Code No: 812AF **R13**

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

Time: 3 Hours **Max. Marks: 60**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 8 marks and may have a, b, c as sub questions.

PART - A

5 × 4 marks = 20

1.a) Define a single linked list, Write the structure of the linked list with neat sketch. [4]
b) Explain the representations of graphs. [4]
c) Write a program to sort an array of integers using selection sort. [4]
d) Insert 02,36,09,06,14,27,28 into BST. [4]
e) What is dynamic programming? When to apply it. [4]

PART - B

5 × 8 marks = 40

2. Explain the Operations on Doubly Linked Lists. [8]

OR

3.a) List and explain the applications of stack ADT.
b) Write an algorithm to find the sum of n-numbers and also analyze its time complexity. [4+4]

4. Differentiate between BFS and DFS traversals. Take an example graph and implement the BFS traversal. [8]

OR

5.a) Define tree and what are the properties of trees?
b) Explain the different types tree traversals. [4+4]

6.a) Explain the worst-case time complexity in the quick sort.
b) Explain the different types of Hash functions are used in hashing. [4+4]

OR

7. Perform heap sort algorithm for (10 15 6 2 25 18 16 2 20 4). [8]

8. Define AVL trees. Explain the rotations involved in balancing an unbalanced AVL tree. [8]

OR

9.a) Write the insertion algorithm of red-black tree. Also analyze its time complexity [8]
b) What are properties of B-Tree.

10. Compare the Standard Tries and Compressed Tries with an example. [8]

OR

11. State and explain the Knuth-Morris-Pratt algorithm with an example. [8]

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