Utach

CS / MCA (A) / ODD / SEM - 1 / 1610 / 2023-2024 / 1036

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY , WEST BENGAL

Time Allotted : 3 Hours

Paper Code : MCAN - 104 Discrete Mathematics

UPID : 001610

MCA

The Figures in the margin indicate full marks .

Candidate are required to give their answers in their own words as far as practicable

1. Answer any ten of the following :

Group - A (Very Short Answer Type Question)

Full Marks : 70

[1x10 = 10]

Let A and B be two sets each having n number of elements . Then how many bijective mappings will exist from A to B ?

(4) Is the set of all real numbers w.r.t the relation ' less than or equal to ' - a partial order relation or a total order relation ?

(1) Write down the necessary and sufficient condition of a subset H of a group (G , *) , to be a subgroup of G.

(IV) What is the maximum number of edges of a simple graph with n vertices ?

(V) Let S be a subset of a ring (R , + ,.) . Write down the two conditions for S to be a subring of R.

(VI) What is the degree of a common vertex of two edges in series ?

(VII) If f (x) = 3x + 2 is a mapping then write down f^{1} (x) .

(VI) The sum of the degrees of all the vertices of a graph is 40. Then write down the number of edges of the graph .

(X) How many generators does an infinite cyclic group have ?

(X) How many edges does a simple graph with 8 vertices have ?

(x) If p : ' Anil is rich ' and q : ' Kanchan is poor ' then what is the symbolic form the statement ' Elther Anil or Kanchan is rich ' ?

[x] If f (x) = 2x - 3 , then write the expression for (f . f) (x) .

Group - B (Short Answer Type Question)

Answer any three of the following :

2. If all the permutations of the letters of the word DIRECTOR be written down as in a dictionary what is the rank of the word ?

3. Let a be an element of a group (G ,.) , of order n . Then ame if and only if n is a divisor of m .

4. Prove that a tree with n vertices has n - 1 number of edges .

5. State Lagrange's theorem . Hence show that every group of prime order is cyclic .

6. Prove that a complete graph with n vertices consists of n (n - 1) / 2 edges .

How many edges does a complete graph with 10 vertices have .

[5x3 = 15]

[5]

[5]

5

5

[5]

[5]

[5]

Group - C (Long Answer Type Question)

Answer any three of the following :

7. (a) Find the number of ways a company can assign 7 projects to 4 people so that each person gets at

least one project .

(b) Four dice are thrown at a time . In how many way a total of 16 can be obtained ?

8. (a) In an examination , out of 90 students 65 passed in Physics and 50 passed in Mathematics and 35

passed in both Physics and Mathematics .

[15 x 3 = 45)

[8]

[7]

[8]