

COURSE CODE: 10B11CI211

MAX. MARKS: 15

COURSE NAME: DATA STRUCTURES

COURSE CREDITS: 4

MAX. TIME: 1 HR

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

1. (a) How does static allocation differ from dynamic allocation of memory?  
(b) How is a string stored in memory? Is there any difference between string and character array?  
Write a C program to copy one string to another, using pointers and without using library functions.

[1+2=3]

2. Write time and space count for (a), (b) and write the complexity of (c).

(a)  
sum = 0;  
for( i=0; i<n; i++ )  
for( j=0; j<i\*i; j++ )  
for( k=0; k<j; k++ )  
    sum++;

(b)  
sum = 0;  
for( i=1; i<n; i++ )  
for( j=1; j<i\*i; j++ )  
if( j%1 == 0 )  
for( k=0; k<j; k++ )  
    sum++;

(c)  
int fun(int n)  
{ int count = 0;  
  for (int i = 0; i < n; i++)  
    for (int j = i; j > 0; j--)  
      count = count + 1;  
  return count;}

3. Write a C program to create a linear linked list and interchange the elements to the list at position m and n and display contents of the list before and after interchanging the elements.

[3x1=3]

4. (a) Compare iteration and recursion? What does the following function do?

[3]

```
int fun(int x,int y)
{
    if(y==0) return 0;
    return(x+fun(x,y-1));
}
```

- (b) Write a recursive function (use no while loops or for loops) that prints all the elements of an array of integers, one per line. The parameters to the function should be int a[], and int size.

[1.5x2=3]

5. (a) What will be output if you will execute following code?

```
#include<stdio.h>
struct emp
{
    char *name;
    int id;
};
int main()
{
    static struct emp e1={"A",1},e2={"B",2},e3={"C",3};
    struct emp(*array[])={&e1,&e2,&e3};
    struct emp>(*ptr)[3]=&array;
    printf("%s%d",(**(*ptr+1)).name,(**(*ptr+1))->id);
    return 0;
}
```

- (b) Write a program to dynamically create a MxN matrix of integer elements using calloc() function. Read and print the matrix elements using pointer.

[1.5x2=3]