Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 & Onward) (Sem.–2)

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Subject Code : MCA-201

Paper ID : [72876]

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 has 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) Describe Euler graph by taking suitable example.

   b) If a graph G consists of edges {(a,c), (a,a), (b,c), (b,d), (d,c)}. Find Chromatic number of G.

2. a) What is the application of Hamiltonian graph in Computer Science?

   b) What is undirected graph? Discuss the relation between in-degree and out- degree of a graph.

SECTION-B

3. a) If a set A= {a, b, c}, then find the power set P(A).

   b) What are Uncountable sets? Prove that set of rational numbers between {0, 1} is uncountable.

4. a) If relation R = {(a,b), (b,b), (b,c), (d,b), (b,d), (d,d)}. Check whether R is equivalence relation or not.

   b) "*Cartesian product of two sets is a complete relation*". Comment on the statement.

SECTION-C

5. a) Explain different types of prepositions used in algebra of logic.

   b) What is meant by '*Principle of mathematical induction*'? Explain.

6. a) Show that (ab)' = a'+ b' is a tautology.

   b) How universal and existential quantifiers are used in algebra of logic? Explain by taking suitable examples.

SECTION-D

7. a) Define upper triangular matrix. What is the significance of Null matrix in Computer Science? Explain.

   b) "*Matrix multiplication is associative*". Justify the statement.

8. a) Discuss different Gauss Jordan method.

   b) What is meant by idempotent matrix? Explain.

SECTION-E

9. **Write briefly :**

   a) Define transitive relation.

   b) What is the significance of minset?

   c) List two examples of Skew-Hermitian matrix.

   d) What is meant by 'Closure property' of a relation?

   e) What is the application of matrix in graphs?

   f) List two properties of Eulerian graph.

   g) Define Range and domain of a set.

   h) Show that intersection of any set with universal set is a set itself.

   i) Define Symmetric Matrix.

   j) Every planar graph is 4-colorable. Comment on the statement.

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