Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech.

End-Semester Examination November, 2019

Branch	**:CSE / ECE / EEE**	**Semester**	**:Autumn**
Title of the Course	**:Problem Solving and Computer Programming**	**Course Code**	**:CSB 101**

Time: 3 Hours **Maximum Marks: 50**

Note: 1. All questions are compulsory and attempt section-wise. Write proper comments while writing programs.

2. The questions in each section should be answered at one place.

3. For Section 3, give output and justify your answer with reasoning.

Section 1

Q1. Answer the following questions with **examples**. [10*1=10]

i. Give the size in bytes and Range of Character and Integer data types.

ii. Give the points of similarity and differences between while loop and do-while loop.

iii. Differentiate between Structure and Union.

iv. What do you understand by scope of a variable? Explain in detail with suitable examples.

v. What does malloc(), calloc(), free() and realloc() do?

vi. How are strings read from standard input device? Explain the different functions used to perform string input operation.

vii. How are the pointers used on 2-D arrays?

viii. Explain different modes in which a file can be opened in C program.

ix. What do you understand by the term preprocessor directive? Differentiate between #include<stdio.h> and #include "stdio.h"

x. Differentiate between compiler and interpreter.

Q2. You are given hundred numbers divided in ten sets in the following order. Draw a flowchart that will print the sum of each set.

Set 1: 1-10, Set 2: 11-20, Set 3: 21-30, …, Set 10: 91-100. [2]

Section 2

Q3. Write a C program to find smallest and largest element in 1-dimensional array also print the corresponding index/position of element. [3]

Q4. Write a C program to find out the LCM and HCF of two numbers recursively. [3]

Q5. Write a C program for multiplication of two matrices. [3]

Q6. Write a C program to send a function address as an argument to other function using pointer. [3]

Q7. Write a C program to convert a lowercase string into uppercase string. [3]

Q8. Define a structure to store the name, an array marks[] which stores marks of five different subjects and a character grade. Write a program to display the details of the student whose name is entered by the user. Also display the name of the students who have secured less than 40% of aggregate. [5]

OR

Search for a given word in the file and if exists, replace it by its reversal.

P.T.O.

Section 3

Q9. Give output of the following questions and justify your answer with reasoning. [12*1.5=18]

1.
```
#include <stdio.h>
void main()
{
        int x=(20 || 40 ) && (10);
        printf("x= %d",x);
}
```

2.
```
# include <stdio.h>
# define scanf "%s NIT DELHI "
main()
{
        printf(scanf, scanf);
        return 0;
}
```

3.
```
#include <stdio.h>
#define PRODUCT(x) (x*x*x*x)
int main()
{
int x = 2;
int result = PRODUCT(x++);
printf("%d %d", x, result);
return 0;
}
```

4.
```
#include<stdio.h>
int main(){
   char c;
   FILE *fp;
   fp=fopen("demo.txt","r");
   while((c=fgetc(fp))!=EOF)
   printf("%c",c);
   fclose(fp);
   return 0;
}
```

5.
```
#include <stdio.h>
int main()
{
        int a=10,b=20,*p,s=0;
        p = &a;
        a++;
        (*p)++;
        s = a + b + *p;
        printf("%d\n",s);
        return 0;
}
```

6.
```
#include<stdio.h>
struct test {
   int x = 0;
   char y = 'A';
};
int main()
{
  struct test t;
  printf("%d, %c", s.x, s.y);
  return 0;
}
```

7.
```
#include <stdio.h>
 int main()
{
        int x;
        x = 5 > 8 ? 10 : 1 != 2 < 5 ?
        20 : 30;
        printf("%d", x);
        return 0;
}
```

8.
```
#include<stdio.h>
void  main()
{
        static int i=5;
        if(--i){
                main();
                printf("%d ",i);
               }
}
```

9.
```
void main()

{
  FILE *fp, *ft;
  fp = fopen("a.txt", "r");
  ft = fopen("b.txt", "r");
  fclose(fp,ft);
}
```

10.
```
#include <stdio.h>
void main ()
{
    int i, j;
    int a [8] = {1, 2, 3, 4, 5, 6, 7, 8};
    for(i = 0; i < 3; i++) {
        a[i] = a[i] + 1;
        i++;
    }
    i--;
    for (j = 7; j > 4; j--) {
        int i = j/2;
        a[i] = a[i] - 1;
    }
    printf ("%d, %d", i, a[i]);
}
```

11.
```
#include <stdio.h>
int main()
{
int i = 0;
while (i < 2)
{
 if (i == 1)
    break;
 i++;
 if (i == 1)
 continue;
 printf("In while loop\n");}
 printf("After loop\n");
}
```

12.
```
#include <stdio.h>
#include <stdlib.h>
int main()
{
  int *j = (int*)malloc(4 * sizeof(int));
  *j = 15;
  free(j);
  printf("%d", *j);
  return 0;
}
```

****All the Best****