

Time: 3 Hours

JUNE 2015

Max. Marks: 100

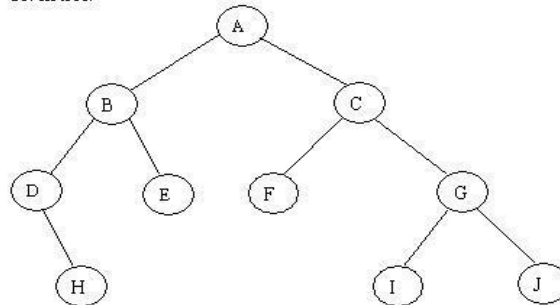
PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.
- Parts of a question should be answered at the same place.

- Q.1**
- What is a pointer? Explain how it is declared and initialized.
 - What is dynamic memory allocation? Write and explain the different dynamic memory allocation functions in C.
 - State the difference between arrays and linked lists.
 - It is generally said that searching a node in a binary search tree is more efficient than that of a simple binary tree. Why?
 - What is the need for Priority queue?
 - What is a spanning Tree? Does the minimum spanning tree of a graph give the shortest distance between any two specified nodes?
 - What do you mean by balanced trees? (7×4)
- Q.2**
- Traverse the given tree using Inorder, Preorder and Postorder traversals. (6)

Given tree:



- Write a C Program to add a new node to the ascending order singly linked list. (8)
- What is the difference between storing data on the heap vs. on the stack? (4)

Code: CT11

Subject: DATA STRUCTURE THROUGH C

Q.3 a. Sort the given values using Quick Sort. 65 70 75 80 85 60 55 50 45 (5)

b. Write a program to find the minimum cost of a spanning tree. (8)

c. Write a brief note on External variables. (5)

Q.4 a. Explain how to check the validity of an expression containing nested parentheses? (5)

b. Explain the following with an example: i) forest ii) graph iii) winner tree (9)

c. Explain and derive the complexity of insertion sort. (4)

Q.5 a. Suppose that a linked list is provided that is either circular or not circular. Write a function that takes as an input a pointer to the head of a linked list and determines whether the list is circular or if the list has an ending node. If the linked list is circular then the function should return true, otherwise should return false if the linked list is not circular. (8)

b. Given a singly linked list, delete all occurrences of a given key in it. For example, consider the following list.

Input: 2 -> 2 -> 1 -> 8 -> 2 -> 3 -> 2 -> 7

Key to delete = 2

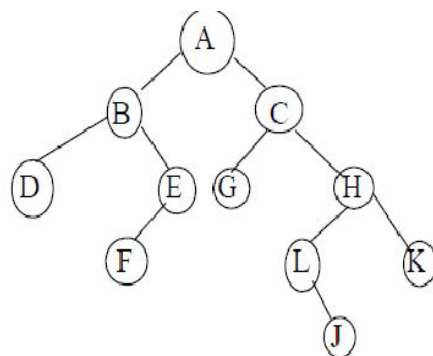
Output: 1 -> 8 -> 3 -> 7

(10)

Q.6 a. Define AVL Tree. Explain various rotations of AVL Trees maintaining balance factor while insertion and deletion takes place. (10)

b. Write a brief note on m-way search tree. (4)

c. Construct a binary tree from the traversal order given below: (4)



Q.7 Write short notes on (6*3=18)

- (i) Stable marriage problem
- (ii) The Max-Flow Min-Cut Theorem
- (iii) Boundary Tag method