

**TWO MARKS QUESTIONS AND ANSWERS**

**1. Define tree?**

Trees are non-linear data structure, which is used to store data items in a sorted sequence. It represents any hierarchical relationship between any data item. It is a collection of nodes, which has a distinguished node called the root and zero or more non-empty sub trees T<sub>1</sub>, T<sub>2</sub>, ..., T<sub>k</sub>. Each of which are connected by a directed edge from the root.

**2. Define Height of tree?**

The height of n is the length of the longest path from root to a leaf. Thus all leaves have height zero. The height of a tree is equal to a height of a root.

**3. Define Depth of tree?**

For any node n, the depth of n is the length of the unique path from the root to node n. Thus for a root the depth is always zero.

**4. Define Degree of a node?**

It is the number of sub trees of a node in a given tree.

**5. Define Degree of a tree?**

It is the maximum degree of a node in a given tree.

**6. Define Terminal node or leaf?**

Nodes with no children are known as leaves. A leaf will always have degree zero and is also called as terminal node.

**7. Define Non-terminal node?**

Any node except the root node whose degree is a non-zero value is called as a non-terminal node. Non-terminal nodes are the intermediate nodes in traversing the given tree from its root node to the terminal node.

**8. Define sibling?**

Nodes with the same parent are called siblings.

**9. Define binary tree?**

A Binary tree is a finite set of data items which is either empty or consists of a single item called root and two disjoint binary trees called left sub tree. The maximum degree of any node is two.

### 10. How to traverse a Tree?

- Traversing means visiting each and every node only once.
- Tree Traversal is a method for visiting all the nodes in the tree exactly once.
- There are three types of tree traversal techniques namely,
  - ✓ Inorder traversal
  - ✓ Preorder traversal
  - ✓ Postorder traversal
  - ✓

### 11. Define expression tree?

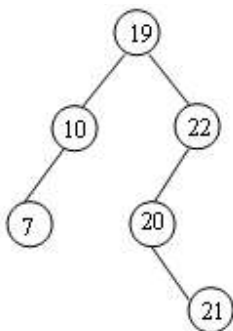
Expression tree is also a binary tree in which the leaf nodes are terminal nodes or operands and non-terminal intermediate nodes are operators used for traversal.

### 12. Construction of expression trees?

1. Convert the given infix expression into postfix notation
2. Create a stack and read each character of the expression and push into the stack, if operands are encountered.
3. When an operator is encountered, pop 2 values from the stack. Form a tree using the operator.

### 13. Define Binary search tree.

- Binary search tree is a binary tree in which for every node X in the tree, the values of all the keys in its left subtree are smaller than the key value in X and the values of all the keys in its right subtree are larger than the key value in X.



### 14. What are the various operations performed in the binary search tree?

- 1.insertion
- 2.deletion
- 3.find
- 4.find min
- 5.find max

**15. What is the Advantage of Threaded Binary Tree**

1) in threaded binary tree is avoid NULL pointer. Hence memory wastage in occupying predecessor and successor nodes.

**16. Define AVL tree?**

AVL tree also called as height balanced tree .It is a height balanced tree in which every node will have a balancing factor of  $-1,0,1$ .

**17. What do you mean by rotations in AVL Tree and what are the types?**

The property can be restored with a simple modification in the tree known as **ROTATION**

There are two types of single rotations

***Single rotation with Left (Left-Left rotation)***

***Single rotation with Right (Right to Right rotation)***

There are two types of double rotation. They are,

***Left-Right Double Rotation***

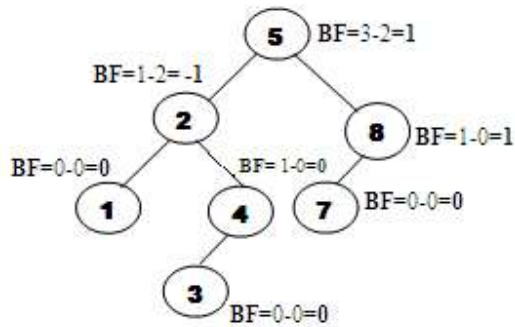
***Right-Left Double Rotation***

**18. Define balance information and balance factor.**

- The **balance information** is termed as **Balance Factor (BF)**, it is the height of the left sub tree minus height of the right sub tree.

$$\text{BF} = \text{Height of left sub tree} - \text{Height of right sub tree}$$

- For an AVL tree all **balance factor** value will be **+1,0,-1**.
- For example, consider the AVL tree in figure 4.2(a). The balance factor of each node will be calculated as follows,

**19. Define B tree:**

- B-tree is a specialized multiway tree used to store the records in a disk. There are number of subtrees to each node. So that the height of the tree is relatively small. So that only small number of nodes must be read from disk to retrieve an item. The goal of B-trees is to get fast access of the data.

**Multiway search tree**

- A multiway search tree of order  $m$  is an ordered tree where each node has at the most  $m$  children. If there are  $n$  number of children in a node then  $(n - 1)$  is the number of keys in the node.

**20. what is priority queue?**

A priority queue is a data structure that allows at least the following two operations: insert which does the obvious thing; and Deletemin, which finds, returns, and removes the minimum element in the priority queue. The Insert operation is the equivalent of Enqueue

**21. what are the main properties of a binary heap?**

1. structure property
2. heaporder property