

Code No: 09A40505

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech II Year II Semester Examinations, November / December-2013

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE, IT)

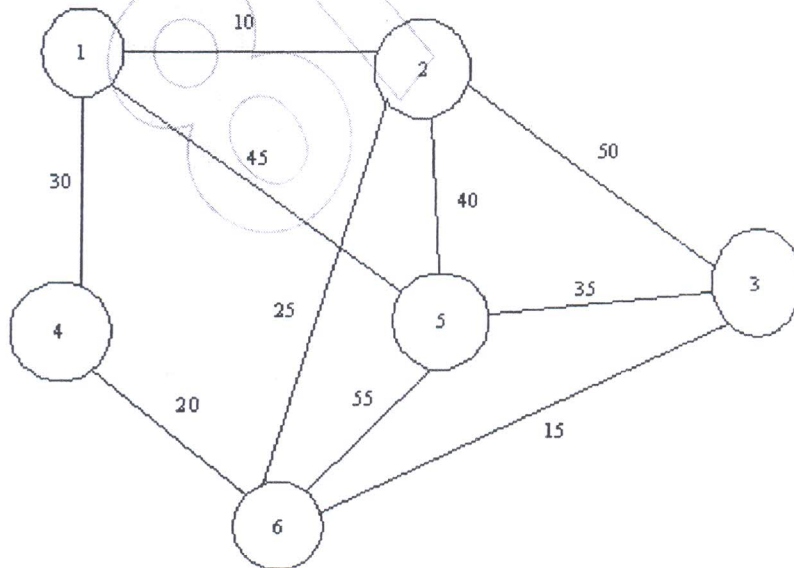
Time: 3 hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

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1. Define Time complexity. Explain the following Asymptotic notations:
  - a) Big Oh notation
  - b) Theta notation
  - c) Little oh notation
  - d) Amortized analysis. [4+4+4+3]
- 2.a) Explain about Connected components and Biconnected components. [8+7]  
b) Discuss about union and find algorithms.
- 3.a) Define Divide and conquer Technique. Explain Binary Search using this method. Derive its time complexity.  
b) Explain about Strassen's matrix multiplication. Derive its time complexity. [8+7]
- 4.a) Define Spanning Tree. Write and explain the Prim's algorithm.  
b) Applying the Prim's algorithm, construct a minimal spanning tree for graph given below: [8+7]



- 5.a) Define OBST. How will you construct an optimal binary search tree?  
b) Use function OBST to compute  $w(i, j)$ ,  $r(i, j)$  and  $c(i, j)$ ,  $0 \leq i < j \leq 4$ , for the identifier set  $(a_1, a_2, a_3, a_4) = (\text{count, float, if, while})$  with  $p(1) = 1/20$ ,  $p(2) = 1/5$ ,  $p(3) = 1/10$ ,  $p(4) = 1/20$ ,  $q(0) = 1/5$ ,  $q(1) = 1/10$ ,  $q(2) = 1/5$ ,  $q(3) = 1/20$ , and  $q(4) = 1/20$ . Using the  $r(i, j)$ 's, construct the Optimal Binary Search Tree. [5+10]

- 6.a) Briefly explain 8-queen problem using backtracking. Explain its application.  
b) Draw the state space tree for m coloring when  $n=3$  and  $m=3$ . [8+7]
- 7.a) Define the terms Branch and Bound. Explain about it's general method.  
b) Explain 0/1 knapsack problem using Branch and Bound. [8+7]
- 8.a) Compare and contrasts between NP-HARD and NP-COMPLETE.  
b) Briefly explain Cooks-theorem. [8+7]

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