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# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD <br> MCA II Semester Examinations, December - 2019 <br> DATA STRUCTURES AND ALGORITHMS 

Time: 3hrs
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 $\mathrm{a}, \mathrm{b}, \mathrm{c}$ as sub questions.

PART - A
$5 \times 5$ Marks $=25$
1.a) Write an algorithm to insert an element in a single linked list
b) List and explain the applications of non linear data structures
c) Give a brief note on collision resolution methods.
d) Define a binary search tree and what are the properties of binary search tree.
e) What do you mean by a spanning tree.

## PART - B

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5 \times 10 \text { Marks }=50
$$

2.a) Explain the Sequential and Linked allocation.
b) Compare and contrast exponential time complexity with polynomial time complexity

OR
3. Analyze the best, average and worst-case time complexities of linear search with an example list of size $n$.
4. Write algorithm to implement depth-first search and explain with example.

## OR

5.a) Explain the threaded binary trees.
b) Write disjoint set union and find algorithms.
6. Search for the element 3 in the array that contain 1,3,5,2,4,6,8 using binary search. [10]

## OR

7. Explain hash tables and hash functions.
8. Construct binary search tree for given data and write the different traversals of tree. (100 1501252512501357562 175).

## OR

9. Explain insertion and deletion operations on a B-Tree.
10.a) Device an algorithm m to find the optimal order of multiplying n matrices using dynamic programming technique.
b) Give a brief note on Suffix tries.

## OR

11. Find the shortest tour of traveling salesperson for the following cost matrix using Dynamic Programming
$\left[\begin{array}{cccc}\infty & 12 & 5 & 7 \\ 11 & \infty & 13 & 6 \\ 4 & 9 & \infty & 18 \\ 10 & 3 \\ \text { www.FirstRanker.dom }\end{array}\right.$
