PVP 12

Code: EM3T4, IT3T1

II B.Tech - I Semester – Regular Examinations - December 2014

DISCRETE MATHEMATICS
(Common for ECM, IT)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1 a) Construct the truth table for the following formula 7 M

i) $(P \leftrightarrow Q) \leftrightarrow ((P \wedge Q) \vee (\sim P \vee \sim Q))$
ii) $(Q \wedge (P \rightarrow Q)) \rightarrow P$

b) Show that the preposition $((P \vee \sim Q) \wedge (\sim P \vee \sim Q) \vee Q)$ is a tautology. 7 M

2 a) What are the different types of normal forms and obtain PDNF of 6 M

i) $P \rightarrow (P \wedge (Q \rightarrow P))$ ii) $(\sim P \vee Q)$

b) Obtain PCNF of 8 M

i) $((\sim P \rightarrow R) \wedge (Q \leftrightarrow P))$ (ii) $((P \wedge Q) \vee (\sim P \wedge Q \wedge R))$

3 a) Define Rule P, Rule T. Show that RVS follows logically from the premises CVD, $(CVD) \rightarrow \sim H$, $\sim H \rightarrow (A \wedge \sim B)$ and $(A \wedge \sim B) \rightarrow (RVS)$. 7 M

b) Prove by mathematical induction that 7 M
$1^3 + 3^3 + 5^5 + \ldots + (2n-1)^3 = n^2(2n^2 - 1)$ for all positive integers n.

4 a) Write the two basic counting principles. How many different plates are there that involve 1,2, or 3 letters followed by 1, 2, 3 or 4 digits? 7 M

b) Enumerate the number of non-negative integral solutions to the inequalities
$x_1 + x_2 + x_3 + x_4 + x_5 <= 19$. 7 M

5 a) Solve the Fibonacci recurrence relation $F_n = F_{n-1} + F_{n-2}$, F1=F2=1 7 M

b) Solve the recurrence relation $a_n - 3a_{n-1} - 4a_{n-2} = 0$ for n>=2 $a_0 = a_1 = 1$ using characteristic roots. 7 M

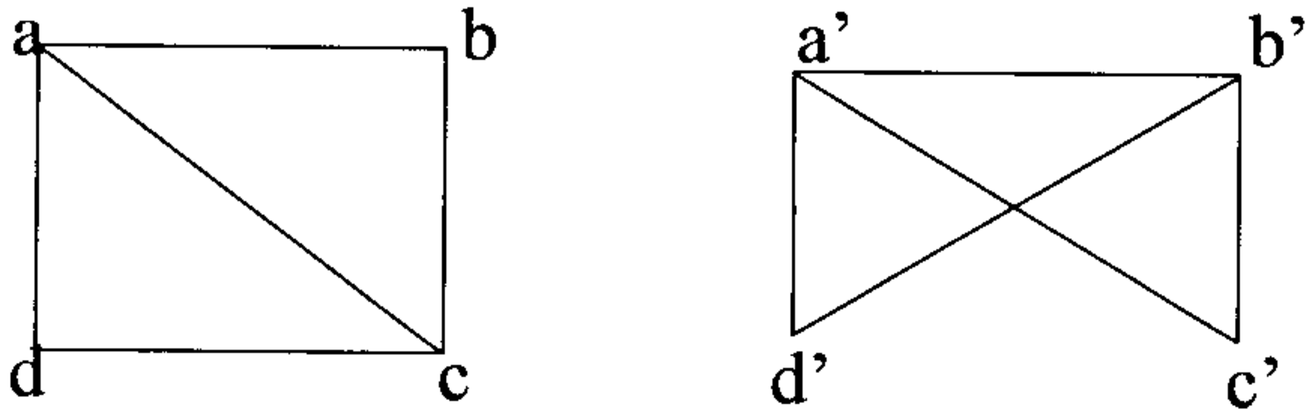
6 a) Define equivalence relation. Prove that the relation "congruence modulo m" given by = = {(x,y) / (x-y) is divisible by m } over the set of positive integers is a equivalence relation. 7 M

b) Define partial ordering relation.
Let A is a set of factors of a particular positive integer m and let <= be the relation divides
<= {(x,y) | x ε A, y ε A (x divides y)}
Draw the Hasse diagram for m=6 and m=30. 7 M

7 a) Explain Warshall's algorithm with an example. 7 M

b) Define transitive clouser.
Let A={a,b,c,d,e} and let R={(a,a), (b,c), (c,d), (c,e), (d,e)}
compute transitive clouser of R. 7 M

8 a) Define isomorphism of a graph. Determine whether the given pair of graphs is Isomorphic. Justify. 7 M



b) Explain the following with examples. 7 M
i) Multi graphs
ii) Hamiltonian graphs.