

**MCA-09****June/December – Examination 2020****Master of Computer Application  
(II Year) Examination****Discrete Mathematics****Paper : MCA-09***Time : 2 Hours ]**[ Maximum Marks : 80*

*Note* :- The question paper is divided into two sections A and B. Use of non-programmable scientific calculator is allowed in this paper.

**Section-A****8×2=16****(Very Short Answer Type Questions)**

*Note* :- Section 'A' contains 8 Very Short Answer Type Questions. Examinees have to attempt all questions. Each question is of 2 marks and maximum word limit is **30** words.

1. (i) Express the following set in Roster method :

$$A = \{x : x \text{ is a divisor of } 24\}.$$

(ii) Write cancellation laws for Boolean algebra  $\langle B, +, \cdot, ', 0, 1 \rangle$ .

(iii) Write the negation of the following statement :

$p$  : 3 is not an integer.

(iv) Define predicates.

(v) Explain statement by giving an example.

(vi) State the Pigeonhole principle.

(vii) Construct the truth table for  $\sim p \wedge p$ .

(viii) Define into function.

**Section-B** **4×16=64**

**(Short Answer Type Questions)**

**Note** :- Section 'B' contains 8 Short Answer Type Questions. Examinees will have to answer any *four* questions. Each question is of 16 marks. Examinees have to delimit each answer in maximum **200** words.

2. Results of survey on 1000 persons are :

720 persons like to drive car

450 persons like to drive scooter

Find minimum number of persons who like to drive both car and scooter.

3. Prove that the intersection of two equivalence relations is also an equivalence relation.

4. Using truth table, verify the distributive law

$$p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$$

5. Explain the following :

(a) Predicate

(b) Universe of discourse

(c) Universal Quantifiers

(d) Existential Quantifiers

6. Prove that a group of order less than or equal to 5 is an abelian group.

7. How many different words can be formed with the letters of the word 'COMPUTER' ? How many of them :

(i) will begin with C and with R ?

(ii) will not have T and R together ?

8. Draw the following graphs :

(a) 3-regular but not complete

(b) A complete bipartite graph having 2 vertices in one partite set and vertices in the other partite set.

9. Prove that every tree has either one or two centers.