JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA II Semester Examinations, April/May - 2019
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

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5 \times 5 \text { Marks }=25
$$

1.a) Explain the operations of Queue with an example.
b) What are the applications of Heap?
c) Differentiate between Bubble sort and Insertion sort with an example.
d) What are the properties of Red-Black tree?
e) Write the flow chart of KMP.

## PART - B

$5 \times 10$ Marks $=50$
2. Write an algorithm to find the reverse of a given number and also its complexity of the same.

## OR

3. Write an algorithm to find the number of occurrences of All Elements in a Linked List.
4. Explain how to represent the graph in the memory with an example.

## OR

5.a) Explain the realization of a priority Queue using heap.
b) Write an algorithm of DFS.
6. Write an algorithm of Quick Sort.

## OR

7. Insert the following list of elements into the Hash Table by using Quadratic Probing ( Size of Hash table is 10) 44, 15, 60, 24, 66, 30, 21, 18.
8. Construct the AVL - tree of the following list of elements $65,89,10,5,43,28,54$.

## OR

9. Write an algorithm to delete an element from the B-tree.
10. Consider $\mathrm{n}=4$ and the identifier set $(\mathrm{a} 1, \mathrm{a} 2, \mathrm{a} 3, \mathrm{a} 4)=(\mathrm{do}$, if, int, while). The values for p's and q's are given as $p(1: 4)=(3,3,1,1)$ and $q(0: 4)=(2,3,1,1,1)$. Construct the optimal binary search tree.

## OR

11. Apply the all- pairs shortest algorithm to the weighted graph whose adjacency matrix is:
[10]

