BHARATIVIDYAPEETH'S

INSTITUTEOFCOMPUTERAPPLICATIONS&MANAGEMENT (BVICAM)

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Course Code: MCA-101 **Course Name: Discrete Structures**

Class Test

Each question is of 5 marks

Q1.	Given a set S containing n elements, formulate a proof to show that the number of proper subsets of S is 2^n - n - 1, where a proper subset excludes the empty set and the set itself.
Q2.	Define a relation R on a set A such that R is both reflexive and symmetric but not transitive. Provide a concrete example to illustrate your definition.
Q3.	Given a set A with n elements, consider a relation R on A defined such that R is symmetric and antisymmetric. Analyze whether R can be reflexive, providing reasoning for your answer.
Q4.	Suppose you have two equivalence relations, R1 and R2, defined on a set A. Evaluate whether the intersection of R1 and R2 is also an equivalence relation. Justify your answer with examples.
Q5.	Create a matrix representation for a relation R on a set A, where A = {a, b, c, d}, and R = {(a, a), (a, b), (b, c), (c, a)}. Then, determine whether the relation R is reflexive, symmetric, antisymmetric, and transitive.
Q6.	A committee of k members is to be formed from a group of n people. Evaluate the number of ways to form the committee when: a) Order doesn't matter. b) Order does matter.
Q7.	Consider a set S containing n elements. Analyze the number of ways to partition S into non-empty subsets.
Q8.	A committee of k members is to be formed from a group of n people. Evaluate the number of ways to form the committee when: a) Order doesn't matter. b) Order does matter.
Q9.	Consider a set S containing n elements. Analyze the number of ways to partition S into non-empty subsets.
Q10.	Given a permutation of n distinct objects, determine the number of inversions in the permutation. Evaluate the formula for the number of inversions and provide a proof for its correctness.

*************Wish you luck!***************