

Due to syllabus change, previous year question is not available,
Available year: 2019

CS/BCA(N)/EVEN/SEM-2/BCAN-203(N)/2018-19



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Paper Code : BCAN-203(N)

DATA STRUCTURE WITH C

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own
words as far as practicable.*

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any ten of the following : 10 × 1 = 10

i) The worst case complexity of bubble sort is

- | | |
|------------------|--------------------|
| a) $O(n^2)$ | b) $O(n)$ |
| c) $O(\log_2 n)$ | d) $O(n \log_2 n)$ |

ii) The way for traversing a Binary tree is

- a) preorder traversing
- b) inorder traversing
- c) postorder traversing
- d) all of these.

iii) The best data structure to evaluate an arithmetic expression (in postfix form) is

- a) queue
- b) stack
- c) tree
- d) linked list.

iv) Stack works on

- a) LIFO
- b) FIFO
- c) FILO
- d) both (a) & (c).

Let n be the size of the array. top is a variable

v) which indicates the last element of the stack.

```
if(top==n-1)
{
    ??
}
else
{
    printf("Enter a value to be pushed:");
    scanf("%d",&x);
    ??
    stack[top]=x;
}
```

The operation in place of ?? is

- a) `printf("\n\tSTACK is over flow");`
- b) `stack[top]=x;`
- c) `printf("\n\tSTACK is under flow");`
- d) `printf("\n\tSTACK is over flow");` and `top++;`

vi) Convert the infix expression $A^{\bullet}B/C^*D/E^*F^*G$ to postfix expression :

- a) $AB^{\wedge}CD^*/EF^{\wedge}G^*/$
- b) $ABC/^{\wedge}DE/F^{\wedge}G^*$
- c) $AB^{\wedge}C/D^*EF^{\wedge}/G^*$
- d) None of these.

vii) Malloc

- a) allocates requested size of bytes and returns a void pointer pointing to the first byte of the allocated space <http://www.makaut.com>
- b) allocates space for an array of elements, initialize them to zero and then returns a void pointer to the memory
- c) releases previously allocated memory
- d) modify the size of previously allocated space.

viii) The general format of the function used for opening a file is

`FILE* fp;`

`fp=fopen("filename", "mode");`

Here "mode" is

- a) file pointer
- b) actual file name with full path of the file.
- c) the operation that will be performed on the file.
Example: r, w, a, r+, w+ and a+.
- d) none of these.

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ix) Example of non-linear data structure is

- a) tree
- b) linked list
- c) graph
- d) both (a) & (c).

x) The tree traversal technique in which the root is traversed after its children is known as

- a) post-order traversal
- b) in-order traversal
- c) pre-order traversal
- d) none of these.

xi) What is the output of the following code ?

```
#include<stdio.h>
int main ()
{
    int d, a = 1, b = 2;
    d = a++ + ++b;
    printf("%d %d %d", d, a, b);
}
```

- a) The code has syntax error
- b) 5 2 3
- c) 4 1 3
- d) 4 2 3.

xii) A conversion specification % 7.4f means

- a) print a floating point value of maximum 7 digits where 4 digits are allotted for the digits after the decimal point
- b) print a floating point value of maximum 4 digits where 7 digits are allotted for the digits after the decimal point
- c) print a floating point value of maximum 7 digits <http://www.makaut.com>
- d) print a floating point value of minimum 7 digits where 4 digits are allotted for the digits after the decimal point.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What do you mean by ADT (Abstract Data types) and primitive data types ? Explain with example.
3. Write a function of Push and Pop of a Stack using Linked list representation.

4. Write a recursive algorithm for preorder and postorder traversal of a binary tree.
5. How is a binary tree different from binary search tree ?
What is recursion ? How does it differ from iteration ?

2 + 1 + 2

6. What is Hashing ? Discuss different types of Hash function.

1 + 4

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Write a program in C to implement the Insert and Delete operations in a Queue using Linked list.
- b) Write C functions to perform the following operations in single linked list :
- i) Add item before a specified node
 - ii) Reverse the linked list
 - iii) Delete an item. $(3 + 3) + (3 + 4 + 2)$
8. a) Convert the following infix expression to corresponding postfix expression :
- $4 + 3 * 10 / 6 + 7 - 4 / 2 + 5 ^ 3$
- b) Create an AVL tree with the following numbers :
- 10, 20, 15, 25, 30, 16, 18, 19 $7 + 8$

9. a) How is binary search more beneficial than linear search ? Explain with example.
b) Write a C function to reverse a doubly linked list.
c) Consider the following sequence of binary tree traversals :

Inorder : Q,B,K,C,F,A,G,P,E,D,H,R

Preorder : G,B,Q,A,C,K,F,P,D,E,R,H

Hence construct the binary tree. $4 + 6 + 5$

10. a) What is Priority Queue ?
b) Write an algorithm to insert a node in a binary search tree.
c) Write down the C function of Insertion sort.
d) What do you mean by adjacency matrix of a graph ? $3 + 4 + 6 + 2$

11. Write short notes on any *three* of the following :

3×5

- a) Abstract Data type
b) Dequeue
c) Threaded Binary Tree
d) Modes of opening a file in C
e) BFS Algorithm for graph traversal.