Code No: 114CS **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2016

DESIGN AND ANALYSIS OF ALGORITHMS

(Computer Science and Engineering)

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.a) List the asymptotic notations. [2]
b) Explain the time complexity of merge sort. [3]
c) Define graph. [2]
d) Explain the properties of strongly connected components. [3]
e) Give brief description on greedy method. [2]
f) What is multistage graph? [3]
g) Write the applications of Branch and Bound problem. [2]
h) What is sum of subsets problem? [3]
i) What is NP-Hard? [2]
j) Explain non-deterministic algorithm. [3]

PART-B **(50 Marks)**

2.a) What is an algorithm? Explain its characteristics.
b) Explain the strassen's matrix multiplication. [5+5]

OR

3.a) Discuss about space complexity in detail.
b) Write an algorithm for quick sort. Explain with an example. [5+5]

4.a) Describe Union and Find algorithms.
b) Explain the BFS algorithm with example. [5+5]

OR

5.a) Write a nonrecursive algorithm for preorder traversal of a binary tree T.
b) Explain game tree with an example. [5+5]

6.a) Write a greedy algorithm to the job sequencing with deadlines.
b) Define merging and purging rules in 0/1 knapsack problem. [5+5]

OR

7.a) Differentiate between greedy method and dynamic programming.
b) Explain the Kruskal's algorithm with an example. [5+5]

8. Draw the portion of the state space tree generated by LCBB for the following instances:
n=5, m=12, $(P_1 \ldots P_5) = (10, 15, 6, 8, 4)$ $(w_1 \ldots w_5) = (4, 6, 3, 4, 2)$ [10]

OR

9.a) Describe Backtracking technique to m-coloring graph.
b) Briefly explain n-queen problem using backtracking. [5+5]

10.a) Explain the classes of NP-Hard and NP-Complete.
b) Explain the satisfiability problem. [5+5]

OR

11.a) Explain the strategy to prove that a problem is NP hard.
b) Explain the non-deterministic sorting problem. [5+5]

---ooOoo---