

BCA 201

B.C.A. (PART-I) EXAMINATION, 2023-24

(Second Semester)

Paper : I

(BCA 201 : Discrete Mathematics)

5446

Time : Three Hours]

[Maximum Marks : 70

- Note: (i) Answer Five Questions in all.
(ii) Question No.1 is Compulsory.
(iii) Answer remaining four question selecting two from each Section A and B
(iv) All questions carry equal marks.

1. Answer all parts of the following :

- (a) State and explain De Morgan's theorem.
(b) Construct the truth table for $\sim q \vee q$
(c) Find the power set of $\{x, \{y\}\}$
(d) What do you mean by group ? List down its properties.

Section-A

2. What do you understand by Normal forms for logical expression? Explain various types of Normal form obtain the principal conjunctive normal form for the following expression :

$$(\sim p \rightarrow r) \wedge (q \leftrightarrow p)$$

3. Define relation. What are the properties of relation?
Also discuss various types of relation.
4. Show that the set $\{0,1,2,3,4\}$ is a finite abelian group of order 5 under addition modulo 5 as a composition.
5. Construct the truth table for the following expression $\sim(p \wedge q) \vee r \rightarrow \sim p$

Section-B

6. (a) If $A = \{4, 5, 7, 8, 10\}$
 $B = \{4, 5, 9\}$, $C = \{1, 4, 6, 9\}$
then verify that
$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$
- (b) A computer company must hire 20 programmers to handle system programming jobs and 30 programmers for application programming of those hired 5 are expected to perform jobs of bolt types. How many programmers must be hired ?
7. (a) Explain subjective and bijective function with examples.
- (b) Explain permutation and combination with examples.

8. (a) If ${}^{2n-1}P_n : {}^{2n+1}P_{n+1} = 5:3$
then find the value of n .
- (b) Draw a tree with at least 6 vertices that has exactly 2 vertices of degree one.
9. Write note on any two of the following :
- (a) Equivalence Relation
- (b) Rings
- (c) Conditional and biconditional statements

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