A-0843

Total Pages : 4 **Roll No. ----------**

BCA-05

Discrete Mathematics

Bachelor of Computer Application (BCA)

2nd Semester Examination 2024(Dec.)

Time: 2:00 hrs Max. Marks: 70

Note : This paper is of Seventy (70) marks divided into Two (02) Section A and B. Attempt the questions contained in these sections according to the detailed given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

P.T.O.

Section-A (Long-Answer-Type Questions)

Note : Section 'A' contains Five (05) long-answer-type questions of Nineteen (19) marks each. Learners are required to answer any Two (02) questions only.

[2x19=38]

Q.1. Prove that every field is an integral domain.

Q.2. Solve a given system of linear equations using Gaussian Elimination.

$$x + 2y + 3 = 6$$
$$2x + 3y + 3z = 14$$
$$y + 2z = 8$$

Q.3. Show that the Cartesian product is not commutative? It is commutative only for equality of sets?

Q.4. Find the inverse of matrix

$$A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$$

Q.5. Using Cramer's rule solve:

$$5x - y - 4z = 5$$
$$2x + 3y + 5z = 2$$
$$7x - 2y + 6z = 5$$

Section-B (Short-Answer-Type Questions)

Note : Section 'B' contains Eight (08) short-answer-type questions of Eight (08) marks each. Learners are required to answer any Four (04) questions only.

[4x8=32]

Q.1. Show that an intersection of ideals of a ring R is again an ideal of R.

Q.2. If A = {1, 2}, B = {3, 4, 5} and C = {3, 5, 6, 7, 8}, Show that

a. $A \cup B = B \cup A.$

b. $(A \bigcap B) \cap C = A \cap (B \cap C).$

Q.3. Define subgroup, normal subgroup, Quotient group and left & right cosets with an example for each.

Q.4. Show that $A \times (B \cap C) = (A \times B) \cap (A \times C).$

Q.5. Define tautology and contradiction with examples.

P.T.O.

Q.6. Draw the Venn Diagram of the following sets:

a. $A \cup B$

b. $A \cap B$

c. $A - B$

d. The complement of A if the universal set is U = {1, 2, 3, 4, 5, 6, 7, 8}.

Q.7. Prove that the set of even integers with usual addition and multiplication forms a commutative ring.

Q.8. Define an equivalence relation with the help of suitable example.

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