Code No: 114CT **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, May - 2016
DESIGN AND ANALYSIS OF ALGORITHMS
(Information Technology)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART - A **(25 Marks)**

1. Write short notes on the following:
   a) Connected components. [2]
   b) Greedy general method. [3]
   c) Time complexity of job sequencing with deadline problem. [2]
   d) Advantages of dynamic programming. [3]
   e) Concept of all pairs shortest path problem. [2]
   f) Concept of backtracking. [3]
   g) Hamiltonian cycles. [2]
   h) LC branch and bound. [3]
   i) Concept of satisfiability. [2]
   j) P and NP class problems. [3]

PART - B **(50 Marks)**

2.a) Explain union and find operations on sets.
b) Describe the union algorithm with weighted rule. [5+5]

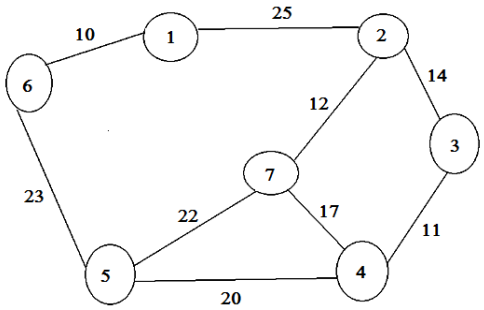
OR

3. Write an algorithm to implement quick sort and derive its time complexity. [10]

4. Explain Dijkstra's algorithm for single shortest path problem with an example. [10]

OR

5.a) Find the minimum cost spanning tree for the following graph using Kruskal's algorithm.



b) Distinguish between Prim's and Kruskal's algorithm. [5+5]

6. Explain dynamic programming approach to solve 0/1 knapsack problem and give time complexity. [10]

OR

7. Using algorithm OBST compute c(i,j) $0 \leq i \leq j \leq 4$ for the identifier set (a_1,a_2,a_3,a_4) = (do, if, int, while) with p(1:4) = (3,3,1,1) and q(0:4) = (2,3,1,1,1). [10]

8.a) Explain N-Queens problem in brief.
b) Discuss the graph coloring algorithm. [5+5]

OR

9. The edge length of a directed graph (adjacency matrix) are given below. Use branch and bound method to find optimal tour of travelling salesperson problem. [10]

$$\begin{bmatrix} 2 & 20 & 30 & 10 & 11 \\ 15 & \alpha & 16 & 4 & 2 \\ 3 & 5 & \alpha & 2 & 4 \\ 19 & 6 & 18 & \alpha & 3 \\ 16 & 4 & 7 & 16 & \alpha \end{bmatrix}$$

10.a) Explain the FIFO Branch and Bound in detail.
b) Write an algorithm to implement Non deterministic search. [5+5]

OR

11. Explain about cook's theorem in detail. [10]

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