

MCQs on Tree with answers

1. The height of a BST is given as  $h$ . Consider the height of the tree as the no. of edges in the longest path from root to the leaf. The maximum no. of nodes possible in the tree is?

- a)  $2^{h-1} - 1$
- b)  $2^{h+1} - 1$**
- c)  $2^h + 1$
- d)  $2^{h-1} + 1$

2. The no of external nodes in a full binary tree with  $n$  internal nodes is?

- a)  $n$
- b)  $n+1$**
- c)  $2n$
- d)  $2n + 1$

3. The difference between the external path length and the internal path length of a binary tree with  $n$  internal nodes is?

- a)  $1$
- b)  $n$
- c)  $n + 1$
- d)  $2n$**

4. Suppose a binary tree is constructed with  $n$  nodes, such that each node has exactly either zero or two children. The maximum height of the tree will be?

- a)  $(n+1)/2$
- b)  $(n-1)/2$**
- c)  $n/2 - 1$
- d)  $(n+1)/2 - 1$

5. Which of the following statement about binary tree is CORRECT?

- a) Every binary tree is either complete or full
- b) Every complete binary tree is also a full binary tree
- c) Every full binary tree is also a complete binary tree**
- d) A binary tree cannot be both complete and full

6. Suppose we have numbers between 1 and 1000 in a binary search tree and want to search for the number 363. Which of the following sequence could not be the sequence of the node examined?

- a) 2, 252, 401, 398, 330, 344, 397, 363
- b) 924, 220, 911, 244, 898, 258, 362, 363
- c) 925, 202, 911, 240, 912, 245, 258, 363**
- d) 2, 399, 387, 219, 266, 382, 381, 278, 363

7. In full binary search tree every internal node has exactly two children. If there are 100 leaf nodes in the tree, how many internal nodes are there in the tree?

- a) 25
- b) 49
- c) 99**
- d) 101

8. Which type of traversal of binary search tree outputs the value in sorted order?

- a) Pre-order
- b) In-order**
- c) Post-order
- d) None

9. Suppose a complete binary tree has height  $h > 0$ . The minimum no of leaf nodes possible in term of  $h$  is?

- a)  $2^h - 1$
- b)  $2^{h-1} + 1$
- c)  $2^h - 1$**
- d)  $2^h + 1$

10. A 2-3 is a tree such that

- a) All internal nodes have either 2 or 3 children
- b) All path from root to leaves have the same length

The number of internal nodes of a 2-3 tree having 9 leaves could be

- a) 4**
- b) 5
- c) 6
- d) 7**

11. If a node having two children is to be deleted from binary search tree, it is replaced by its

- a) In-order predecessor
- b) In-order successor**
- c) Pre-order predecessor

12. A binary search tree is formed from the sequence 6, 9, 1, 2, 7, 14, 12, 3, 8, 18. The minimum number of nodes required to be added in to this tree to form an extended binary tree is?

- a) 3
- b) 6
- c) 8
- d) 11**

13. In a full binary tree, every internal node has exactly two children. A full binary tree with  $2n+1$  nodes contains

- a)  $n$  leaf node
- b)  $n$  internal nodes**
- c)  $n-1$  leaf nodes
- d)  $n-1$  internal nodes

14. the run time for traversing all the nodes of a binary search tree with  $n$  nodes and printing them in an order is

- a)  $O(n \lg(n))$
- b)  $O(n)$**
- c)  $O(\sqrt{n})$
- d)  $O(\log(n))$

15. When a binary tree is converted in to an extended binary tree, all the nodes of a binary tree in the external node becomes

- a) Internal nodes**
- b) External nodes
- c) Root nodes
- d) None

16. If  $n$  numbers are to be sorted in ascending order in  $O(n \log n)$  time, which of the following tree can be used

- a) Binary tree
- b) Binary search tree
- c) Max-heap
- d) Min-heap**

17. If  $n$  elements are sorted in a binary search tree. What would be the asymptotic complexity to search a key in the tree?

- a)  $O(1)$
- b)  $O(\log n)$
- c)  $O(n)$**
- d)  $O(n \log n)$

18. If  $n$  elements are sorted in a balanced binary search tree. What would be the asymptotic complexity to search a key in the tree?

- a)  $O(1)$
- b)  $O(\log n)$**
- c)  $O(n)$
- d)  $O(n \log n)$

19. The minimum number of elements in a heap of height  $h$  is

- a)  $2^{h+1}$
- b)  $2^h$**
- c)  $2^h - 1$
- d)  $2^{h-1}$

20. The maximum number of elements in a heap of height  $h$  is

- a)  **$2^{h+1} - 1$**
- b)  $2^h$
- c)  $2^h - 1$
- d)  $2^h - 1$

21. A threaded binary tree is a binary tree in which every node that does not have right child has a thread to its

- a) Pre-order successor
- b) **In-order successor**
- c) In-order predecessor
- d) Post-order successor

22. In which of the following tree, parent node has a key value greater than or equal to the key value of both of its children?

- a) Binary search tree
- b) Threaded binary tree
- c) Complete binary tree
- d) **Max-heap**

23. A binary tree  $T$  has  $n$  leaf nodes. The number of nodes of degree 2 in  $T$  is

- a)  $\log_2 n$
- b)  **$n - 1$**
- c)  $n$
- d)  $2n$

24. A binary search tree is generated by inserting in order the following integers:

50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24

The number of the node in the left sub-tree and right sub-tree of the root, respectively, is

a) (4, 7)

**b) (7, 4)**

c) (8, 3)

d) (3, 8)