**Quiz-5 Tree**

**1. In a complete k-ary tree, every internal node has exactly k children or no child. The number of leaves in such a tree with n internal nodes is:**

A. nk

B. (n-1) k+1

C. n (k-1) +1

D. n (k-1)

**2. A binary tree T has n leaf nodes. The number of nodes of degree 2 in T is**(a) log2n (b) n-1 (c) n (d) 2n

**3. Let LASTPOST, LASTIN and LASTPRE denote the last node visited in a postorder, inorder and preorder traversal. Respectively, of a complete binary tree. Which of the following is always true?**

**(**a) LASTIN = LASTPOST  
(b) LASTIN = LASTPRE  
(c) LASTPRE = LASTPOST  
(d) None of the above

**4.The height of a binary tree is the maximum number of edges in any root to leaf path. The maximum number of nodes in a binary tree of height h is:**

(a) 2h -1

(b) 2h-1 – 1

(c) 2h+1 -1

(d) 2h+1

**5. The following numbers are inserted into an empty binary search tree in the given order: 10, 1, 3, 5, 15, 12, 16. What is the height of the binary search tree (the height is the maximum distance of a leaf node from the root)?**  
(a) 2 (b) 3 (c) 4 (d) 6

**6.The maximum number of binary trees that can be formed with three unlabeled nodes is:**

(a) 1 (b) 5 c) 4 (d) 3

**7. How many distinct binary search trees can be created out of 4 distinct keys?**

(a) 5 (b) 14 c) 24 (d) 42

**8. Postorder traversal of a given binary search tree, T produces the following sequence of keys 10, 9, 23, 22, 27, 25, 15, 50, 95, 60, 40, 29**

**Which one of the following sequences of keys can be the result of an in-order traversal of the tree T?**

(a) 9, 10, 15, 22, 23, 25, 27, 29, 40, 50, 60, 95

(b) 9, 10, 15, 22, 40, 50, 60, 95, 23, 25, 27, 29

(c) 29, 15, 9, 10, 25, 22, 23, 27, 40, 60, 50, 95

(d) 95, 50, 60, 40, 27, 23, 22, 25, 10, 9, 15, 29

**9.** A full binary tree with n non-leaf nodes contains

A. n+ 1 node

B. 2n+1 nodes

C. 2n-1 nodes

D. log n nodes

10. A data structure is required for storing a set of integers such that each of the following operations can be done in  
O (log n) time, where n is the number of elements in the set.   
I. Deletion of the smallest element   
II. Insertion of an element if it is not already present in the set   
which of the following data structures can be used for this purpose?

A. A Heap but not balanced binary search tree

B. A balanced binary search tree but not heap

C. both a heap and a balanced binary search tree

D. neither heap nor a balanced binary search tree

11. The worst case running time to search for an element in a balanced in a binary search tree with n\*2^n elements is   
(A)  
(B)  
(C)  
(D) 

12. What does the following function do for a given binary tree?

**int fun (struct node \*root)**

**{**

**if (root == NULL)**

**return 0;**

**if (root->left == NULL && root->right == NULL)**

**return 0;**

**return 1 + fun(root->left) + fun(root->right);**

**}**

A. count internal nodes

B. count leaf nodes

C. returns height

D. return diameter where diameter is number of edges on longest path between any two nodes

|  |  |  |
| --- | --- | --- |
|  |  |  |