questions.

9. Construct a truth table for each of the following compund propositions

(i) $(p \wedge q) \vee (p \wedge r)$

(ii) $\sim(p \vee q) \vee (\sim p \wedge \sim q)$

(iii) $p \wedge (q \vee r)$.

10. State and prove Demorgan's laws in set theory.

11. Define lattices, sub lattices and prove that dual of a lattice is a lattice.

12. Define composition of functions. If $f{:}A \to B$, $g{:}B \to C$ and $h{:}C \to D$ then prove that $ho(gof)=(hog)\,of$.

13. Write short notes on the following

(i) Propositions

(ii) Hasse diagram

(iii) Predicates