

# MCA-09

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. Write answers as per the given instructions.

**Section-A**

**8×2=16**

**(Very Short Answer Type Questions)**

**Note** :- Answer all questions. As per the nature of the question delimit your answer in one word, one sentence or maximum upto **30** words. Each question carries 2 marks.

1. (i) Give an example of a Tree.
- (ii) What is Graph ?

- (iii) What is a Universal Set ?
- (iv) What do you mean by the height of the tree ?
- (v) What is the incidence matrix ?
- (vi) Prove that  $0! = 1$ .
- (vii) What do you mean by Predicate ?
- (viii) What is a tautology ?

**Section-B** **4×16=64**

**(Short Answer Type Questions)**

*Note* :- Answer any *four* questions. Answer should not exceed **200** words. Each question carries 16 marks.

2. What is Set ? Explain various operations on sets using a suitable examples.
3. Let S be a set having 3 elements. How many binary operations can be defined on S ?
4. Explain the following terms with a suitable example :
  - (i) Group
  - (ii) Sub-group

5. Explain the Pigeonhole principle in brief ?
6. Write the dual of each of the following Boolean function :
  - (i)  $ac + a + bc$
  - (ii)  $ab + a'b'$
7. Construct the truth value for each of the following :
  - (i)  $(P \wedge Q) \rightarrow (P \vee Q)$
  - (ii)  $(P \wedge Q) \rightarrow \sim P$
8. Let  $A = \{1, 2, 3\}$ ,  $B = \{3, 4, 5\}$ . How many relations are there from A to B ? Write down any *four* relations from A to B.
9. Explain the concept of Functions and their types.