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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD MCA II Semester Examinations, June/July - 2018 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 $\mathrm{a}, \mathrm{b}, \mathrm{c}$ as sub questions.

## PART - A

$$
5 \times 4 \text { Marks }=20
$$

1.a) Write a procedure to convert infix expression to postfix expression. Apply the procedure on the following

$$
\begin{equation*}
((\mathrm{A}+\mathrm{B}) * \mathrm{D}) \uparrow(\mathrm{E}-\mathrm{F}) \tag{4}
\end{equation*}
$$

b) Define Binary tree. Write an algorithm to insert an element in to a binary tree.
c) Write the principle of(i) Quick sort (ii) Merge sort and write their complexities. [4]
d) Construct an AVL Tree by inserting numbers from 1 to 8 . [4]
e) Explain Kruskal's Algorithm for Minimum cost spanning trees. [4]

## PART - B

$$
5 \times 8 \text { Marks }=40
$$

2. What is meant by stack? Write push and pop functions in C++ using an array.
3.a) Write a short note on Linked List. What the various applications of linked list?
b) Write an algorithm for deleting an element from the linked list.
3. With a neat sketch explain DFS and BFS traversals with an example.

## OR

5. Explain Binary tree ADT and its representation in Array and Linked lists.
6. Suppose a sequence of numbers is given like: $5,1,6,7,9,22,10,55,45$, and 34 . How this numbers will be sorted using a) Insertion Sort b) Bubble sort.

## OR

7. Write an algorithm for linear search and Binary Search and compare them in terms of time complexity.
8. Explain in detail about Red-Black trees and Splay trees with examples.

## OR

9.a) Show the result of inserting 3, 1, 4, 6, 9, 2, 5, 7 into an initially empty binary search tree.
b) Show the result of deleting the root.
10. Discuss about Job Sequencing with deadlines and Single Source Shortest path problem.[8]

## OR

11. Explain the Pattern matching algorithm with an example.
