B.Sc. (Data Science) (NEP) Semester-I

BSCDS012 : Discrete Mathematics

P. Pages : 1 **GUG/W/24/15256**

Time : Two Hours * 6 1 2 9 * Max. Marks : 40

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1. a) A Finite Non Empty Poset (P, R) has at least on Maximal element and at least one minimal. **4**

b) Explain Linear Ordering Hasse Diagrams. **4**

OR

c) Find the inverse g(x) of bijective function f(x) = 2x – 3 for f, $g : R \to R$. Verify the inverse by showing $f \circ g(x) = x = g \circ f(x)$. **4**

d) Show that the set $A = \{1, 2, 3, 4\}$ under the divisibility relation is not totally ordered. **4**

2. a) Difference between Permutations and Combination. **4**

b) Define Tower of Hanoi. **4**

OR

c) Define – 1. Finite State Machines 2. Turing Machine **4**

d) Explain Binomial Theorem. **4**

3. a) In how many of the distinct permutations of the letters in MISSISSIPPI do the four I's not come together? **4**

b) Difference between Graphs and Trees. **4**

OR

c) Explain Vandermonde's Identity. **4**

d) Explain Pascal Identity. **4**

4. a) Explain Traversing a Graph-Breath First Search and Depth First Search. **4**

b) Define - Path Matrix with example. **4**

OR

c) Define: **4**

i) Ordered rooted tree

ii) Binary tree

d) Explain types of binary trees. **4**

5. a) Definition of bijective and Injective Functions. **2**

b) Define POSET and TOSET. **2**

c) Definition of Composite and Inverse Function. **2**

d) Define: **2**

i) Regular Graph

ii) Complete Graph

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