AA-684

M.C.A. EXAMINATION, Dec. 2017

(First Semester)

(B. Scheme) (Main & Re-appear)

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.

Unit IV

7. (a) Solve the recurrence relation $a_r - 7a_{r-1} + 10a_{r+2} = 0$ with the initial conditions $a_0 = 3$ and $a_1 = 3$. **10**

(b) Explain Isomorphism and Homomorphism with suitable example. **5**

8. Write notes on the following :

(a) Permutations

(b) Combination

(c) AP series

(d) GP series

(e) AG series. **5×3=15**

Unit I

1. Explain the following terms with suitable example :

(a) Power set

(b) Classes of set

(c) Types of Relations

(d) Partial Ordering Relation

(e) Finite and Infinite set. **5×3=15**

2. (a) What do you mean by Relation ? Explain the different properties of relation. **8**

(b) What do you mean by Lattices ? Explain in detail. **7**

Unit II

3. What is meant by Eulerian and Hamiltonian circuits ? Draw a graph :

(a) Which has an Euler circuit but not a Hamiltonian circuit ?

(b) That has an Euler circuit which is also a Hamiltonian circuit. **15**

4. Write notes on the following with suitable example :

(a) Homomorphic Graphs

(b) Cut points and Bridges

(c) Paths and Circuits. **3×5=15**

Unit III

5. Define propositions, tautologies and contradiction. From the following formulae find out tautology, contingency and contradiction :

(a) $\neg(A \rightarrow B) \vee (\neg A \vee (A \wedge B))$

(b) $(H \rightarrow (I \wedge J)) \rightarrow \neg(H \rightarrow I)$

(c) $(P \leftrightarrow Q) \cong (P \wedge Q) \vee (\neg P \wedge Q)$ **15**

6. Explain the following :

(a) Rings

(b) Cosets

(c) Cyclic Group

(d) Automorphism in Groups

(e) Groups. **5×3=15**