

TCS-607

238

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Paper ID & Roll No. to be filled in your Answer Book

Roll No.

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B.Tech. (CS)

End Semester Examination 2015

DATA STRUCTURE USING C++

*Time: 3.00 Hours]**[Total Marks: 100***Note:** All questions are compulsory.

Q1. Attempt any four of the following: [4x5=20]

- Define the different types of data structures. Discuss briefly with their diagrams and applications.
- Write the algorithm for the insertion of an element in a circular queue.
- Why circular queue is better than simple queue? Write C++ code for the deletion of an element in a circular queue.
- What are the different tree traversals? Explain with examples?
- Suppose the following sequences list the nodes of a binary tree T in preorder and in order, respectively;

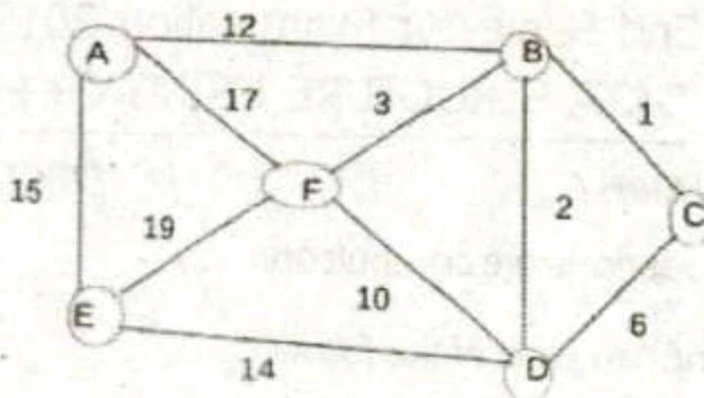
Preorder: G, B, Q, A, C, K, F, P, D, E, R, H

Inorder: Q, B, K, C, F, A, G, P, E, D, H, R

Draw the diagram of the tree.

Q2. Attempt any four of the following: [4x5=20]

- (a) Construct the minimum spanning tree (step-by-step) from the following graph using Kruskal's algorithm.



- (b) Write the C++ program for creating a Binary Search Tree (BST).
- (c) Write the algorithms of PUSH and POP operations on stack.
- (d) Write down the procedure to convert an infix expression $a+b*c+(d*e+f)*g$
- (e) Translate by inspection and hand, each infix expression into equivalent prefix expression:

$$(A + B \wedge D) / (E - F) + G.$$

Q3. Attempt any two of the following: [2x10=20]

- (a) Using the quick sort algorithm, sort the following list and show your work in each pass:

13, 11, 14, 11, 15, 21, 12, 16, 15, 13, 19, 18, 20

Also, write the time complexity of worst and average cases for the quick sort algorithm.

(b) Define the terms:

i) Depth First Search

ii) Spanning Trees

(c) Write the algorithm or C++ function for inorder traversal in a tree.

14. Attempt any two of the following: [2x10=20]

(a) Sort the following numbers using heap sort showing each step of creation of tree and sorting of elements

25, 55, 46, 35, 10, 90, 84, 31

(b) What do you mean by collision in hashing? Discuss different collision resolution strategies.

(c) Write an algorithm to implement merge sort and explain. Write the average and worst case complexity of merge sort also discuss about its time-space complexity.

25. Attempt any two of the following: [2x10=20]

(a) Write an algorithm for searching an element and inserting it in Binary Search Tree (BST). Discuss about its complexity for search.

(b) Define the graphs. Explain the adjacency and linked representation of graph.