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Question No: 1 (Marks: 1) - Please choose one
A solution is said to be efficient if it solves the problem within its resource constraints i.e. hardware and time.

- **True (Page 4)**
- False

Question No: 2 (Marks: 1) - Please choose one
Which one of the following is known as "Last-In, First-Out" or LIFO Data Structure?

- Linked List
- **Stack (Page 54)**
- Queue
- Tree

Question No: 3 (Marks: 1) - Please choose one
What will be postfix expression of the following infix expression?
Infix Expression : a+b*c-d

- ab+c*d-
- **abc*+d-**
- abc+*d-
- abcd+*-

Question No: 4 (Marks: 1) - Please choose one
For compiler a postfix expression is easier to evaluate than infix expression?

- **True Click here for detail**
- False

Question No: 5 (Marks: 1) - Please choose one
Consider the following pseudo code
declare a stack of characters
while (there are more characters in the word to read)
{

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```
  read a character
  push the character on the stack
}
while ( the stack is not empty )
{
  pop a character off the stack
  write the character to the screen
}
```

What is written to the screen for the input "apples"?

- selpa
- **selppa**
- apples
- aaapppppllеess

Question No: 6 (Marks: 1) - Please choose one

Consider the following function:

```
void test_a(int n)
{
        cout << n << " ";
        if (n>0)
        test_a(n-2);
}
```

What is printed by the call test_a(4)?

- **4 2**
- 0 2 4
- 0 2
- 2 4

Question No: 7 (Marks: 1) - Please choose one

If there are N external nodes in a binary tree then what will be the no. of internal nodes in this binary tree?

- **N -1 (Page 304)**
- N+1
- N+2
- N

Question No: 8 (Marks: 1) - Please choose one

If there are N internal nodes in a binary tree then what will be the no. of external nodes in this binary tree?

- N -1
- N
- **N +1 (Page 303)**
- N +2

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Question No: 9 (Marks: 1) - Please choose one

If we have 1000 sets each containing a single different person. Which of the following relation will be true on each set:

- **Reflexive (page 387)**
- Symmetric
- Transitive
- Associative

Question No: 10 (Marks: 1) - Please choose one

Which one of the following is NOT the property of equivalence relation:

- Reflexive
- Symmetric
- Transitive
- **Associative (page 387)**

Question No: 11 (Marks: 1) - Please choose one

A binary tree of N nodes has _____.

- Log_{10} N levels
- **Log_2 N levels (Page 212)**
- N / 2 levels
- N x 2 levels

Question No: 12 (Marks: 1) - Please choose one

The easiest case of deleting a node from BST is the case in which the node to be deleted _____.

- **Is a leaf node (Page 173)**
- Has left subtree only
- Has right subtree only
- Has both left and right subtree

Question No: 13 (Marks: 1) - Please choose one

If there are N elements in an array then the number of maximum steps needed to find an element using Binary Search is _____ .

- N
- N^2
- $Nlog_2N$
- **log_2N (page 440)**

Question No: 14 (Marks: 1) - Please choose one

Merge sort and quick sort both fall into the same category of sorting algorithms. What is this category?

- O(nlogn) sorts
- Interchange sort (not sure)
- Average time is quadratic
- **None of the given options. (Page 488)**

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Question No: 15 (Marks: 1) - Please choose one
If one pointer of the node in a binary tree is NULL then it will be a/an _____ .

- **External node (Page 303)**
- Root node
- Inner node
- Leaf node

Question No: 16 (Marks: 1) - Please choose one
We convert the _____ pointers of binary to threads in threaded binary tree.

- Left
- Right
- **NULL (Page 312)**
- None of the given options

Question No: 17 (Marks: 1) - Please choose one
If the bottom level of a binary tree is NOT completely filled, depicts that the tree is NOT a

- Expression tree
- Threaded binary tree
- **complete Binary tree (Page 323)**
- Perfectly complete Binary tree

Question No: 18 (Marks: 1) - Please choose one
What is the best definition of a *collision* in a hash table?

- Two entries are identical except for their keys.
- Two entries with different data have the exact same key
- **Two entries with different keys have the same exact hash value. (page 464)**
- Two entries with the exact same key have different hash values.

Question No: 19 (Marks: 1) - Please choose one
Suppose that a selection sort of 100 items has completed 42 iterations of the main loop. How many items are now guaranteed to be in their final spot (never to be moved again)

- 21
- 41
- **42** Click here for detail
- 43

Question No: 20 (Marks: 1) - Please choose on
Suppose you implement a Min heap (with the smallest element on top) in an array. Consider the different arrays below; determine the one that *cannot* possibly be a heap:

- 16, 18, 20, 22, 24, 28, 30
- 16, 20, 18, 24, 22, 30, 28
- 16, 24, 18, 28, 30, 20, 22
- **16, 24, 20, 30, 28, 18, 22 (page 334)**

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Question No: 21 (Marks: 1) - Please choose one

Do you see any problem in the code of nextInOrder below:

```
TreeNode * nextInorder(TreeNode * p)
{
  if(p->RTH == thread)
    return( p->R );
  else {
    p = p->R;
  while(p->LTH == child)
 p = p->R;
  return p;
   }
}
```

► The function has no problem and will fulfill the purpose successfully.
► The function cannot be compile as it has syntax error.
► The function has logical problem, therefore, it will not work properly.
► The function will be compiled but will throw runtime exception immediately after the control is transferred to this function.

Question No: 22 (Marks: 1) - Please choose one

Which of the following statement is correct about find(x) operation:

► A find(x) on element x is performed by returning exactly the same node that is found.
► **A find(x) on element x is performed by returning the root of the tree containing x.** Click here for detail
► A find(x) on element x is performed by returning the whole tree itself containing x.
► A find(x) on element x is performed by returning TRUE.

Question No: 23 (Marks: 1) - Please choose on

Which of the following statement is NOT correct about find operation:

► It is not a requirement that a find operation returns any specific name, just that finds on two elements return the same answer if and only if they are in the same set.
► **One idea might be to use a tree to represent each set, since each element in a tree has the same root, thus the root can be used to name the set.**
► Initially each set contains one element.
► Initially each set contains one element and it does not make sense to make a tree of one node only.

Question No: 24 (Marks: 1) - Please choose one

In complete binary tree the bottom level is filled from _____

► **Left to right (Page 323)**
► Right to left
► Not filled at all
► None of the given options

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Question No: 25 (Marks: 1) - Please choose one

Here is an array of ten integers:

5 3 8 9 1 7 0 2 6 4

The array after the FIRST iteration of the large loop in a selection sort (sorting from smallest to largest).

- ► **0 3 8 9 1 7 5 2 6 4 (Page 477)**
- ► 2 6 4 0 3 8 9 1 7 5
- ► 2 6 4 9 1 7 0 3 8 5
- ► 0 3 8 2 6 4 9 1 7 5

Question No: 26 (Marks: 1) - Please choose one

What requirement is placed on an array, so that *binary search* may be used to locate an entry?

- ► The array elements must form a heap.
- ► The array must have at least 2 entries.
- ► **The array must be sorted. Click here for detail**
- ► The array's size must be a power of two

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Question No: 1 (Marks: 1) - Please choose one
Which one of the following operations returns top value of the stack?

- Push
- Pop
- **Top (page 53)**
- First

Question No: 2 (Marks: 1) - Please choose one
Compiler uses which one of the following in Function calls,

- **Stack (page 80)**
- Queue
- Binary Search Tree
- AVL Tree

Question No: 3 (Marks: 1) – Please choose one
Every AVL is _____

- Binary Tree
- Complete Binary Tree
- None of these
- **Binary Search Tree** **Click here for detail**

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Question No: 4 (Marks: 1) – Please choose one
If there are 56 internal nodes in a binary tree then how many external nodes this binary tree will have?
- ► 54
- ► 55
- ► 56
- ► **57 (page 303)**

Question No: 5 (Marks: 1) - Please choose one
If there are 23 external nodes in a binary tree then what will be the no. of internal nodes in this binary tree?
- ► 23
- ► 24
- ► 21
- ► **22 (page 303)**

Question No: 6 (Marks: 1) - Please choose one
Which one of the following is not an example of equivalence relation?
- ► Electrical connectivity
- ► Set of people
- ► **<= relation (page 388)**
- ► Set of pixels

Question No: 7 (Marks: 1) - Please choose one
Binary Search is an algorithm of searching, used with the _____ data.
- ► **Sorted (page 432)**
- ► Unsorted
- ► Heterogeneous
- ► Random

Question No: 8 (Marks: 1) - Please choose one
Which one of the following is NOT true regarding the skip list?
- ► Each list S_i contains the special keys + infinity and - infinity.
- ► List S_0 contains the keys of S in non-decreasing order.
- ► Each list is a subsequence of the previous one.
- ► **List S_h contains only the n special keys. (page 446)**

Question No: 9 (Marks: 1) - Please choose one
A simple sorting algorithm like selection sort or bubble sort has a worst-case of
- ► O(1) time because all lists take the same amount of time to sort
- ► O(n) time because it has to perform n swaps to order the list.
- ► **$O(n^2)$ time because sorting 1 element takes O(n) time - After 1 pass through the list,either of these algorithms can guarantee that 1 element is sorted. (page 487)**
- ► $O(n^3)$ time, because the worst case has really random input which takes longer to sort.

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Question No: 10 (Marks: 1) - Please choose one
Which of the following is a property of binary tree?
- ► A binary tree of N external nodes has N internal node.
- ► **A binary tree of N internal nodes has N+ 1 external node. (page 303)**
- ► A binary tree of N external nodes has N+ 1 internal node.
- ► A binary tree of N internal nodes has N- 1 external node.

Question No: 11 (Marks: 1) - Please choose one
By using _____we avoid the recursive method of traversing a Tree, which makes use of stacks and consumes a lot of memory and time.
- ► Binary tree only
- ► **Threaded binary tree (page 306)**
- ► Heap data structure
- ► Huffman encoding

Question No: 12 (Marks: 1) - Please choose one
Which of the following statement is true about dummy node of threaded binary tree?
- ► This dummy node never has a value.
- ► This dummy node has always some dummy value.
- ► **This dummy node has either no value or some dummy value. (Page 321)**
- ► This dummy node has always some integer value.

Question No: 13 (Marks: 1) - Please choose one
For a perfect binary tree of height h, having N nodes, the sum of heights of nodes is
- ► N – (h – 1)
- ► **N – (h + 1) (page 373)**
- ► N – 1
- ► N – 1 + h

Question No: 14 (Marks: 1) - Please choose one
What is the best definition of a *collision* in a hash table?
- ► Two entries are identical except for their keys.
- ► Two entries with different data have the exact same key
- ► **Two entries with different keys have the same exact hash value. (page 464)**
- ► Two entries with the exact same key have different hash values.

Question No: 15 (Marks: 1) - Please choose one
Which formula is the best approximation for the depth of a heap with n nodes?
- ► **log (base 2) of n (page 353)**
- ► The number of digits in n (base 10), e.g., 145 has three digits
- ► The square root of n
- ► n

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Question No: 16 (Marks: 1) - Please choose one

Which of the following statement is NOT correct about find operation:

► It is not a requirement that a find operation returns any specific name, just that finds on two elements return the same answer if and only if they are in the same set.

► **One idea might be to use a tree to represent each set, since each element in a tree has the same root, thus the root can be used to name the set.**

► Initially each set contains one element.

► Initially each set contains one element and it does not make sense to make a tree of one node only.

Question No: 17 (Marks: 1) - Please choose one

Which of the following is not true regarding the maze generation?

► Randomly remove walls until the entrance and exit cells are in the same set.

► Removing a wall is the same as doing a union operation.

► **Remove a randomly chosen wall if the cells it separates are already in the same set. (page 424)**

► Do not remove a randomly chosen wall if the cells it separates are already in the same set.

Question No: 18 (Marks: 1) – Please choose one

In threaded binary tree the NULL pointers are replaced by ,

► preorder successor or predecessor

► **inorder successor or predecessor (page 307)**

► postorder successor or predecessor

► NULL pointers are not replaced

Question No: 19 (Marks: 1) - Please choose one

Which of the given option is NOT a factor in Union by Size:

► Maintain sizes (number of nodes) of all trees, and during union.

► Make smaller tree, the subtree of the larger one.

► **Make the larger tree, the subtree of the smaller one. (page 408)**

► Implementation: for each root node i, instead of setting parent[i] to -1, set it to -k if tree rooted at i has k nodes.

Question No: 20 (Marks: 1) - Please choose one

Suppose we had a hash table whose hash function is "n % 12", if the number 35 is already in the hash table, which of the following numbers would cause a collision?

► 144

► 145

► **143**

► 148

Question No: 21 (Marks: 1) - Please choose o

What requirement is placed on an array, so that *binary search* may be used to locate an entry?

► The array elements must form a heap.

► The array must have at least 2 entries.

► **The array must be sorted.** Click here for detail

► The array's size must be a power of two

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Question No: 22 (Marks: 1) - Please choose one
A binary tree with 24 internal nodes has _____ external nodes.

- ► 22
- ► 23
- ► 48
- ► **25 (page 303)**

Question No: 23 (Marks: 1) - Please choose on
In case of deleting a node from AVL tree, rotation could be prolong to the *root* node.

- ► **Yes (Page 267)**
- ► No

Question No: 24 (Marks: 1) - Please choose one
when we have declared the size of the array, it is not possible to increase or decrease it during the _____of the program.

- ► Declaration
- ► **Execution (page 17)**
- ► Defining
- ► None of the abov

Question No: 25 (Marks: 1) - Please choose one
it will be efficient to place stack elements at the start of the list because insertion and removal take _____time.

- ► Variable
- ► **Constant (page 60)**
- ► Inconsistent
- ► None of the above

Question No: 26 (Marks: 1) - Please choose one
_____ is the stack characteristic but _____was implemented because of the size limitation of the array.

- ► isFull(),isEmpty()
- ► pop(), push()
- ► **isEmpty() , isFull() (page 59)**
- ► push(),pop()

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Question No: 1 (Marks: 1) - Please choose one
What kind of list is best to answer questions such as "What is the item at position n?"

- **Lists implemented with an array.** **Click here for detail**
- Doubly-linked lists.
- Singly-linked lists.
- Doubly-linked or singly-linked lists are equally best

Question No: 2 (Marks: 1) - Please choose one
Each node in doubly link list has,

- 1 pointer
- **2 pointers (page 39)**
- 3 pointers
- 4 pointers

Question No: 3 (Marks: 1) - Please choose one
If there are 56 internal nodes in a binary tree then how many external nodes this binary tree will have?

- 54
- 55
- 56
- **57 (page 303)**

Question No: 4 (Marks: 1) - Please choose one
If there are N internal nodes in a binary tree then what will be the no. of external nodes in this binary tree?

- N -1
- N
- **N +1 (page 303)**
- N +2

Question No: 5 (Marks: 1) - Please choose one
A binary tree with N internal nodes has _____ links, _____ links to internal nodes and _____ links to external nodes

- N+1, 2N, N-1
- N+1, N-1, 2N
- **2N, N-1, N+1 (page 304)**
- N-1, 2N, N+1

Question No: 6 (Marks: 1) - Please choose one
The definition of Transitivity property is

- For all element x member of S, x R x
- For all elements x and y, x R y if and only if y R x
- **For all elements x, y and z, if x R y and y R z then x R z (page 385)**
- For all elements w, x, y and z, if x R y and w R z then x R z

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Which one of the following is not an example of equivalence relation:

- ► Electrical connectivity
- ► Set of people
- ► **<= relation (page 388)**
- ► Set of pixels

Question No: 8 (Marks: 1) - Please choose one
Union is a _____ time operation.

- ► **Constant (page 405)**
- ► Polynomial
- ► Exponential
- ► None of the given options

Question No: 9 (Marks: 1) - Please choose one
Binary Search is an algorithm of searching, used with the _____ data.

- ► **Sorted (page 432)**
- ► Unsorted
- ► Heterogeneous
- ► Random

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A simple sorting algorithm like selection sort or bubble sort has a worst-case of

- ► O(1) time because all lists take the same amount of time to sort
- ► O(n) time because it has to perform n swaps to order the list.
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Merge sort and quick sort both fall into the same category of sorting algorithms. What is this category?

- ► O(nlogn) sorts
- ► Interchange sort
- ► Average time is quadratic
- ► **None of the given options. (Page 488)**

Question No: 12 (Marks: 1) - Please choose one
Huffman encoding uses _____ tree to develop codes of varying lengths for the letters used in the original message.

- ► Linked list
- ► Stack
- ► Queue
- ► **Binary tree (page 287)**

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Question No: 13 (Marks: 1) - Please choose one
Which of the following statement is true about dummy node of threaded binary tree?

► The left pointer of dummy node points to the itself while the right pointer points to the root of tree.
► **The left pointer of dummy node points to the root node of the tree while the right pointer points itself i.e. to *dummy* node (page 321)**
► The left pointer of dummy node points to the root node of the tree while the right pointer is always NULL.
► The right pointer of dummy node points to the itself while the left pointer is always NULL.

Question No: 14 (Marks: 1) - Please choose one
Consider a min heap, represented by the following array:
10,30,20,70,40,50,80,60
After inserting a node with value 31.Which of the following is the updated min heap?

► **10,30,20,31,40,50,80,60,70 (page 336)**
► 10,30,20,70,40,50,80,60,31
► 10,31,20,30,40,50,80,60,31
► 31,10,30,20,70,40,50,80,60

Question No: 15 (Marks: 1) - Please choose one
Consider a min heap, represented by the following array:
11,22,33,44,55
After inserting a node with value 66.Which of the following is the updated min heap?

► **11,22,33,44,55,66 (page 336)**
► 11,22,33,44,66,55
► 11,22,33,66,44,55
► 11,22,66,33,44,55

Question No: 16 (Marks: 1) - Please choose one
Suppose that a selection sort of 100 items has completed 42 iterations of the main loop. How many items are now guaranteed to be in their final spot (never to be moved again)?

► 21
► 41
► **42** **Click here for detail**
► 43

Question No: 17 (Marks: 1) - Please choose one
_____ is a data structure that can grow easily dynamically at run time without having to copy existing elements.

► Array ()
► List
► **Both of these (page 10)**
► None of these

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Question No: 18 (Marks: 1) - Please choose one
The maximum number of external nodes (leaves) for a binary tree of height H is _____

- ► **2^H** **Click here for detail**
- ► 2^H+1
- ► 2^H-1
- ► 2^H+2

Question No: 19 (Marks: 1) - Please choose one
A complete binary tree of height ____ has nodes between 16 to 31 .

- ► 2
- ► 3
- ► **4 (page 373)**
- ► 5

Question No: 20 (Marks: 1) - Please choose one
Which of the given option is NOT a factor in Union by Size:

- ► Maintain sizes (number of nodes) of all trees, and during union.
- ► Make smaller tree, the subtree of the larger one.
- ► **Make the larger tree, the subtree of the smaller one. (page 408)**
- ► Implementation: for each root node i, instead of setting parent[i] to -1, set it to -k if tree rooted at i has k nodes.

Question No: 21 (Marks: 1) - Please choose one
Here is an array of ten integers:
5 3 8 9 1 7 0 2 6 4
The array after the FIRST iteration of the large loop in a selection sort (sorting from smallest to largest).

- ► 0 3 8 9 1 7 5 2 6 4 **(Page 477)**
- ► 2 6 4 0 3 8 9 1 7 5
- ► 2 6 4 9 1 7 0 3 8 5
- ► 0 3 8 2 6 4 9 1 7 5

Question No: 22 (Marks: 1) - Please choose one
Suppose A is an array containing numbers in increasing order, but some numbers occur more than once when using a binary search for a value, the binary search always finds _____

- ► **the first occurrence of a value.** **Click here for detail**
- ► the second occurrence of a value.
- ► may find first or second occurrence of a value.
- ► None of the given options.

Question No: 23 (Marks: 1) - Please choose one
A binary tree with 24 internal nodes has _____ external nodes.

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- 22
- 23
- 48
- **25 (page 303)**

Question No: 24 (Marks: 1) - Please choose one
it will be efficient to place stack elements at the start of the list because insertion and removal take _____time.

- Variable
- **Constant (page 60)**
- Inconsistent
- None of the above

Question No: 25 (Marks: 1) - Please choose one
"+" is a _____*operator*.

- Unary
- **Binary (page 64)**
- Ternary
- None of the above

Question No: 26 (Marks: 1) - Please choose one
A kind of expressions where the operator is present between two operands called _____expressions.

- Postfix
- **Infix (page 64)**
- Prefix
- None of the above.

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Question No: 1 (Marks: 1) - Please choose one

Here is a small function definition:

```
void f(int i, int &k)
{
i = 1;
k = 2;
}
```

Suppose that a main program has two integer variables x and y, which are given the value 0. Then the main program calls f(x,y); What are the values of x and y after the function f finishes?

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- Both x and y are still 0.
- x is now 1, but y is still 0.
- **x is still 0, but y is now 2.**
- x is now 1, and y is now 2.

Question No: 2 (Marks: 1) - Please choose one
A binary tree with N internal nodes has _____ links, _____ links to internal nodes and _____ links to external nodes

- N+1, 2N, N-1
- N+1, N-1, 2N
- **2N, N-1, N+1 (page 304)**
- N-1, 2N, N+1

Question No: 3 (Marks: 1) - Please choose one
Each node in doubly link list has,

- 1 pointer
- **2 pointers (Page 39)**
- 3 pointers
- 4 pointers

Question No: 4 (Marks: 1) - Please choose one
If you know the size of the data structure in advance, i.e., at compile time, which one of the following is a good data structure to use.

- Array
- List
- **Both of these (page 10)**
- None of these

Question No: 5 (Marks: 1) - Please choose one
Which one of the following is not an example of equivalence relation:

- Electrical connectivity
- Set of people
- **<= relation (Page 388)**
- Set of pixels

Question No: 6 (Marks: 1) - Please choose one
If a complete binary tree has height h then its no. of nodes will be,

- Log (h)
- **2^{h+1} - 1 (page 125)**
- Log (h) - 1
- 2^{h} - 1

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Question No: 7 (Marks: 1) - Please choose one
If a max heap is implemented using a partially filled array called data, and the array contains n elements (n > 0), where is the entry with the greatest value? **Data[0] is correct**

- data[1]
- data[n-1]
- data[n]
- data[2*n+1]

Question No: 8 (Marks: 1) - Please choose one
Which one is a self-referential data type?

- Stack
- Queue
- **Link list** **Click here for detail**
- All of these

Question No: 9 (Marks: 1) - Please choose one
There is/are _____ case/s for rotation in an AVL tree,

- 1
- 3
- 2
- **4 (page 229)**

Question No: 10 (Marks: 1) - Please choose one
Which of the following can be the inclusion criteria for pixels in image segmentation.

- Pixel intensity
- Texture
- Threshold of intensity
- **All of the given options (page 421)**

Question No: 11 (Marks: 1) - Please choose one
Consider te following array
23 15 5 12 40 10 7
After the first pass of a particular algorithm, the array looks like
15 5 12 23 10 7 40
Name the algorithm used

- Heap sort
- Selection sort
- Insertion sort
- **Bubble sort (According to rule)**

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Question No: 12 (Marks: 1) - Please choose one
In a perfectly balanced tree the insertion of a node needs _____ .

- **One rotation (Page 225)**
- Two rotations
- Rotations equal to number of levels
- No rotation at all

Question No: 13 (Marks: 1) - Please choose one
If there are N elements in an array then the number of maximum steps needed to find an element using Binary Search is _____ .

- N
- N^2
- $N\log_2 N$
- **$\log_2 N$ (page 440)**

Question No: 14 (Marks: 1) - Please choose one
Which of the following is NOT a correct statement about Table ADT.

- In a table, the type of information in columns may be different.
- **A table consists of several columns, known as entities. (page 408)**
- The row of a table is called a record.
- A major use of table is in databases where we build and use tables for keeping information.

Question No: 15 (Marks: 1) - Please choose one
If both pointers of the node in a binary tree are NULL then it will be a/an _____ .

- Inner node
- **Leaf node (page 120)**
- Root node
- None of the given options

Question No: 16 (Marks: 1) - Please choose one
Suppose we are sorting an array of eight integers using quick sort, and we have just finished the first partitioning with the array looking like this:

2 5 1 7 9 12 11 10

Which statement is correct?

- **The pivot could be either the 7 or the 9.(page 506)**
- The pivot could be the 7, but it is not the 9.
- The pivot is not the 7, but it could be the 9.
- Neither the 7 nor the 9 is the pivot.

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Question No: 17 (Marks: 1) - Please choose one
What is the best definition of a *collision* in a hash table?

- ► Two entries are identical except for their keys.
- ► Two entries with different data have the exact same key
- ► **Two entries with different keys have the same exact hash value. (page 464)**
- ► Two entries with the exact same key have different hash values.

Question No: 18 (Marks: 1) - Please choose one
For a perfect binary tree of height h, having N nodes, the sum of heights of nodes is

- ► N – (h – 1)
- ► **N – (h + 1) (Page 373)**
- ► N – 1
- ► N – 1 + h

Question No: 19 (Marks: 1) - Please choose one
A binary tree with 33 internal nodes has _____ links to internal nodes.

- ► 31
- ► **32 (Page 304)**
- ► 33
- ► 66

Question No: 20 (Marks: 1) - Please choose one
Suppose you implement a Min heap (with the smallest element on top) in an array. Consider the different arrays below; determine the one that *cannot* possibly be a heap:

- ► 16, 18, 20, 22, 24, 28, 30
- ► 16, 20, 18, 24, 22, 30, 28
- ► 16, 24, 18, 28, 30, 20, 22
- ► **16, 24, 20, 30, 28, 18, 22 (see min heap property at page 337)**

Question No: 21 (Marks: 1) - Please choose one
Which of the following is not true regarding the maze generation?

- ► Randomly remove walls until the entrance and exit cells are in the same set.
- ► Removing a wall is the same as doing a union operation.
- ► **Remove a randomly chosen wall if the cells it separates are already in the same set. (Page 424)**
- ► Do not remove a randomly chosen wall if the cells it separates are already in the same set.

Question No: 22 (Marks: 1) - Please choose one
Which formula is the best approximation for the depth of a heap with n nodes?

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► **log (base 2) of n (Page 353)**
► The number of digits in n (base 10), e.g., 145 has three digits
► The square root of n
► n

Question No: 23 (Marks: 1) - Please choose one
In threaded binary tree the NULL pointers are replaced by ,

► preorder successor or predecessor
► **inorder successor or predecessor (Page 307)**
► postorder successor or predecessor
► NULL pointers are not replaced

Question No: 24 (Marks: 1) - Please choose one
The _____ method of list will position the *currentNode* and *lastCurrentNode* at the start of the list.

► Remove
► Next
► **Start (Page 38)**
► Back

Question No: 25 (Marks: 1) - Please choose one
Mergesort makes two recursive calls. Which statement is true after these recursive calls finish, but before the merge step?

► Elements in the first half of the array are less than or equal to elements in the second half of the array.
► None of the given options.
► The array elements form a heap.
► **Elements in the second half of the array are less than or equal to elements in the first half of the array.** **Click here for detail**

Question No: 26 (Marks: 1) - Please choose one
Suppose we had a hash table whose hash function is "n % 12", if the number 35 is already in the hash table, which of the following numbers would cause a collision?

► 144
► 145
► **143**
► 148

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