Exam. Code : 107201
Subject Code : 1774

Bachelor of Computer Application (BCA) 1st Semester

APPLIED AND DISCRETE MATHEMATICS

Paper—III

Time Allowed—Three Hours] [Maximum Marks—75

Note :— Attempt **FIVE** questions selecting at least **ONE** question from each section and the **fifth** question may be attempted from any section. All questions carry equal marks.

SECTION—I

1. (a) Define :
   (i) Set
   (ii) Union of Set
   (iii) Intersection of set, each with an example.
   (b) If A = [1, 4, 6, 8], B = [5, 9, 11] verify that $A \cap (B - A) = \phi$.
   (c) If A = [4, 5, 8, 12], B = [1, 4, 6, 9], C = [1, 2, 3, 4] then find A – (B – A).
2. (a) Define :
   (i) Reflexive relation
   (ii) Symmetric relation
   (iii) Transactive relation.
   (b) Let A = [1, 2, 3], B = [3, 4], C = [4, 5, 6] find $(A \times B) \cup (A \times C)$.

SECTION—II

3. (a) Prove that $(p \wedge q) \wedge r \cong p \wedge (q \wedge r)$ with the help of truth table.

   (b) Check the validity of argument if I work, I cannot study either I work or pass examination.

   I passed Mathematics. Therefore I study.

4. (a) Define :

   (i) Conditional Statement

   (ii) Biconditional Statement

   with the help of truth table.

   (b) Prove De-Morgan law with the help of truth table.

SECTION—III

5. (a) Convert into DN form :

   $$[(xy^1)^1 + z^1] - (x^1 + z^1)^1$$

   (b) Show that xz^1 is prime implicant of :

   $$xy^1 + xyz^1 + x^1yz^1.$$

6. (a) Reduce the expression :

   $$A[B + \overline{C(AB + A\overline{C})}].$$

   (b) Show $f = \Sigma m(2, 3, 6, 7)$ using k-map.

SECTION—IV

7. (a) Let $f(x) = x^2 - 5x + 6$ find $f(A)$ if :

$$A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}.$$

(b) If $A = \begin{bmatrix} 11 & -25 \\ 4 & -9 \end{bmatrix}$ then $A^n = \begin{bmatrix} 1+10n & -25n \\ 4n & 1-10n \end{bmatrix}$.

8. (a) Find A^{-1} if $A = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 0 & -1 \\ 1 & 2 & 3 \end{bmatrix}$.

(b) Find rank of matrix $A = \begin{bmatrix} 2 & 3 & 5 \\ 4 & 6 & 10 \\ -8 & -12 & -20 \end{bmatrix}$.