

Code No: 114CS

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. [5]
- b) Explain the strassen's matrix multiplication. [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. [5]
- b) Explain the BFS algorithm with example. [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 LCB for the following instances:

$$n=5, m=12, (P_1 \dots P_5) = (10, 15, 6, 8, 4) (w_1 \dots w_5) = (4, 6, 3, 4, 2) \quad [10]$$

**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.

OR

11.a) Explain the strategy to prove that a problem is NP hard.

b) Explain the non-deterministic sorting problem.

[5+5]

[5+5]

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