AA-684

M.C.A. EXAMINATION, Dec. 2018

(First Semester)

(B Scheme) (Re-appear Only)

MCA-405

DISCRETE MATHEMATICS

Time : 3 *Hours*]   [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

(1-03) M-AA-684   **P.T.O.**

Unit I

1. (a) What do you mean by Equivalence Relation and Partial Ordering Relation ? Explain. **8**

   (b) Prove that : **7**

   $(A \times B) \cup (P \times Q) = (A \cup P) \times (B \cup Q).$

2. (a) What do you mean by Functions ? Explain different types of Functions. **7**

   (b) What do you mean by Multisets ? Also explain different operations on Multisets. **8**

Unit II

3. (a) How will you differentiate between a general tree and binary tree ? **5**

   (b) Explain the Dijkstra's Algorithm to find shortest path in a weighted graph. **10**

4. Write notes on the following : **3×5=15**

   (a) Eulerian Path and Circuit

   (b) Graph Coloring

   (c) Spanning Tree.

Unit III

5. (a) State and prove Lagrange Theorem. **10**

   (b) With the help of suitable example explain what are rings. **5**

6. (a) Define tautologies, contingency and contradiction. From the following formulae find out tautology, contingency and contradiction : **5**

   (i) $P \rightarrow (P \rightarrow Q)$

   (ii) $P \vee \wedge P.$

   (b) Write note on Boolean Algebra. **5**

Unit IV

7. (a) List solve the recurrence relation $a_r = a_{r-2} + a_{r-2}, r \geq 2$ with the initial conditions $a_0 = 1$ and $a_1 = 1$. **10**

   (b) State and Euler's formula for planar graph. **5**

8. With the help of suitable examples define Permutations, Combination, AP, GP and AG Series. **15**