AKGEC/IAP/FM/02

**AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD**

**DEPARTMENT OF CSE/IT**

**SESSIONAL TEST -2**

Course: B.Tech Semester: III

Session:2017-18 Section: CSE-1,2,3, IT-1,2

Subject: Data Structure Sub. Code: RCS-305

Max Marks: 50 Time: 2 Hours

**SECTION A**

1. Attempt **all** the parts. (5\*2=10)
2. What is dequeue? Explain.
3. What is tail recursion?
4. If there are 27 nodes in a complete binary tree, what will be its height and how many nodes will be in the last level?
5. If the Tower of Hanoi is operated on n=11 disks, calculate the total number of moves.
6. Define priority queue. How is it implemented?

**SECTION B**

1. Attempt **all** the parts. (5\*5=25)
2. Create BST for the following data, show all steps

Insert: 20, 10, 25, 5, 15, 22, 30, 3, 14, 13

Delete: 20, 22, 10

1. Prove that the maximum number of nodes in a binary tree of height h is **2h+1-1**
2. Generate a binary tree for the following traversal sequences given-

IN-ORDER: D B H E A I F J C G

PRE-ORDER: A B D E H C F I J G

1. Write a C program to implement the array representation of circular queue
2. Write an algorithm for finding solution to the Tower of Hanoi problem. Explain the working of your algorithm with 4 disks with diagram.

**SECTION C**

1. Attempt **all** the parts. (7.5\*2=15)
2. A)Convert this infix expression into prefix expression **a - b + c \* (d / e - (f + g))**

B) Evaluate the postfix expression **3 2 ^ 5 \* 3 2 \* 3 / 5 + -**

1. What is variable length encoding scheme. Draw a Huffman tree and encode each character for the following symbols whose frequency of occurrence in a message is stated along with the symbol below:

A:24, B:55, C:13, D:67, E:88, F:36, G: 17, H:61, T:24 , U: 76