CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Third Semester of B. Tech. (CE/IT) Examination

March-Apr 2018

CE201.02/CE201.01/CE201 Data Structure & Algorithms

Date: 4.4.2018, Wednesday **Time: 1:30 p.m. To 4:30 p.m.** **Maximum Marks: 70**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.

Q - 1 (a) What is data structure? Explain types of data structure with an example. **[04]**

(b) What is searching? Differentiate Linear Search and Binary Search. **[03]**

Q - 2 (a) Write an algorithm or C function for push and pop operation of stack. **[05]**

(b) What is tower of Hanoi problem? Explain with n=3. **[04]**

(c) Write C function or an algorithm for inserting and deleting an element into simple queue. **[04]**

OR

(c) Write an algorithm for inserting an element in Circular Queue with suitable example. **[04]**

Q:3 Answer following Questions(Any three) **[15]**

(a) Write an algorithm for singly linked list that performs following operations:
(i) Insert a node at the end of the linked list
(ii) Delete a node with information field X

(b) Convert the following infix expression into postfix expression

A + B *(C ^ D * E) – F

(c) Write an algorithm for doubly linked list that performs following operations:
(i) Insert a node after the node whose address is M
(ii) Delete the node whose address is OLD

(d) Trace the following data using Insertion Sort.

5, 9, 2, 15, 30, 92, 1, 24

(e) Explain different types of file indexing methods stating their advantages and disadvantages.

SECTION – II

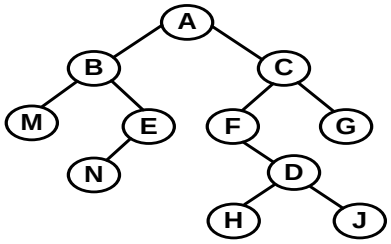
Q - 4 (a) Construct a binary search tree with the following data **[05]**
5,3,1, 6,7,11,9,10,14,12,15,13
Also perform delete 12 and draw final binary search tree.

(b) What are the differences between array and linked list? **[02]**

Q - 5 (a) Discuss following with reference to graphs. **[05]**
(i) Graph (ii) Directed graph (iii) Undirected graph
(iv) Degree of vertex (v)Null graph

(b) What is Minimum Heap Tree? Perform ascending order sorting for following data using Minimum Heap Tree : **15, 19, 10, 7, 17, 16** **[04]**

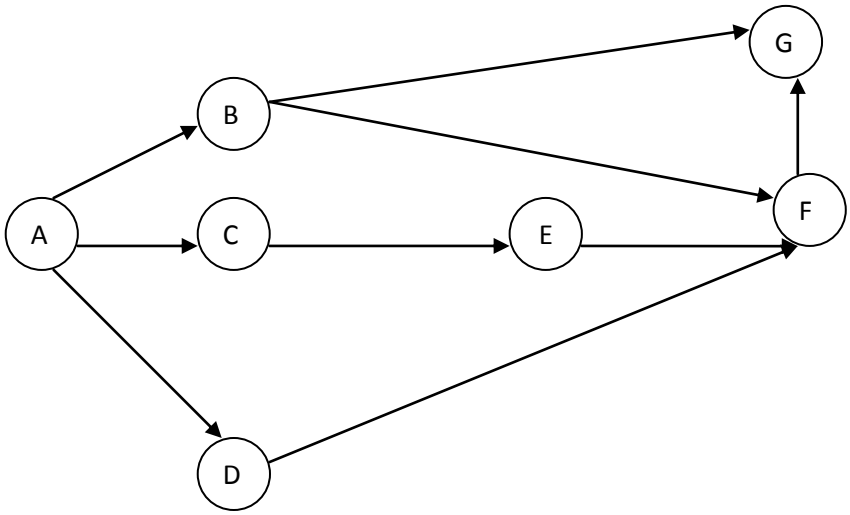
(c) Answer the following questions with reference to the given tree: **[04]**



(i) Find in order traversal for the tree.
(ii) Find post order traversal of the tree.

OR

(c) Show BFS Traversal of the following graph taking A as the source vertex. **[04]**



Q - 6 Answer following Questions(Any three) **[15]**

(a) Define graph. Explain storage representation of a graph.

(b) Evaluate following expression using stack.

3 2 + 9 4 / 2 / 6 2 * 3 + * -

(c) What is Hashing? List out important features of good hashing algorithm.

(d) Explain various multiple key access file organization in brief.

(e) Explain quick sort using recursive algorithm.

****