Code No: 09A40505 **R09**

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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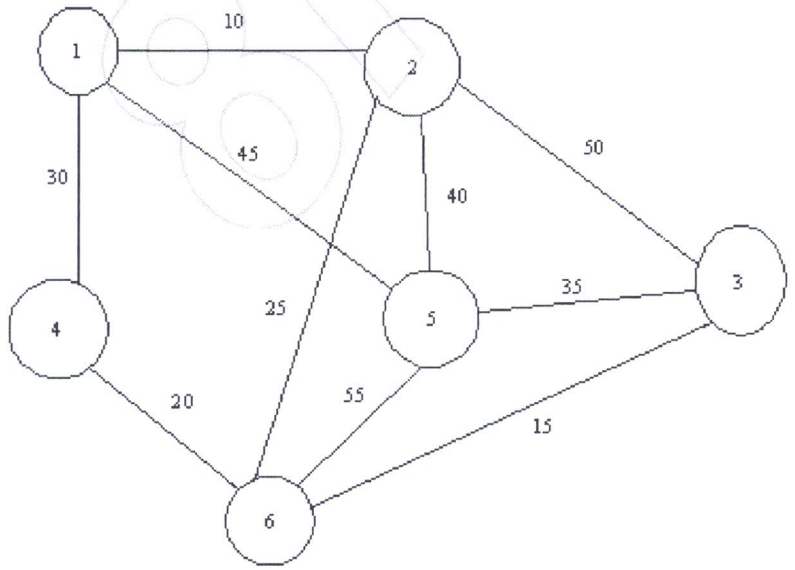
1. Define Time complexity. Explain the following Asymptotic notations:
   a) Big Oh notation
   b) Theta notation
   c) Little oh notation
   d) Amortized analysis. [4+4+4+3]

2.a) Explain about Connected components and Biconnected components.
b) Discuss about union and find algorithms. [8+7]

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 bellow: [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), $0 <= i < j <= 4$, for the identifier set (a1, a2, a3, a4) = (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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