Maulana Azad National Urdu University

Master of Computer Application

III Semester Examination November/December - 2015

CS232 : Analysis & Design of Algorithms

Total Marks : 70 **Time : 3 hours**

Attempt any five questions. Each question carries equal marks. **14*5 = 70**

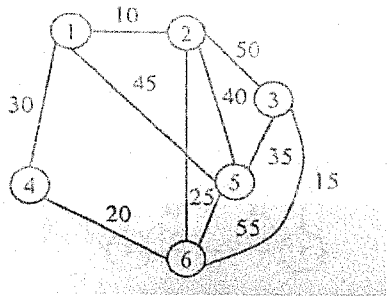
Q.1 (A) Illustrate Θ notation. Find the Θ notation for the following functions: **(7 Marks)**
(i) $f(n) = 27n^2+16n+25$ (ii) $f(n) = 3n^3+4n$

(B) Illustrate the operation of merge sort on the given array:

85	76	46	92	30	41	42	12	19	93	3	50	11

Also write the algorithm of merge sort. **(7 Marks)**

Q.2 (A) Explain the Kruskal's algorithm, applying the algorithm construct a minimal spanning tree for the given graph. **(7 Marks)**

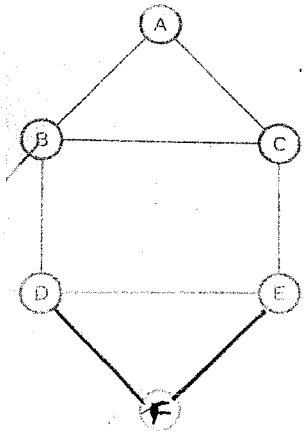


(B) Find the optimal solution to the knapsack problem instance n = 3, M =20, P_1, P_2, P_3 = 13,8,6 and w_1,w_2,w_3 = 19, 13, 9. Write the algorithm of knapsack problem. **(7 Marks)**

Q.3 Consider n = 7, (w_1,w_2,w_3,w_4,w_5,w_6,w_7,) = (2, 3, 5, 7, 1, 4, 1), (P_1,P_2,P_3,P_4,P_5,P_6,,P_7) = (10, 5, 15, 7, 6, 18, 3), M=15, solve this knapsack problem using dynamic programming. **(14 Marks)**

Q.4 (A) Portray the Backtracking. Define answer node, dead node, live node and E-node. Let w = {7, 4, 10, 23, 35, 20, 32} and M = 55. Find all possible subsets of w that sum to M. **(7 Marks)**

(B) Delineate the Chromatic Number. Explain the backtracking method for coloring the given graph. **(7 Marks)**



(B) Delineate Hamiltonian Cycle. Consider the graph and find out the Hamiltonian cycles if it exists. **(7 Marks)**