JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
II.B.TECH - I SEMESTER REGULAR EXAMINATIONS NOVEMBER, 2009
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Common to CSE, IT, CSS)

Time: 3hours   Max.Marks:80

Answer any FIVE questions
All questions carry equal marks
- - -

1. Explain following terms:
   i) Tautology   ii) Contra positive   iii) Universal valid formula
   iv) Contradiction   [4*4=16]

2. a) What is predicate calculus? What is its significance? Give example for 3-place, 4-place & 5-place predicates.
   b) Prove validity of following argument using propositional logic:
   $$A \to (B \to C), B \to (C \to D) \Rightarrow A \to (B \to D)$$
                                                         [8+8]

3. a) Let the relation R = { (1,2), (2,3) , (2,4)} on the set { 1,2,3,4} . Obtain transitive closure of R.
   b) What is the domain of the function : $f(x) = \mathrm{coslog}\left\{ \dfrac{\sqrt{2-x}^2}{(1-x)} \right\}$ [8+8]

4. a) Show that for any commutative monoid (m,*), the set of idempotent elements of m forms a submonoid.
   b) Explain Epimorphism & Monomorphism in detail.   [8+8]

5. a) How many ways are there to roll two distinguishable dice to yield a sum that is divisible by 2?
   b) State & prove Binomial theorem.   [8+8]

6. a) Compute a simple expression for the power series:
   $$\sum_{n=1}^{\infty} (n+1)(n+1)(n) X^n$$
   b) Solve $a_n - 6a_{n-1} + 8a_{n-2} = n4^n$ where $a_0 = 8, a_1 = 22$ [8+8]

7. a) What is planar graph? Show that following graph is planar.
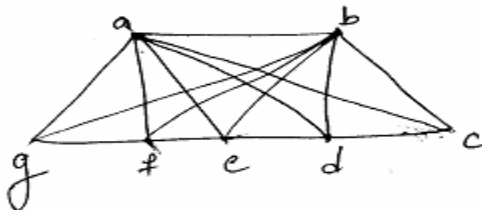
   b) Draw following graphs : i) c_5 ii) K_6 iii) $K_{3,3}$ iv) W_6 [8+8]

8. a) Derive an algorithm for constructing Euler circuit in directed & non-directed graph
   b) Distinguish between following terms
       i) Cycle and Circuits.
       ii) Hamiltonian graph & Euler graph.   [8+8]

******