



MS 13

I Semester M.Sc. (I.T.) Examination, Dec. 2009/Jan. 2010
DISCRETE MATHEMATICS
(Freshers)

Time : 3 Hours

Max. Marks : 75

Instructions : 1) Answer *all* questions in Part – A.
2) Answer *any* 5 questions in Part – B.

PART – A

- I. State whether the following statements are **true** or **false** : **(1×5=5)**
- a) Every positive integer can be written as the product of primes.
 - b) A graph is two colorable if and only if it contains no odd cycle.
 - c) If every node in a graph has degree atmost d , then the graph can be colored with $d + 1$ colors.
 - d) In the euclidean plane, every point has two coordinates.
 - e) If a graph has an odd number of nodes then it has a node with even degree.
- II. Answer the following : **(2×10=20)**
- 1) What is symmetric difference of 2 sets A and B ? Write it with the help of Venn diagram.
 - 2) n boys and n girls go out to dance. In how many ways can they all dance simultaneously. (Assuming the only couples of mixed gender dance with each other.)
 - 3) Prove that sum of first n positive integers is $n(n + 1)/2$.
 - 4) Explain stirlings formula.
 - 5) Prove that F_{3n} is even.
 - 6) Write a short note on finite geometry.
 - 7) Write Eulers formula for n polygons and explain the terms.
 - 8) Into how many parts do 2 quadrilaterals divide the plane if they are convex ?
 - 9) Write sets having cardinality (a) 13 (b) 15.
 - 10) What is graphs ? Give an example.

P.T.O.



PART – B

(5×10=50)

1. De Morgan's law say that $\sim (p \vee q) \approx \sim p \wedge \sim q$. Write a truth table to demonstrate the truth of De Morgan's law.
 2. Prove that each row of Pascal's triangle starts and ends with 1.
 3. Explain equivalence and implication with examples.
 4. Describe Hamiltonian cycles with examples.
 5. Write a note on public key cryptography.
 6. Explain with an example the concept of coloring graphs with many color.
 7. Explain the law of large numbers in detail.
 8. Explain in detail "Eulerian Walk".
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