

Roll No

CS/IT - 404**B.E. IV Semester Examination, June 2014****Analysis And Design of Algorithm***Time : Three Hours**Maximum Marks : 70*

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

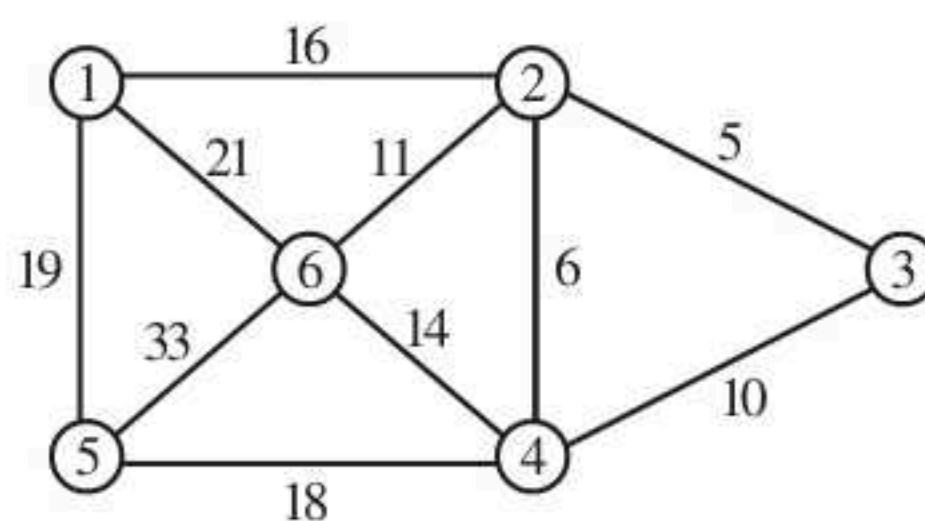
iv) Except numericals, Derivation, Design and Drawing etc.

1. a) What are different asymptotic notations used? Explain. 2
- b) Explain the strassen's multiplication technique? 2
- c) Explain how to apply the divide and conquer strategy for sorting the elements using quick sort? 3
- d) Following nodes are inserted in empty tree to form minimum heap with neat sketches show how insertion will be done 8, 7, 11, 6, 2, 1, 5, 12. 7

OR

Sort the given list using merge sort 70, 80, 40, 50, 60, 12, 35, 95, 10. 7

2. a) Explain optimal merge (pattern) in brief. 2
- b) Write the general characteristics of greedy algorithm. 2
- c) Give an algorithm for computing minimum spanning tree. 3
- d) Find minimum spanning tree using Prim's algorithm for given graph given below. 7



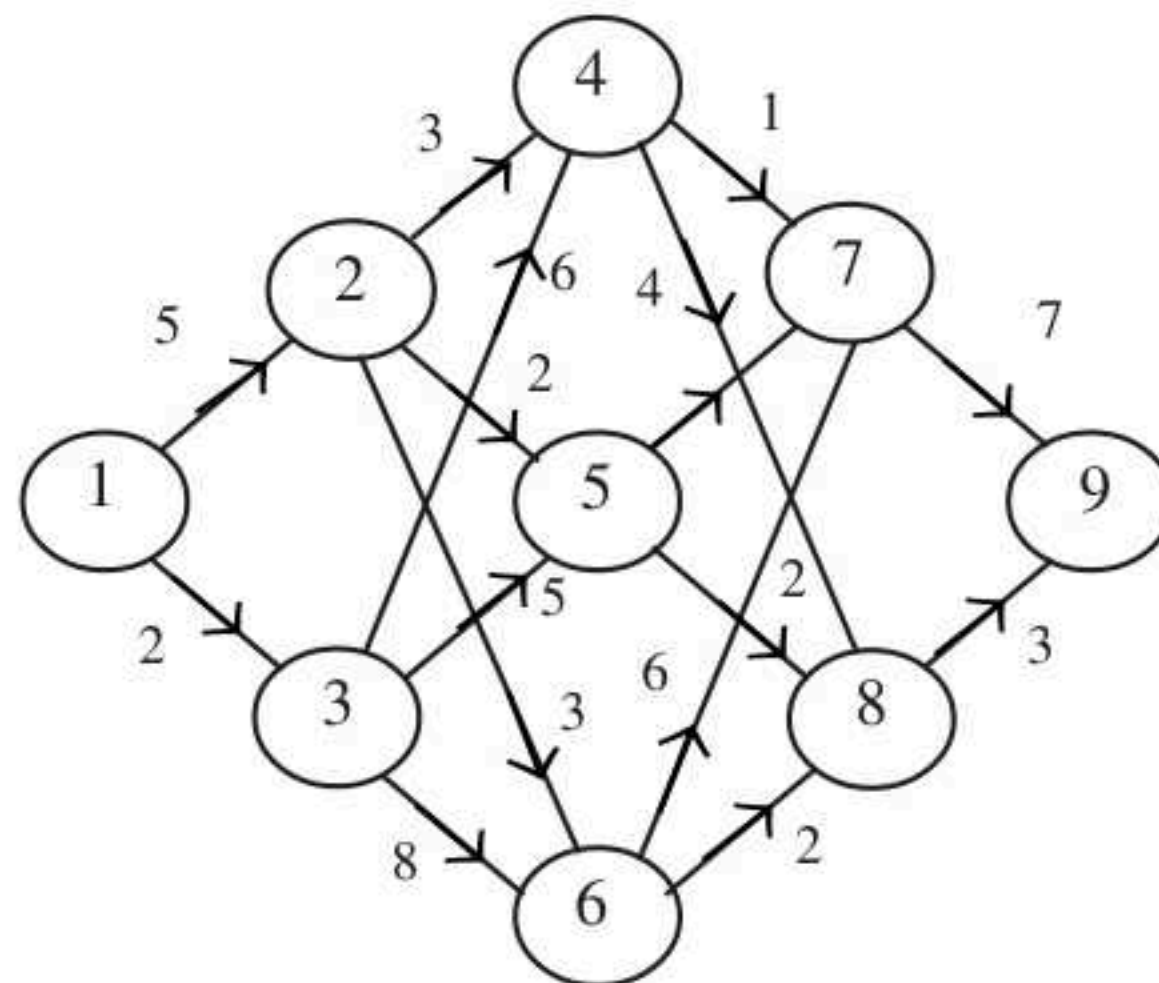
OR

Explain how job sequencing with deadline can be solved using greedy approach. 7

3. a) What is principle of optimality? Explain with example. 2
- b) Define multistage graph problem with the help of suitable algorithm. 2
- c) Find optimal solution for 0/1 knapsack problem $(w_1, w_2, w_3, w_4) = (10, 15, 6, 9)$; $(P_1, P_2, P_3, P_4) = (2, 5, 8, 1)$ and $M = 30$. 3

[2]

- d) Find a minimum cost path from 'S' to 't' in multistage graph using dynamic programming? 7



OR

Explain Floyd - Warshall algorithm with suitable example. 7

4. a) Explain the concept of backtracking. 2
 b) Write a pseudo algorithm for graph coloring problem. 2
 c) What is Hamiltonian cycle? Explain how it can be solved using backtracking algorithm. 3
 d) Draw the portion of state space tree generated by LC branch and bound for the following knapsack instance $n = 4$, $(P_1, P_2, P_3, P_4) = (10, 10, 12, 18)$; $(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$ and $M = 15$. 7

OR

Consider the travelling salesman on instance defined by cost matrix

$$\begin{bmatrix} \infty & 7 & 3 & 12 & 8 \\ 3 & \infty & 6 & 14 & 9 \\ 5 & 8 & \infty & 6 & 18 \\ 9 & 3 & 5 & \infty & 11 \\ 18 & 14 & 9 & 8 & \infty \end{bmatrix}$$

obtain the reduced cost matrix and solve it. 7

5. a) Explain 2-3 trees with the help of suitable example. 2
 b) What is AVL tree? Discuss its properties. 2
 c) What is P, NP class problems? Explain the concept with suitable example. 3
 d) Insert the elements in the order shown to build them into an AVL tree. Also determine the complexity of this procedure 1, 26, 2, 25, 3, 24, 4, 23, 5, 22, 6. 7

OR

Create a B - tree for the following list of elements $L = \{86, 50, 40, 3, 94, 10, 70, 90, 110, 113, 116\}$ given minimization factor $t = 3$, minimum degree = 2 and maximum degree = 5. 7
