Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

M.Sc.(Computer Science) (Sem.-1) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE Subject Code : MSC-101 M.Code : 70887 Date of Examination : 19-01-2023

Time: 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students have to attempt any ONE question from each SECTION.
- 2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

- 1. a) If A, B, C are three sets such that $A \subseteq B$. show that $(A \times C) \subseteq (B \times C)$?
 - b) State and prove DeMorgans law.
- 2. a) Why Venn's diagram is used. Explain using an example.
 - b) What is Associative and Distributive law. Give an example.

SECTION-B

- 3. a) Write the following in symbolic notation and determine whether it is a tautology: "*If I study then I will learn. I will not learn. Therefore, I do not study.*"
 - b) What do you mean by Universal and Existential Quantifiers.
- 4. a) Using predicate logic, prove the validity of the following argument "Every husband argues with his wife. X' is A husband. Therefore, 'X' argues With his wife"?
 - b) What is the principle of Mathematical induction.

SECTION-C

- 5. a) How many vertices will the graph contain 6 edge and all vertices of degree 3?
 - b) What is an Eulerian graph? Give an example from day-to-day life.
- 6. State the Kruskals algorithm for finding Minimal Spanning tree. Explain with an example.

SECTION-D

- 7. a) Solve the recurrence relation un + 2 + 4un + 1 + 3un = 5(-2)n, u0 = 1, ul = 0 using generating function.
 - b) Write a short note on the Matrix inversion method with an example.
- 8. Using Gauss Jordan Method solve the following question:

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

SECTION-E

- 9. a) Define the rank of a matrix.
 - b) Define Duality law.
 - c) How to make a graph of relations.
 - d) What is a truth table, and why they are used?
 - e) What do you mean by laws of logic?
 - f) Differentiate between directed and undirected graphs.
 - g) What is a spanning tree?
 - h) What is recurrence relation?
 - i) Define various matrix operations.
 - j) Prove or disprove the validity of the following arguments.

All dogs are carnivorous.

Some animals are dogs.

Therefore, some animals are carnivorous.

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.