

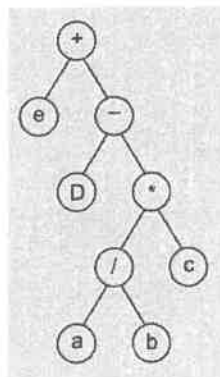
ROLL NO. _____

Instructions:

- Do not write anything other than your roll number on the question paper.
- Attempt all parts of a question in one place.
- Mention all the assumptions for your answers clearly.
- Question Paper is printed on both sides.

All The Best

- (a) Explain the meaning of in-place and online sorting with the help of a proper sorting example for each. [2] (CO5)
 - (b) Consider the following array:
10, 80, 30, 90, 40, 50, 70
Using the array's last element as the pivot, apply Quicksort to sort the array.
Show each step of sorting. [2] (CO5)
- (a) Write down the steps to perform parentheses checking for (), {}, [] in an given expression using stacks. [2] (CO1)
 - (b) Write a function to delete an element in a linear queue. [2] (CO3)
- (a) Write a program to multiply every element of linked list with 10. [3] (CO3)
 - (b) Write an algorithm to insert an element after a given node in linked list. [3] (CO1)
- (a) For the expression tree given below, do the following:



1. Extract the infix expression it represents. [1]
2. Find the corresponding prefix and postfix expressions. [1]

3. Evaluate the infix expression, given $a = 30$, $b = 10$, $c = 2$, $d = 30$, $e = 10$.
[1]

(CO1)

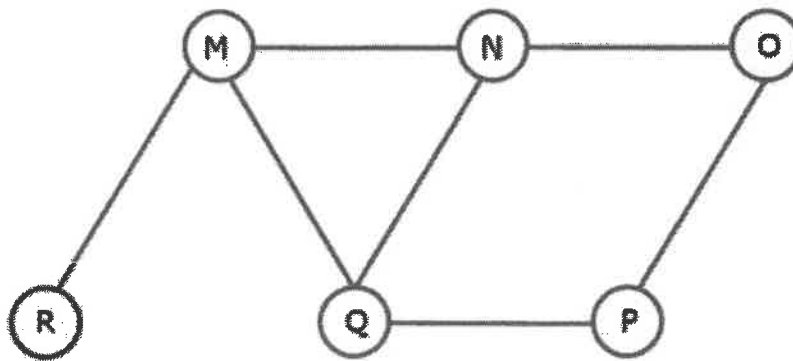
- (b) The postorder traversal of a binary tree is 8, 9, 6, 7, 4, 5, 2, 3, 1. The inorder traversal of the same tree is 8, 6, 9, 4, 7, 2, 5, 1, 3.

1. Construct the binary tree using these traversals (Show all steps). [2]
2. Find the preorder of the binary tree. Write down the C function to find the preorder of a given binary tree (The function should take the tree as input). [2]
3. What is the advantage of AVL over a binary search tree? [1]

(CO1, CO6)

5. (a) For the given graph, answer the following:

(CO1, CO5)



1. What is an articulation point and a bridge in Graphs? Is there any articulation point or bridge in this Graph. If yes, name them. [2]
2. Draw the Adjacency Matrix of the given Graph. [1]
3. Which data structure is used to find the Breadth-First Search (BFS) of a graph. Using the data structure, find the BFS of the given graph starting from vertex 'O'. Show the status of the data structure with each vertex processing. [4]
4. Discuss one application of graphs. [1]

END