Assignment-II

Subject: Discrete Mathematics (MA 2013) Full Marks: $10 = 4 \times 2.5$

Answer all the questions

1. Find the reflexive, symmetric and transitive closure of the relation $\boldsymbol{R = \{(b,c),(b,e),(c,e),(d,a),(e,b),(e,c)\}}$ on $\boldsymbol{\{a,b,c,d,e\}}$. Use Warshall's algorithm to find the transitive closure.

2. Prove that the relation $\boldsymbol{R = \{(a,b) \mid a \text{ divides } b\}}$ is partial ordering on $\boldsymbol{S = \{1,2,3,4,6,8,12,24\}}$. Draw the Hasse diagram for the POSET $\boldsymbol{(S,R)}$. Find the greatest and least element of the POSET $\boldsymbol{(S,R)}$. Find the greatest lower bound (glb)and least upper bound (lub) of the set $\boldsymbol{A = \{3,4,6\}}$ in the POSET $\boldsymbol{(S,R)}$.

3. Solve the linear recurrence relation $\boldsymbol{a_n = 2a_{n-1} + 5a_{n-2} - 6a_{n-3}, n \geq 3}$ with initials $\boldsymbol{a_0 = 7, a_1 = -4}$ and $\boldsymbol{a_2 = 8}$ by characteristic roots method.

4. Solve the linear recurrence relation $\boldsymbol{a_n = 4a_{n-1} - 4a_{n-2} + 4^n, n \geq 2}$ with initials $\boldsymbol{a_0 = 2, a_1 = 8}$ by generating function method.