

Roll No.-----

<b>Paper Code</b>		
<b>4</b>	<b>9</b>	<b>4</b>
(To be filled in the OMR Sheet)		

प्रश्नपुस्तिका क्रमांक  
Question Booklet No.

O.M.R. Serial No.

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प्रश्नपुस्तिका सीरीज  
Question Booklet Series  
**B**

**B.C.A.(Third Semester) Examination, February/March-2022**

**BCA-302(N)**

**Data Structure Using C & C++**

**Time : 1:30 Hours**

**Maximum Marks-100**

जब तक कहा न जाय, इस प्रश्नपुस्तिका को न खोलें

- निर्देश : —
1. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सीरीज का विवरण यथास्थान सही— सही भरे, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।
  2. इस प्रश्नपुस्तिका में 100 प्रश्न हैं, जिनमें से केवल 75 प्रश्नों के उत्तर परीक्षार्थियों द्वारा दिये जाने हैं। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर पत्रक (O.M.R. ANSWER SHEET) में उसके अक्षर वाले वृत्त को काले या नीले बाल प्वाइंट पेन से पूरा भर दें। यदि किसी परीक्षार्थी द्वारा निर्धारित प्रश्नों से अधिक प्रश्नों के उत्तर दिये जाते हैं तो उसके द्वारा हल किये गये प्रथमतः यथा निर्दिष्ट प्रश्नोत्तरों का ही मूल्यांकन किया जायेगा।
  3. प्रत्येक प्रश्न के अंक समान हैं। आप के जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
  4. सभी उत्तर केवल ओ०एम०आर० उत्तर पत्रक (O.M.R. ANSWER SHEET) पर ही दिये जाने हैं। उत्तर पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
  5. ओ०एम०आर० उत्तर पत्रक (O.M.R. ANSWER SHEET) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाय।
  6. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी प्रश्नपुस्तिका बुकलेट एवं ओ०एम०आर० शीट पृथक—पृथक उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
  7. निगेटिव मार्किंग नहीं है।

महत्वपूर्ण : — प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्ष निरीक्षक को दिखाकर उसी सीरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।



1. Which of the following is true about linked list implementation of stack?
  - (A) In push operation, if new nodes are inserted at the end, then in pop operation, nodes must be removed from the beginning.
  - (B) In push operation, if new nodes are inserted at the beginning of linked list, then in pop operation, nodes must be removed from end.
  - (C) In push operation, if new nodes are inserted at the Beginning, then in pop operation, nodes must be removed from the beginning.
  - (D) None of the above.
2. Which of the following points is/are true about Linked list data structure when it is compared with array?
  - (A) All of the below are correct.
  - (B) The size of array has to be pre-decided, linked lists can change their size any time.
  - (C) Arrays have better cache locality that can make them better in terms of performance.
  - (D) It is easy to insert and delete elements in linked list.
3. Which of the following sorting algorithms can be used to sort a random linked list with minimum time complexity?
  - (A) Insertion Sort
  - (B) Heap Sort
  - (C) Merge Sort
  - (D) Quick Sort
4. Which of the following sorting algorithms can be used to sort a fixed size Array with minimum time complexity?
  - (A) Radix Sort
  - (B) Heap Sort
  - (C) Bucked Sort
  - (D) Quick Sort

5. In the worst case, the number of comparisons needed to search a singly linked list of length  $n$  for a given element is:
- (A)  $\log_2 n$
  - (B)  $n$
  - (C)  $\log_2 n - 1$
  - (D)  $n/2$
6. What are the time complexities of finding 4<sup>th</sup> element from beginning and 4<sup>th</sup> element from end in a singly linked list?
- Let  $n$  be the number of nodes in linked list, you may assume that  $n > 4$ :
- (A)  $O(n)$  and  $O(n)$
  - (B)  $O(1)$  and  $O(n)$
  - (C)  $O(1)$  and  $O(1)$
  - (D)  $O(n)$  and  $O(1)$
7. Given pointer to a node  $X$  in a singly linked list. Only one pointer is given, pointer to head node is not given, can we delete the node  $X$  from given linked list?
- (A) Possible if  $X$  is not first node. Use following two steps (a) Copy the data of next of  $X$  to  $X$ . (b) Delete next of  $X$ .
  - (B) Possible if  $X$  is not last node. Use following two steps (a) Copy the data of next of  $X$  to  $X$ . (b) Delete next of  $X$ .
  - (C) Possible if size of linked list is even.
  - (D) Possible if size of linked list is odd.
8. You are given pointers to first and last nodes of a singly linked list, which of the following operations are dependent on the length of the linked list?
- (A) Delete the last element of the list.
  - (B) Add a new element at the end of the list.
  - (C) Delete the first element.
  - (D) Insert a new element as a first element.

9. Consider the following function to traverse a linked list.

```
void traverse(struct Node *head)
{
while (head->next!=NULL)
{
printf("%d", head->data);
head=head->next;
}
}
```

Which of the following is **FALSE** about above function?

- (A) All of the Below.
  - (B) The function is implemented incorrectly because it changes head.
  - (C) The function may crash when the linked list is empty.
  - (D) The function doesn't print the last node when the linked list is not empty.
10. What does the following function do for a given linked List with first node as head?

```
Void fun 1(struct node*head )
{
if(head==NULL)
return;
fun1(head->next);
printf("%d ", head->data);
}
```

- (A) Prints alternate nodes in reverse order.
- (B) Prints alternate nodes of Linked List.
- (C) Prints all nodes of linked lists.
- (D) Prints all nodes of linked list in reverse order

11. Suppose a circular queue of capacity  $(n-1)$  elements is implemented with an array of  $n$  elements. Assume that the insertion and deletion operation are carried out using REAR and FRONT as array index variables, respectively, Initially,  $\text{REAR} = \text{FRONT} = 0$ . The conditions to detect queue full and queue empty are:
- (A) Full:  $\text{REAR} == \text{FRONT}$ , empty:  $(\text{REAR} + 1) \bmod n == \text{FRONT}$
  - (B) Full:  $(\text{FRONT} + 1) \bmod n == \text{REAR}$ , empty:  $\text{REAR} == \text{FRONT}$
  - (C) Full:  $(\text{REAR} + 1) \bmod n == \text{FRONT}$ , empty:  $\text{REAR} == \text{FRONT}$
  - (D) Full:  $(\text{REAR} + 1) \bmod n == \text{FRONT}$ , empty:  $(\text{FRONT} + 1) \bmod n == \text{REAR}$
12. A Priority-Queue is implemented as a Min-Heap. Initially, it has 5 elements. The level-order traversal of the heap is given below:  
2, 3, 5, 8, 10  
Two new elements “1” and “7” are inserted in the heap in that order. The level-order traversal of the heap after the insertion of the elements is:
- (A) 2, 3, 1, 5, 7, 8, 10
  - (B) 1, 3, 2, 8, 10, 5, 7
  - (C) 1, 3, 2, 7, 5, 8, 10
  - (D) 2, 3, 1, 10, 8, 5, 7
13. An implementation of a queue Q, using two stacks S2 and S1, is given below:
- ```
void insert(Q, x) {
    push(S2,x);
}
void delete(Q){
    if(stack-empty(S1)) then
        if(stack-empty(S2)) then {
            print("Q is empty");
            return;
        }
    else while(!(stack-empty(S2))){
        x=pop(S2);
        push(S1,x);
    }
    x=pop(S1);
}
```
- Let  $n$  insert and  $n$  ( $\leq m$ ) delete operations be performed in an arbitrary order on an empty queue Q. Let  $a$  and  $b$  be the number of push and pop operations performed respectively in the process. Which one of the following is true for all  $n$  and  $m$ ?
- (A)  $2n \leq a < 2m$  and  $2n \leq b \leq 2m$
  - (B)  $2n \leq a < 2m$  and  $2m \leq b \leq n+m$
  - (C)  $n+m \leq a < 2m$  and  $2n \leq b \leq n+m$
  - (D)  $n+m \leq a < 2m$  and  $2n \leq b \leq 2m$

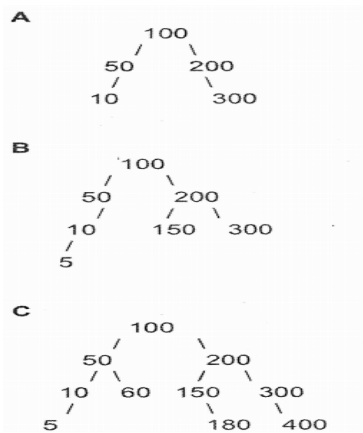
14. Which of the following is a true about Binary Trees:
- (A) Every complete binary tree is also a full binary tree.
  - (B) Every full binary tree is also a complete binary tree.
  - (C) Every binary tree is either complete or full.
  - (D) None of the above
15. What are the main applications of tree data structure?
- 1) As a workflow for compositing digital images for visual effects.
  - 2) Form of a multi-stage decision-making, like chess Game.
  - 3) Router algorithms
  - 4) Manipulate sorted lists of data
  - 5) Manipulate Hierarchical data.
- (A) 1, 2, 3, 4 and 5
  - (B) 1, 2, 3 and 4
  - (C) 1, 2, 3 and 5
  - (D) 1, 3, 4 and 5
16. Which of the following traversal outputs the data in sorted order in a BST?
- (A) Level-order
  - (B) Post-order
  - (C) Pre-order
  - (D) In-order
17. Suppose the numbers 6, 4, 1, 8, 7, 3, 2, 9, 0, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?
- (A) 9 8 6 4 2 3 0 1 2 7
  - (B) 7 2 1 0 3 2 4 6 8 9
  - (C) 0 1 2 2 3 4 6 7 8 9
  - (D) 0 2 4 3 1 6 2 9 8 7

18. The following numbers are inserted into an empty binary search tree in the given order: 11, 0, 2, 4, 13, 12, 15. What is the height of the binary search tree (the height is the maximum distance of a leaf node from the root)?
- (A) 5
  - (B) 4
  - (C) 2
  - (D) 3
19. The preorder traversal sequence of a binary search tree is 3, 2, 1, 1.5, 2.5, 2.3, 3.9, 3.5, 4.2. Which one of the following is the post-order traversal sequence of the same tree?
- (A) 1.5, 2, 1, 2.3, 2.5, 4.2, 3.5, 3.9, 3
  - (B) 1.5, 1, 2.3, 2.5, 2, 3.5, 4.2, 3.9, 3
  - (C) 1, 2, 1.5, 2.3, 2.5, 3.5, 4.2, 3.9, 3
  - (D) 1.5, 1, 2.5, 2.3, 2, 4.2, 3.5, 3.9, 3
20. Post-order 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) 95, 50, 60, 40, 27, 23, 22, 25, 10, 9, 15, 29
  - (B) 29, 15, 9, 10, 25, 22, 23, 27, 40, 60, 50, 95
  - (C) 9, 10, 15, 22, 23, 25, 27, 29, 40, 50, 60, 95
  - (D) 9, 10, 15, 22, 40, 50, 60, 95, 23, 25, 27, 29
21. Consider the following nested representation of binary trees: (X Y Z) indicates Y and Z are the left and right sub stress, respectively, of node X. Note that Y and Z may be NULL, or further nested. Which of the following represents a valid binary tree?
- (A) (A(B NULL D) (E F G))
  - (B) (A(BC NULL) (D E))
  - (C) (A B (D E F G))
  - (D) (A(B C D) E NULL) G)



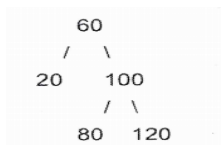
22. If arity of operators is fixed, then which of the following notations can be used to parse expressions without parentheses?
- a) Infix Notation (In-order traversal of a expression tree)
  - b) Postfix Notation (Post-order traversal of a expression tree)
  - c) Prefix Notation (Pre-order traversal of a expression tree)
- (A) a, b and c
- (B) Only a
- (C) Only b
- (D) b and c
23. In delete operation of BST, we need in-order successor (or predecessor) of a node when the node to be deleted has both left and right child as non-empty. Which of the following is true about in-order successor needed in delete operation?
- (A) In-order successor may be ancestor of the node
  - (B) In-order successor is always either a leaf node or a node with empty right child
  - (C) In-order Successor is always a leaf node
  - (D) In-order successor is always either a leaf node or a node with empty left child.
24. What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0:
- (A) 5
  - (B) 4
  - (C) 3
  - (D) 2

25. Which of the following is AVL Tree?

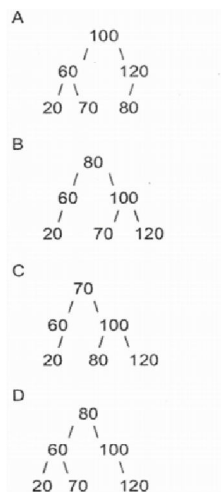


- (A) A, B and C  
 (B) Only C  
 (C) B and A  
 (D) C and A

26. Consider the following AVL tree.



Which of the following is updated AVL tree after insertion of 70?



- (A) D  
 (B) C  
 (C) B  
 (D) A

27. ....is not the operation that can be performed on queue.
- (A) Insertion
  - (B) Traversal
  - (C) Retrieval
  - (D) Deletion
28. In a linked list, insertion can be done as\_\_\_\_\_.
- (A) Beginning
  - (B) Middle
  - (C) Anywhere
  - (D) End
29. The quick sort algorithm exploit \_\_\_\_\_design technique.
- (A) Dynamic programming
  - (B) Divide and Conquer
  - (C) Backtracking
  - (D) Overflow
30. What data structure would you mostly likely see in a non-recursive implementation of a recursive algorithm?
- (A) Queue
  - (B) Linked list
  - (C) Stack
  - (D) Trees
31. The pre-order and post order traversal of a Binary Tree generates the same output.  
The tree can have maximum:
- (A) Any number of nodes
  - (B) Three nodes
  - (C) One node
  - (D) Two nodes

32. In a binary tree a sequence of consecutive edges is called \_\_\_\_\_.  
(A) Connecting lines  
(B) Two-way  
(C) Rotate  
(D) Path
33. Before inserting into stack one must check the condition \_\_\_\_\_.  
(A) Maximum elements  
(B) Underflow  
(C) Overflow  
(D) Existing elements
34. Deletion in the linked stack takes place by deleting \_\_\_\_\_.  
(A) End of the list  
(B) Node pointed by the start process.  
(C) Beginning of the list  
(D) Middle of the list
35. In a extended-binary tree nodes with 2 children are called \_\_\_\_\_.  
(A) Interior node  
(B) Domestic node  
(C) Internal node  
(D) Inner node
36. Binary search algorithm cannot be applied to \_\_\_\_\_.  
(A) Sorted linked list  
(B) Sorted binary trees  
(C) Sorted linear array  
(D) Pointer array

37. Which of the following conditions checks available free space in avail list?
- (A) Avail=NULL
  - (B) Null=Avail
  - (C) Avail=Max stack
  - (D) Avail=Top
38. The number of comparisons done by sequential search is \_\_\_\_\_.
- (A)  $(N - 1)/2$
  - (B)  $(N+2)/2$
  - (C)  $(N/2) - 1$
  - (D)  $(N+1)/2$
39. In a queue, the initial values of front pointer f and rear pointer r should be .....and .....Respectively.
- (A) -1 and 0
  - (B) 1 and 0
  - (C) 0 and 1
  - (D) 0 and -1
40. A data structure where elements can be added or removed at either end but not in the middle is called \_\_\_\_\_.
- (A) Linked lists
  - (B) Queues
  - (C) Stacks
  - (D) Dequeue
41. The use of pointers to refer elements of a data structure in which elements are logically adjacent is \_\_\_\_\_.
- (A) Pointers
  - (B) Linked allocation
  - (C) Queue
  - (D) Stack

42. Which of the following sorting methods would be most suitable for sorting a list, which is almost sorted:
- (A) Quick Sort
  - (B) Bubble Sort
  - (C) Insertion Sort
  - (D) Selection Sort
43. Tower of Hanoi is a classic example of:
- (A) Recursive Approach
  - (B) Divide and Conquer
  - (C) Both (A)&(B)
  - (D) (B) but not (A)
44. A balance factor in AVL tree is used to check:
- (A) If the tree is unbalanced.
  - (B) If all child nodes are at same level
  - (C) What rotation to make
  - (D) When the last rotation occurred.
45. A stable sorting algorithm:
- (A) Does not run out of memory.
  - (B) Does not change the sequence of appearance of elements.
  - (C) Does not crash
  - (D) Does not exist
46. Quick sort algorithm is an example of:
- (A) Improved binary search
  - (B) Divide and conquer
  - (C) Greedy approach
  - (D) Dynamic Programming

47. An algorithm is:
- (A) All of the below
  - (B) A piece of code to be executed.
  - (C) A loosely written code to make final code.
  - (D) A step by step procedure to solve problem
48. For a binary search algorithm to work, it is necessary that the array (list) must be:
- (A) None of the below
  - (B) In a Heap
  - (C) Unsorted
  - (D) Sorted
49. Match the following:
- |                     |                                                                         |
|---------------------|-------------------------------------------------------------------------|
| a) Completeness     | i) How long does it take to find a solution                             |
| b) Time Complexity  | ii) How much memory need to perform the search.                         |
| c) Space Complexity | iii) Is the strategy guaranteed to find the solution when there in one. |
- (A) a-iii, b-ii, c-i
  - (B) a-i, b-iii, c-ii
  - (C) a-ii, b-i, c-iii
  - (D) a-iii, b-i, c-ii
50. The simplest type of data structure is \_\_\_\_\_.
- (A) Three dimensional array
  - (B) Two dimensional array
  - (C) Multidimensional array
  - (D) Linear array

51. Which of the following is not the part of ADT description?
- (A) Data
  - (B) Operation
  - (C) Both of the above
  - (D) None of the above
52. Which data structure allows deletion and insertion of data elements from different location?
- (A) Stack
  - (B) Queues
  - (C) Binary Search Tree
  - (D) Graph
53. Which of the following data structure cannot store the non-homogeneous data element?
- (A) Pointers
  - (B) Records
  - (C) Arrays
  - (D) Stacks
54. Which data structure is used in breadth first search of a graph to hold nodes?
- (A) Array
  - (B) Stack
  - (C) Tree
  - (D) Queue
55. Identify the data structure which allows deletion at both ends of the list but insertion at only one end:
- (A) Input Restricted Dequeue
  - (B) Output Restricted Dequeue
  - (C) Stack
  - (D) Priority Queue



56. To represent hierarchical relationship between elements, which data structure is suitable?
- (A) Graph
  - (B) Tree
  - (C) Dequeue
  - (D) Priority
57. The number of comparison done by sequential search is \_\_\_\_\_.
- (A)  $(N/2)+1$
  - (B)  $(N - 1)/2$
  - (C)  $(N+1)/2$
  - (D)  $(N+2)/2$
58. In a circular the value of index position I will be \_\_\_\_\_.
- (A)  $i=i+1$
  - (B)  $i=(i+1)\% [QUEUE\_SIZE- 1]$
  - (C)  $i=(i-1)\% QUEUE\_SIZE$
  - (D)  $i=(i+1)\% QUEUE\_SIZE$
59. Any node is the path from the root to the node is called:
- (A) Internal Node
  - (B) Successor Node
  - (C) Ancestor Node
  - (D) None of the above
60. \_\_\_\_\_ is not an operation performed on linear list a) Insertion b) Deletion c) Retrieval d) Traversal
- (A) Only (a), (b) and (c)
  - (B) Only (a) and (b)
  - (C) All of the above
  - (D) None of the above

61. \_\_\_\_\_ is a directed tree in which out degree of each node is less than or equal to two.
- (A) Binary tree
  - (B) Unary tree
  - (C) Trinary tree
  - (D) Both (A) and (C)
62. Each node in a link list has two pairs of \_\_\_\_\_ and \_\_\_\_\_.
- (A) Address field and link field
  - (B) Avail field and information field
  - (C) Information field and link field
  - (D) Link Field And Avail Field
63. A linear list in which each has pointer to point to the predecessor and successors nodes is called as \_\_\_\_\_.
- (A) Circular Linked List
  - (B) Singly Linked list
  - (C) Doubly Linked list
  - (D) Linear Linked List
64. The time complexity of the quick sort is:
- (A)  $O(n)$
  - (B)  $O(n^2)$
  - (C)  $O(\log n)$
  - (D)  $O(n \log n)$
65. The running time for creating a heap of size  $n$  is \_\_\_\_\_.
- (A)  $O(n \log n)$
  - (B)  $O(\log n)$
  - (C)  $O(n^2)$
  - (D)  $O(n)$

66. Which of the following type of expressions do not require precedence rules for evaluations?
- (A) Postfix Expressions
  - (B) Partially parenthesized Infix Expressions
  - (C) Fully Parenthesized Infix Expressions
  - (D) More Than one of the above
67. Linked list are not suitable data structures for which one of the following problem?
- (A) Insertion Sort
  - (B) Radix Sort
  - (C) Binary Search
  - (D) Polynomial Manipulation
68. What value does the function my\_code return when called with a value of 5?
- ```

Intmy_code(intnum)
{
    If (num<=1)
        return 1;
    else
        return num*my_code (num-1);
}

```
- (A) 0
  - (B) 60
  - (C) 20
  - (D) 120
69. The post fix form of  $- A^B * C - D + E / F (G + H)$
- (A)  $AB^CD-EP/GH+/+*$
  - (B)  $AB^D+EFGH+//+*$
  - (C)  $AB^C*D-EF/GH+/+$
  - (D)  $ABCDEF GH+//+-*^$

70. A full binary tree with  $n$  leaf nodes contains .....totalnodes.
- (A)  $\log_2 n$  Nodes
  - (B)  $2n$  Nodes
  - (C)  $n+1$  Nodes
  - (D)  $2n+1$  Nodes
71. Recursive procedures are implemented by using ..... Data structures.
- (A) Queues
  - (B) Linked Lists
  - (C) Stacks
  - (D) Strings
72. Which one of the below is not divide and conquer approach?
- (A) Shell Sort
  - (B) Heap Sort
  - (C) Insertion Sort
  - (D) Merge Sort
73. What kind of linked list begins with a pointer to the first node, and each node contains a pointer to the next nodes, and the pointer in the last node points back to the first node?
- (A) Circular, Singly-Linked List
  - (B) Circular, Doubly- Linked List
  - (C) Singly -Linked List
  - (D) Doubly linked List
74. The data structure required to check whether an expression contains balanced parenthesis is \_\_\_\_\_.
- (A) Array
  - (B) Tree
  - (C) Queue
  - (D) Stack

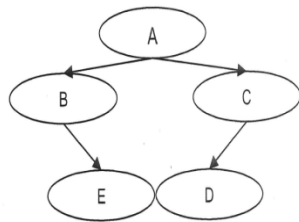
75. The number of leaf nodes in a complete binary tree of height  $h$  is \_\_\_\_\_.  
(A)  $2^{h+1}$   
(B)  $2^{h+2}$   
(C)  $2^h$   
(D)  $2^{h-2}$
76. Recursion uses more memory space than iteration because \_\_\_\_\_.  
(A) Every recursive call has to be stored  
(B) It uses stack instead of queue  
(C) Both (A) and (B) are true  
(D) None of the above
77. Quick sort running time depends on the selection of \_\_\_\_\_.  
(A) Size of Array  
(B) Pivot Element  
(C) Sequence of Values  
(D) None of the above
78. Representation of data structure in memory is known as:  
(A) Storage Structure  
(B) File Structure  
(C) Abstract Data Types  
(D) Recursive
79. What is not true about insertion sort?  
(A) Exhibits the worst case performance when the initial array is sorted in reverse order  
(B) Worst case and average case performance is  $O(n^2)$   
(C) Can be compared to the way a card player arranges cards from a card deck  
(D) None of the above

80. .... form of excess is used to add and remove nodes from a queue.
- (A) LIFO, list in first out
  - (B) FIFO, First in First out
  - (C) Both (A) and (B)
  - (D) None of the above
81. In a stack if the user tries to push an element in a filled stack is called\_\_\_\_\_.
- (A) Underflow
  - (B) Empty Collection
  - (C) Overflow
  - (D) Garbage Collection
82. Which of the following is not the application of stack ?
- (A) A parenthesis balancing program
  - (B) Data transfer between two asynchronous process
  - (C) Tracking of local variable at run time
  - (D) Compiler syntax analyzer
83. Here is an infix expression  $6+7*(8*15-12)$ . Suppose that we are using the usual stack algorithm to convert the expression from infix to postfix notation. The maximum number of symbols that will appear on a stack at one time during the conversion of this expression?
- (A) 4
  - (B) 3
  - (C) 2
  - (D) 1

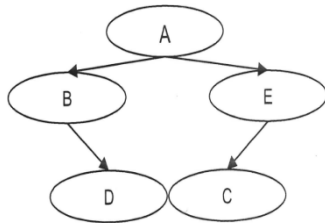
84. If the elements "U", "X", "Y" and "Z" are placed in queue and are deleted one at a time, in what order will they be removed ?
- (A) UXZY
  - (B) ZYXU
  - (C) UXYZ
  - (D) ZYUX
85. A normal Queue, if implemented using an array of size MAX, gets full when?
- (A)  $\text{Rear} = \text{Front}$
  - (B)  $\text{Front} = \text{Rear} + 1$
  - (C)  $\text{Rear} = \text{MAX} - 1$
  - (D)  $\text{Front} = (\text{Rear} + 1) \% \text{MAX}$
86. Disadvantages of linked list representation of binary trees over arrays?
- (A) Random access is not possible and extra memory with every element
  - (B) Randomly accessing is not possible
  - (C) Extra memory for a pointer is needed with every element in the list
  - (D) Difficulty in deletion
87. The following lines talks deleting a node in a binary tree. (the tree property must not be violated after deletion)
- i) From root search for the node to be deleted
  - ii)
  - iii) Delete the node at
- what must be statement ii) and fill up statement iii)
- (A) ii)- find deepest node, replace with node to be deleted iii)- delete a node
  - (B) ii)- find deepest node, replace with node to be deleted. iii)- delete the deepest node
  - (C) ii)- find node to be deleted. iii)- delete the node at found location
  - (D) ii)- find random node replace with node to be deleted. iii)- delete the node
88. What operation does the following diagram depict?
- (A) Deleting a node with 2 children
  - (B) Inserting an internal node
  - (C) Inserting a leaf node
  - (D) Deleting a node with 0 or 1 child

89. If binary trees are represented in arrays, what formula can be used to locate a left child, if the node has an index  $i$ ?
- (A)  $2i$   
 (B)  $4i$   
 (C)  $2i+2$   
 (D)  $2i+1$
90. Which of the following properties are obeyed by all three tree-traversals?
- (A) Root node is visited before left sub-tree  
 (B) Root node is visited before right sub-tree  
 (C) Right sub-trees are visited before left sub-trees  
 (D) Left sub-trees are visited before right sub-trees
91. Construct a binary tree using the following data the preorder traversal of a binary tree is A, B, E, C, D. The in-order traversal of the same binary tree is B, E, A, D, C.

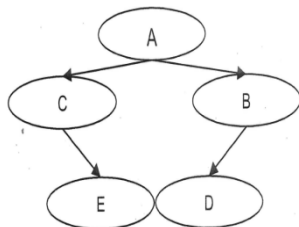
(A)



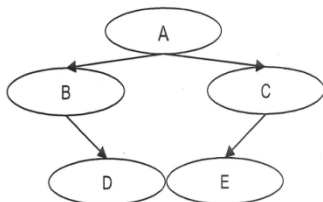
(B)



(C)



(D)

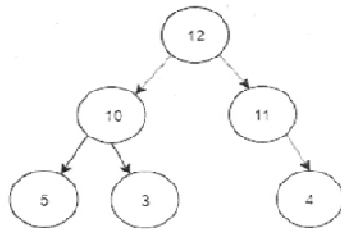




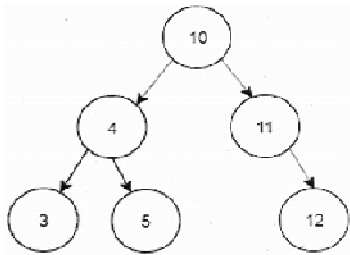
92. Which of the following is false about a binary search tree?
- (A) The left and right sub-trees should also be binary search trees
  - (B) In order sequence gives decreasing order of elements
  - (C) The left child is always lesser than its parent
  - (D) The right child is always greater than its parent
93. Construct a binary search tree with the below information.

The preorder traversal of a binary search tree 10, 4, 3, 5, 11, 12.

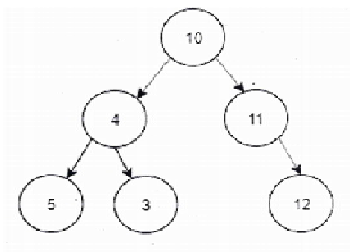
(A)



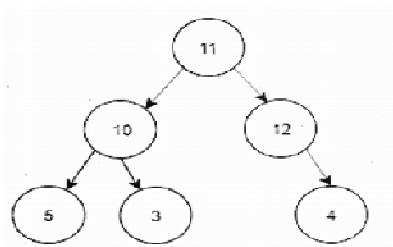
(B)



(C)



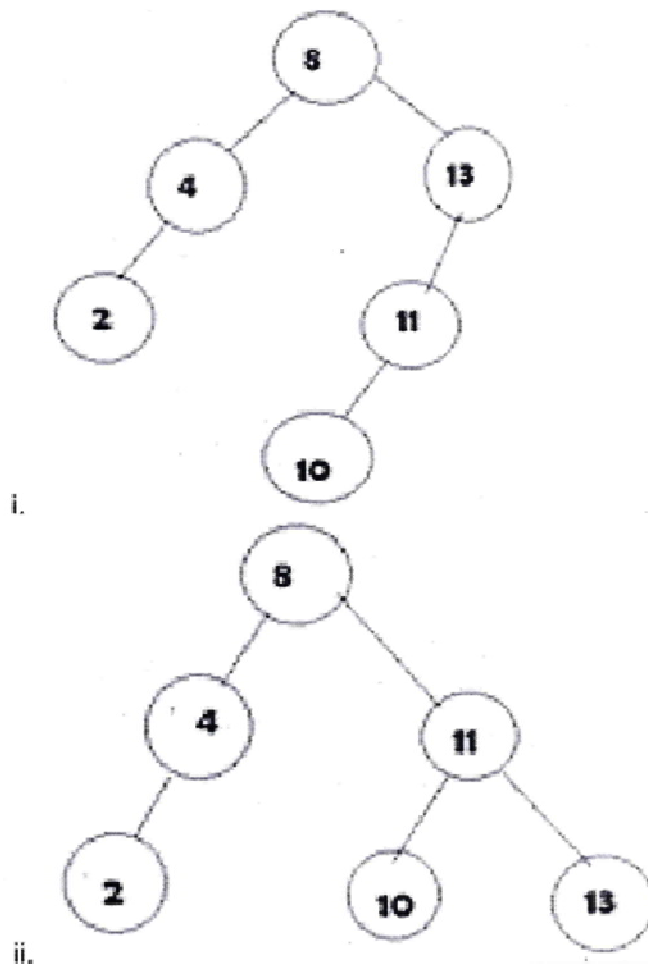
(D)



94. Why we need to a binary tree which is height balanced?

- (A) To simplify storing
- (B) To Attain faster memory access
- (C) To avoid formation of skew trees
- (D) To Save memory

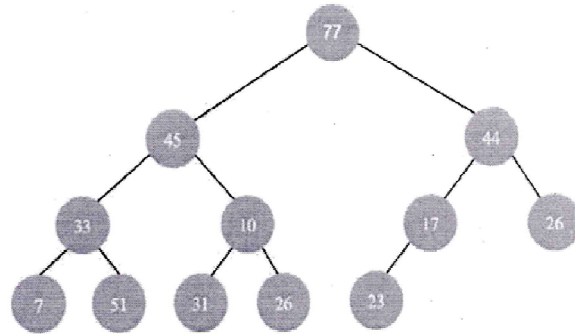
95. Which of the below diagram is following AVL tree property?



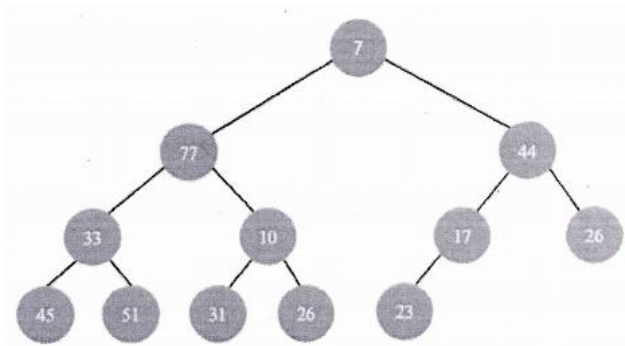
- (A) Only ii
- (B) i is not a binary search tree
- (C) Only i
- (D) Only i and ii

96. Which of the following is the valid min heap?

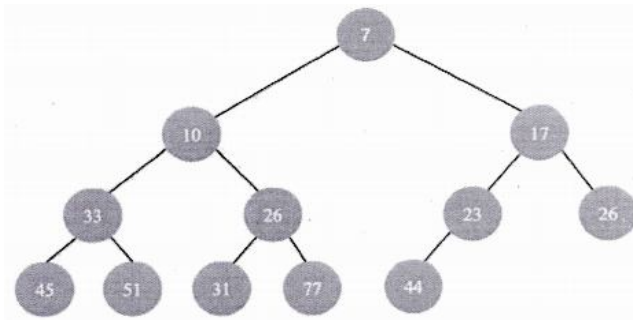
(A)



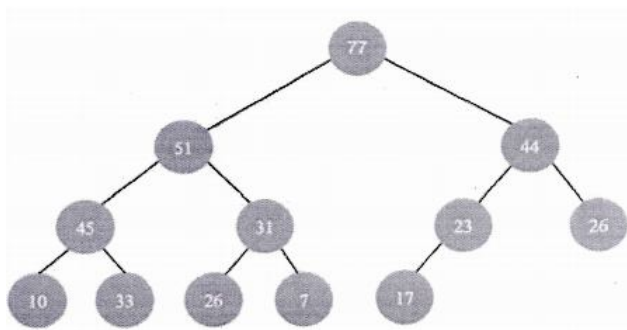
(B)



(C)



(D)



97. Which one of the following array elements represents a binary min heap?
- (A) B D E A S F T
  - (B) A B D E S F T
  - (C) D B A E F S T
  - (D) A E S B D T F
98. In a binary min heap containing  $n$  elements, the largest element can be found in \_\_\_\_\_ time.
- (A)  $O(n \log n)$
  - (B)  $O(n)$
  - (C)  $O(1)$
  - (D)  $O(\log n)$
99. What will be the position of 70, when a min heap is constructed on the input elements 5, 70, 45, 7, 12, 15, 13, 65, 30, 25?
- (A) 70 can be anywhere in heap
  - (B) 70 will be at second level
  - (C) 70 will be at root
  - (D) 70 will be at last level
100. In a min-heap, element with the greatest key is always in the which node?
- (A) Leaf node
  - (B) First node of right sub tree
  - (C) First node of left sub tree
  - (D) Root node

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## **Rough Work / रफ कार्य**

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