

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 miniset?
 - 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.