8. Explain the following computer codes :

   (a) ASC II

   (b) UNICODE

9. If a, b, c, d are elements of lattice (A, $\leq$) such that $a \leq b$ and $c \leq d$, then prove that :

$$a \vee c \leq b \vee d$$

BCA–02

June – Examination 2022

BCA (Part-I) 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) Express the following set in Roster method :

   A = {x : x is an even number between 41 to 59}

(ii) Define reflexive relation.

(iii) Define binary number system.

(iv) Write the negation of the following statement :

p : Ramesh is elder than Mahesh.

(v) Define Contradiction.

(vi) Define identity element for operation* in a set.

(vii) Define order of an element in a group.

(viii) Write De-Morgan's law for Boolean Algebra.

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. Prove that :

$$\text{set } G = \left\{a + b\sqrt{2}; a, b \in Q\right\}$$

is a commutative group for addition.

3. Out of 200 students, 70 likes mathematics, 60 likes physics, 25 likes chemistry, 30 likes both mathematics and physics, 22 likes both mathematics and chemistry, 17 likes both physics and chemistry and 12 likes all the three subjects. How many students do not like any *one* of these subjects ?

4. Show that if R is an equivalence relation then R^{-1} also equivalence relation.

5. Find conjunctive normal form (CNF) of given function :

$$f(x) = [x_1 + (x'_1 + x'_2)'].[x_1 + (x'_2.x'_3)]$$

6. Prove that following propositions are fallacies :

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

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

7. If A, B and C are any sets, then prove that :

(a) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

(b) $(A \cap B)' = A' \cap B'$