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BCA–02

December – Examination 2020

BCA (Part I) Examination

Discrete Mathematics

Paper : BCA-02

*Time : **2** Hours*] [*Maximum Marks : **70***

Note :– The question paper is divided into two sections A and B. Use of calculator is allowed in this paper.

Section–A **7×2=14**

(Very Short Answer Type Questions)

Note :– Section 'A' contains 7 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 = $\{x : x$ is a month of the year$\}$

 (ii) Define Identity Relation.

 (iii) Define binary number system.

 (iv) Write the negation of the following statement :

 p : 0 is a whole number.

(v) Prove that If R is a ring with unity, then unity is unique.

(vi) Define a subgroup.

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

Section–B 4×14=56

(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 14 marks. Examinees have to delimit each answer in maximum **200** words.

2. In a village of 1000 families it was found the 30% families have agriculture profession, 15% families have milk product profession and 20% families have other profession. If 5% families have both agriculture and milk product profession, 3% have milk product and other profession and 4% have agriculture and other profession and 2% families have all these profession, find the number of family which have :

   (i) Only agriculture profession

   (ii) Only milk product profession

   (iii) No profession

3. For any two numbers 'a' and 'b' if relation R is defined as aRb if and only if $\sin^2 a + \cos^2 b = 1$ then prove that R is equivalence relation.

4. Solve :

   (i) $(110111)_2 = (?)_{10}$

   (ii) $(2456)_8 = (?)_{10}$

   (iii) $(84FC)_{16} = (?)_{10}$

5. Construct truth table of $(p \to q) \wedge (q \to r)$

6. Prove that dual of a lattice is again a lattice.

7. Prove that set of positive rational numbers Q^+ is an abelian group for operation * defined as $a * b = \frac{ab}{2}$.

8. Prove that a non-zero finite integral domain is a field.

9. Prove that a Boolean Algebra does not have exactly 3 distinct elements.