

Moradabad Institute of Technology
Computer Science & Engineering
Class Test-1 (3rd Semester)
Session: 2021-22

Subject Name: Data Structure
Subject Code: KCS301

MM: 15
Duration: 1hr 15 minutes

| Q. No | 1 | 2 | 3 | 4 | 5 | 6 |
|---------------|-----|-----|-----|-----|-----|-----|
| CO | CO1 | CO2 | CO1 | CO2 | CO1 | CO2 |
| Bloom's Level | K4 | K2 | K3 | K3 | K3 | K3 |

Note:

- 1) This paper contains two sections (A) and (B).
- 2) All sections are compulsory.

Section (A)

Attempt all questions. Each question carries 2 mark. (3*2=6)

- 1) Determine the complexity function of the following code and represent it in Big-O notation. Assume printf statement as only significant step in the code.

```
void complexity()
{
    int i, j, n=5;
    printf("complexity");
    for ( i=0; i< n; i++)
    {
        for (j=0; j< n-2; j++)
        {
            printf("hello");
        }
    }
}
```


- 2) Explain data structure and its types.
3) Construct a C function (or algorithm) to insert an element at the beginning of a singly linked list.

Section (B)

Attempt all questions. Each question carries 3 marks. (3*3=9)

- 4) Convert the following infix expression, Q, into postfix notation, P, using stack:
Q: $(A + B * C / D * E ^ (F + G) - H) * (I + J)$
- 5) Consider the following multidimensional array, Y [-1:4, 2:5, 0:4] stored in row major order. Find
a). number of elements in Y.
b). the address of element Y [2, 4, 3] if Base(A) = 200, w = 4.
c). the address of element Y [-1, 6, 3] if Base(A) = 200, w = 4.
- 6) Write the conditions of empty and full for simple and circular queues and compose the algorithms (or C functions) to insert and delete an element in a circular queue.


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MORADABAD INSTITUTE OF TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CLASS TEST 2

Subject: Data Structures
Subject Code: KCS301
Max Marks: 15

Semester: 3rd
SESSION: 2021-22
Time: 1HR 15 MIN

| Q. No | 1 | 2 | 3 | 4 | 5 | 6 |
|---------------|-----|-----|-----|-----|-----|-----|
| CO | CO3 | CO4 | CO5 | CO3 | CO4 | CO5 |
| Bloom's Level | K3 | K3 | K2 | K3 | K3 | K3 |

Attempt all questions

Section A

Marks

1. Explain the limitations of recursion over iteration. (2)
2. The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function $h(k) = k \bmod 10$ and linear probing. What is the resultant hash table? (2)
3. Explain: (2)
a). Strictly Binary Tree b). Complete Binary Tree


Section B

4. Construct a recursive algorithm to solve tower of Hanoi problem. Find the solution of tower of Hanoi problem for 3 disks. (3)
5. Write the recursive algorithm for mergesort. Sort the following elements using mergesort: 12,5,7,3,6,2,1. Explain the complexity of mergesort. (3)
6. The preorder and inorder traversal of binary tree is given below, construct the tree and find the postorder of the resulting binary tree: (3)

Inorder: BEGHFCAIDKJL

Preorder: ABCEFGHDIJKL


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