Roll No. | | | | | | | | | | | | |

Total No. of Pages: 02
Total No. of Questions: 07

BCA (Sem.-2nd)

MATHEMATICS-I(DISCRETE MATHS)

Subject Code: BC-203
Paper ID: [B0207]

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATE:

1. **Section-A is compulsory**
2. **Attempt any four questions from section-B**

SECTION-A

Q.1. (a) If A and B are any two sets, then $(A \cap B)^C = A^C \cap B^C$

(b) Define reflexive and transitive relation with an example.

(c) For non empty sets A and B, prove that $AxB = BxA \Leftrightarrow A=B$

(d) Find n if $p\ (2n, 3) = 100\ p\ (n, 2)$

(e) Define Eulerian and Hamiltonian graph.

(f) Construct a truth table for pvq

(g) Solve the recurrence relation.

$$S\ (n+2)\ -6S\ (N+1) + 9S\ (N) = 0$$

(h) Using principle of mathematical induction prove that $1+3+5+ \text{-----} + (2n-1) = n^2$

(i) Define the out degree and in degree of a vertex V'

(j) Define equivalence relation.

SECTION-B

Q.2. If A, B, C are any three sets, then prove that

a) $Ax\ (B \cap C) = (Ax\ B) \cap (AxC)$
b) $(A \cap B)\ x\ C = (AxC) \cup (BxC)$

Q.3.(a) Find the number of different 8- letter words formed from the letters of word. TRIANGLE if each word is to have Consonants never together

(b) The number of diagonal of a polygon is 20 find the number of its sides

Q.4.(a) Show the equivalence of the following

$$d \rightarrow (\sim a) \wedge b) \wedge c \quad and \sim \ (av(\sim (b \wedge c) \wedge d$$

(b) Set *f: R→R be defined by f(x) = 2x +3*

(i) Find f^{-1} (ii) Find the domain of f^{-1}

Q.5.(a) Show that ($p \wedge q$) $\wedge$ ~ ($p \wedge q$) is a fallacy.

(b) Solve the recurrence relation:

S (k) -7S (k-1) + 10 S (k-2) = 6+8k

Where S(0) = 1, S(1) = 2

Q.6.(a) Show that maximum numbers of edges in graph with n- vertices and no multiple edges are $\frac{n(n-1)}{2}$

(b) Prove that chromatic number of graph C_n where C_n is the cycle with 'n' vertices is either 2 or 3

SECTION-C

Q.7.(a) Determine the sequence whose generating function is *G(S,Z)*= $\left(\frac{3-5z}{1-2z-3z^2}\right)$

(b) Prove by mathematical induction that

$$\frac{1}{3.5}+\frac{1}{5.7}+\frac{1}{7.9}----+\frac{1}{(2n+1)(2n+3)}=\frac{n}{3(2n+3)}$$

.....END.....