NATIONAL INSTITUTE OF TECHNOLOGY GOA

Farmagudi, Ponda, Goa, 403401
Programme Name: B.Tech.
Mid Semester Examinations, February-2020

Course Name: Computer Programming and problem solving   Course code: **CS 100**
Date: 3rd February 2021   Time: 2 PM
Duration:1 hour 30 Minutes   Max. Marks:50

ANSWER ALL QUESTIONS

Part 1: Write a program for following questions. (4 x 5 =20 Marks)

1. C program to design calculator with basic operations using switch case.
2. Write a program in C to print the pattern.

```
     1
    121
   12321
  1234321
 123454321
```

3. Write a C program to check whether a given number is palindrome or not.

4. Write a program in C to count a total number of occurrences of each element in an array.
   Input: 1 2 3 1 2 4 5 3 6 5
   Output: Total number of duplicate elements found in the array is:

1	2	3	4	5	6
2	2	2	1	2	1

5. Write a C program for swap three numbers using pointer.

Part2: Write short note on following questions. (1*10=10 Marks)

1. What is || operator and how does it function in a program?
2. What are header files and what are its uses in C programming?
3. What are reserved key words?
4. What do we mean by the "equivalence between pointers and arrays" in C?
5. What is the difference between the expression "++a" and "a++" (with example)?
6. When is a "switch" statement preferable over an "if" statement?
7. What are logical errors and how does it differ from syntax errors?
8. Describe the order of precedence with regards to operators in C.
9. What is a program flowchart and how does it help in writing a program?
10. When is the "void" keyword used in a function?

[P.T.O]

Part 3: Write down the outputs of the following C codes.(2*10=20)

1.
```c
# include <stdio.h>
int main() {   int i = 0;
  for (i=0; i<20; i++)   {
   switch(i)
   {
     case 0:
      i += 5;
     case 1:
      i += 2;
     case 5:
      i += 5;
     default:
      i += 4;
      break;     }
   printf("%d ", i);  }    return 0; }
```

2.
```c
#include <stdio.h>
int main(){
 int a = 1; int b = 1;   int c = a || --b;
 int d = a-- && --b;
printf("a = %d, b = %d, c = %d, d = %d", a, b, c, d);
 return 0;}
```

3.
```c
#include <stdio.h>
int main() {
   int i = 0, j = 0;
   while (i<5,j<10)
   {
     i++;
     j++;
   }
   printf("%d %d", i, j); }
```

4.
```c
#include "stdio.h"
int main()
{
   char a[] = { 'A', 'B', 'C', 'D' };
   char* ppp = &a[0];
   *ppp++; // Line 1
   printf("%c %c ", *++ppp, --*ppp);
}
```

5.
```c
#include<stdio.h>
int main()
{
 int a[] = {1, 2, 3, 4, 5, 6};
 int *ptr = (int*)(&a+1);
 printf("%d ", *(ptr-1) ); return 0;}
```

6.
```c
#include <stdio.h>
int main ()   {
   int sum = 0, maxsum = 0,  i,  n = 6;
   int a [] = {2, -2, -1, 3, 4, 2};
   for (i = 0; i < n; i++)   {
```

```c
      if (i == 0 || a [i]  < 0  || a [i] < a [i - 1])  {
            if (sum > maxsum)
               maxsum = sum;
            sum = (a [i] > 0) ? a [i] : 0;
       }
       else sum += a [i];    }
    if (sum > maxsum) maxsum = sum ;
    printf ("%dn", maxsum);
} }
```

7.
```c
void main(){
   Int i, j, c='A';
   for(i=5;i>=1;i--)    {
      for(j=0;j<i;j++)
         printf("%c ",(c+j));
         if(i==2)
         continue;
         printf("\n");    } }
```

8.
```c
void main(){
int cnt=1;
   do   {
      printf("%d,",cnt);
      cnt+=1;
   }while(cnt>=10);
printf("\nAfterDWloopcnt=%d",cnt);
while(cnt>=10)   {
   printf("%d,",cnt);
   cnt+=1;
}
printf("\nAfterwloopcnt=%d",cnt); }
```

9.
```c
#include <stdio.h>
int 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]);}
```

10.
```c
int main(){
int a[ ] = { 2, 3, 4,5,6};
int *p[ ] = {a, a + 1, a + 2, a + 3, a + 4};
int **ptr =  p;
++*ptr;
printf("%d  %d  %d", ptr-p,*ptr-a, **ptr);
return 0;
}
```

END