Roll No. ....

Total No. of Questions : 13]   **[Total No. of Pages : 02**

Paper ID [A0208]

(Please fill this Paper ID in OMR Sheet)

BCA/B.Sc. IT (202/203) (S05) (N) (O) (Sem. - 2nd)

MATH - I (DISCRETE MATHS)

Time : 03 Hours   **Maximum Marks : 75**

Instruction to Candidates:

    1) Section - A is **Compulsory**.

    2) Attempt any **Nine** questions from Section - B.

Section - A

Q1)   *(15 × 2 = 30)*

    a) Find the Cardinal number of each set :

       (i) $A = \{x : x^2 = 25, 3x = 6\}$

       (ii)   Power set P (B) of B = {1, 4, 5, 9}

    b) What is Relation? Enlist its various types?

    c) Define Function. How it is represented in Mathematics?

    d) Define Partition.

    e) What is duality principle in set theory?

    f) Express the following statements in symbolic form

       (i)   If it is cold he takes tea and not cold drink

       (ii)   If you work hard you will succeed

    g) Explain Principle of Mathematics Induction.

    h) Explain Quantifiers.

    i) Explain Recursion

    j) Define Recurrence Relations.

    k) Enlist various types of Graph.

    l) Differentiate between Eulerian and Hamiltonian Graph.

    m) Define Graph.

    n) Define Euler Graph.

    o) What is Spanning Tree?

A-65   *P.T.O.*

Section - B

(9 × 5 = 45)

Q2) Let A, B, C be any three subsets of a universal sets U, then

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

    (b)

Q3) If $f : R : R$ given by $f(x) = 3x - 1$, Find f^{-1}. Verify it also.

Q4) Let $f(x) = x + 2$, $g(x) = x - 2$, $h(x) = 3x$ for x R, where R is a set of real numbers. Find gof, fog, hog.

Q5) Let S = {2, 3, 4, 6, 8, 9, 12} and let R be the relation on S defined by ^xR_y if x divides y. Draw digraph for their relation.

Q6) Prove using Truth Table :

    (a) ~ (p   q) = ~ p   q = p   ~ q

    (b) p   (q ^ r) = (p   q) ^ (p   r).

Q7) Prove that for all natural numbers n

    $1^2 + 3^2 + 5^2 .... + (2n - 1)^2 = [n(2n - 1)(2n + 1)] / 3$

Q8) How many words can be formed out of the letters if the word 'PECULIAR' beginning with P and ending with R?

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

Q9) Solve $D(k) - 8 D(k - 1) + 12 D(k - 2) = 0$, when $D(0) = 54$, $D(1) = 308$

Q10) Explain with example

    (a) Bipartite Graph

    (b) Complete Bipartite Graph

Q11) A simple undirected graph G is a tree if G is connected and has no cycle. Prove.

Q12) A tree with n vertices has exactly (n – 1) edges. Proved.

Q13) Construct a binary tree whose nodes in two order are as under :

    Pre order A, B, C, D, E, F, H, J, M, K, E, G, J, L, N

    In order A, D, J, M, H, K, F, C, I, N, L, G, E, B

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