**R16**

Code No: 135AF

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech III Year I Semester Examinations, May/June - 2019**

**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) | In what way a time complexity differs from space complexity. | [2] |
| b) | Give the general plan of divide and conquer algorithms. . | [3] |
| c) | Write an algorithm for collapsing find. | [2] |
| d) | Define Backtracking? List the applications of Backtracking | [3] |
| e) | What is the importance of knapsack algorithm in our daily life? | [2] |
| f) | Write Control Abstraction of Greedy method. | [3] |
| g) | What you mean by dynamic programming. | [2] |
| h) | Define optimal binary search tree with an example. | [3] |
| i) | State the difference between FIFO and LC Branch and Bound algorithms. | [2] |
| j) | Write the Control Abstraction of Least – Cost Branch and Bound. | [3] |

## PART - B

**(50 Marks)**

2.a) What are the different mathematical notations used for algorithm analysis.

b) Write Divide – And – Conquer recursive Quick sort algorithm and analyze the algorithm for average time complexity. [10]

**OR**

3. Write Randomized algorithm of Quicksort. [10]

4. Write an algorithm to determine the Hamiltonian cycle in a given graph using backtracking. [10]

**OR**

5. Explain the AND/OR graph problem with an example. [10]

6.a) Explain the Knapsack problem with an example.

b) Write a greedy algorithm for sequencing unit time jobs with deadlines and profits. [10]

**OR**

7. State the Job – Sequencing with deadlines problem. Find an optimal sequence to the n = 5 Jobs where profits (P1, P2, P3, P4, P5) = (20, 15, 10, 5, 1) and deadlines (d1, d2, d3, d4, d5) =(2, 2, 1, 3, 3). [10]

8. Draw an Optimal Binary Search Tree for n=4 identifiers (a1,a2,a3,a4) = ( do, if, read, while) P(1:4)=(3,3,1,1) and Q(0:4)=(2,3,1,1,1). [10]

**OR**

9. Explain how Matrix – chain Multiplication problem can be solved using dynamic programming with suitable example. [10]

10. Solve the Travelling Salesman problem using branch and bound algorithms. [10]

**OR**

11. Explain the FIFO BB 0/1 Knapsack problem procedure with the knapsack instance for n=4, m=15,(p1,p2,p3,p4)=(10,10,12,18), (w1,w2,w3,w4) =(2, 4, 6, 9). Draw the portion of the state space tree and find optimal solution. [10]

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