Code No: 124CT **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, May - 2017
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) Space complexity. [2]
   b) Bi-connected components. [3]
   c) Single source shortest path problem. [2]
   d) Concept of job sequencing problem. [3]
   e) Multistage graphs. [2]
   f) Reliability design. [3]
   g) Graph coloring. [2]
   h) Branch and bound. [3]
   i) Clique decision problem. [2]
   j) Cook's theorem. [3]

PART - B **(50 Marks)**

2.a) Explain UNION algorithm with example.
b) Write short notes on amortized complexity. [5+5]

OR

3. Explain about Strassen's matrix multiplication and derive time complexity. [10]

4. Discuss Prim's and kruskal's algorithms. [10]

OR

5.a) Discuss the general method of greedy approach.
b) Find the optimal solution of greedy knapsack where n=3, $(p_1,p_2,p_3)=(30,21,18)$, $(w_1,w_2,w_3)=(18,15,10)$ and knapsack capacity m=20. [5+5]

6. Explain all pairs shortest paths algorithm. [10]

OR

7. Explain traveling sales person problem and discuss its time complexity. [10]

8.a) Write short notes on backtracking general method.
b) Solve the following sum of subsets problem using state space tree. W = (7,11,13,24) and m=31. [5+5]

OR

9. Solve the following knapsack problem using branch and bound technique. 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 capacity m=15. [10]

10.a) Write a nondeterministic algorithm for sorting.
b) Explain the concept of satisfiability. [5+5]

OR

11. Explain P and NP class problems in detail. [10]

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