

R16

Code No: 135AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, November/December - 2018

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE, IT)

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) Write an algorithm to find the number of digits in the binary representation of a positive decimal integer. [2]
- b) How can we measure an algorithm's running time? [3]
- c) What is a set? List the operations that can be performed on it. [2]
- d) Give brief note on graph coloring. [3]
- e) State the Job – Sequencing Deadline Problem. [2]
- f) Find an optimal solution to the knapsack instance $n=4$ objects and the capacity of knapsack $m=15$, profits (10, 5, 7, 11) and weight are (3, 4, 3, 5). [3]
- g) What is Travelling Sales Man Problem? [2]
- h) Give the statement of Reliability design problem. [3]
- i) State the methodology of Branch and Bound. [2]
- j) Define Bounding Function? Give the statement of 0/1 Knapsack FIFO BB. [3]

PART - B**(50 Marks)**

- 2.a) Explain Recursive Binary search algorithm with suitable examples.
 - b) Distinguish between Merge sort and quick sort. [5+5]
- OR**
- 3.a) What is stable sorting method? Is Merge sort a stable sorting method? Justify your answer.
 - b) Explain partition exchange sort algorithm and trace this algorithm for $n=8$ elements: 24,12, 35, 23,45,34,20,48. [5+5]
4. Write and explain the algorithm of Bi connected components with an example. [10]
- OR**
5. Give the solution to the 8-queens problem using backtracking. [10]
 6. What is Minimum cost spanning tree? Explain an algorithm for generating minimum cost Spanning tree and list some applications of it. [10]
- OR**
- 7.a) Explain the greedy technique for solving the Job Sequencing problem.
 - b) Write with an example of Prim's algorithm. [5+5]

8.a) Discuss the time and space complexity of Dynamic Programming traveling sales person algorithm.

b) Write an algorithm of matrix chain multiplication. [5+5]

OR

9. With the help of suitable example explain the all pairs shortest path problem. [10]

10.a) Give the 0/1 Knapsack LCBB algorithm.

b) Differentiate between deterministic and non deterministic algorithm. [5+5]

OR

11. Draw the portion of state space tree generated by LCBB for the 0/1 Knapsack instance: $n = 5$, $(p_1, p_2, \dots, p_5) = (10, 15, 6, 8, 4)$, $(w_1, w_2, \dots, w_5) = (4, 6, 3, 4, 2)$ and $m=12$. And also find an optimal solution of the same. [10]

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