BCA–02

December – Examination 2021

BCA (I Year) Examination

Discrete Mathematics

Paper : BCA-02

Time : 1½ Hours]   *[Maximum Marks : 70*

Note :– The question paper is divided into two Sections A and B. Write answers as per the given instructions.

Section–A   4×3½=14

(Very Short Answer Type Questions)

Note :– Answer any *four* questions. As per the nature of the question delimit your answer in one word, one sentence or maximum up to **30** words. Each question carries 3½ marks.

1. (i) What is the full form of ASCII ?

    (ii) Define Poset. Give an example.

(iii) What is Identity Relation ? Give an example.

(iv) If $a + b' = 1$, then what is the value of $a'b$?

(v) Why is Venn diagram used ? Explain with an example.

(vi) What do you mean by an Independent set ? Give an example.

(vii) Draw a logical symbol of NOT gate. Also, give its truth table.

(viii) State Lagrange's theorem.

Section–B   4×14=56

(Short Answer Type Questions)

Note :– Answer any *four* questions. Answer should not exceed **200** words. Each question carries 14 marks.

2. Solve :

   (a) $(1257)_8 = (?)_{10}$

   (b) $(1011)_{10} = (?)_2$

   (c) $(12A)_{16} = (?)_2$

   (d) $(10010110)_2 = (?)_{16}$

3. Construct truth table of $(\sim p \vee q) \wedge (q \vee \sim r)$.

4. Explain the laws of the algebra of propositions and draw the table for the same.

5. Prove that the following propositions are tautology or fallacies :

   (a) $(p \wedge q) \rightarrow (p \vee q)$

   (b) $(p \vee q) \wedge (\sim p \wedge \sim q)$

6. Simplify the three variable Boolean expressions $\Pi(1, 2, 3, 4, 7)$ using Boolean algebra.

7. What is the relation in Set Theory ? Mention the types of relation with examples.

8. Prove that the set $G = \{1, \omega, \omega^2\}$ is a cyclic group for multiplication of complex numbers where 1, ω, ω^2 is the cube root of unity.

9. State and prove De-Morgan theorem.