Roll No.: _____

Dr- Hemraj Saini

COURSE CODE: 18B11CI111   MAX. MARKS: 25
COURSE NAME: Programming for Problem solving
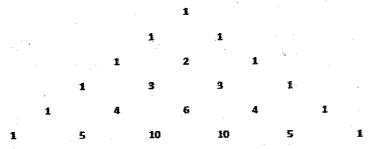COURSE CREDITS: 3   MAX. TIME: 1.5 Hrs

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

Que.1: [CO3; Marks 4] What would be the output of the following programs?

(i)
```c
#include<stdio.h>
int main()
{
 int i=1, j;
 while(i<=10){
  for(j=0; j<i; j++){
   if(j<i-1)
     continue;
   printf("%d\n", i);
  }
  if(i==5)
   break;
  i++;
 }
}
```

(ii)
```c
#include<stdio.h>
void main()
{
 int i=5;
 while(i-->=0)
   printf("%d", i);
 i=5;
 printf("\n");
 while(i-->0)
   printf("%d", i);
 printf("\n");
 while(i-->=0)
   printf("%d", i);
}
```

(iii)
```c
#include<stdio.h>
void main()
{
 int i=1, j=1;
 for( ; ; ){
  if(i>5) break;
  else j+=i;
  printf("\n%d", j);
  i+=j;
 }
}
```

(iv)
```c
#include<stdio.h>
void main()
{
 int a=-3, b=2, c=0, d;
 d=++a&&++b||c;
 printf("a=%d, b=%d, c=%d, d=%d", a, b, c, d);
}
```

Que.2: [CO4] Answer the following questions-

(A) *[Marks 2]* Write a program which maps a single character to lower case for the ASCII character set, by using conditional expression.

(B) *[Marks 2]* Write a program that converts characters like newline and tab into visible escape sequences like \n and \t as it copies the string A to B. Use a *switch* statement. For example string A = "aaaa\nbbbb\tkkkk", you do your logic and copy it to string B and when you display string B then it must print **aaaa\nbbbb\tkkkk** on the screen.   ***PTO***

(C) *[Marks 3]* Write a program to print the following Pascal's triangle using for loop in 'C' language.

```
                    1
              1           1
          1         2         1
      1         3         3         1
    1       4         6       4       1
  1     5       10      10      5       1
```

Que.3: *[CO6]* Answer the following questions-

(A) *[Marks 2]* Write a program to read a square matrix and print the diagonal elements of square matrix.

(B) *[Marks 2]* Write a program o find the second largest element from an array of integers.

(C) *[Marks 3]* Write a program to read marks of 10 students in the range of 0-100. Then make 10 groups: 0-10, 11-20, 21-30 etc. Count the number of values that falls in each group and display the results.

Que.4: *[CO7]* Answer the following questions-

(A) *[Marks 2]* Write and explain the algorithm for the insertion sort. In what situation, it will perform the best and the worst. Explain

(B) *[Marks 2]* What do you mean by time complexity of a program? Analyze the following algorithm and find out the total number of comparisons -

```
Begin
        for k=1 to (n-1) by 1 do
              set j=k
              while((a[j]<a[j-1]) and j>=0) do
                      set temp=a[j]
                      set a[j]=a[j-1]
                      set a[j-1]=temp
                      set j=j-1
              endwhile
        endfor
end
```

(C) *[Marks 3]* Write a C program to search the location of the book in the library. Detail of all the books present in the library are stored in a 2D array: "books" of size 1000 X 2 with first column containing the information of book ID and second column containing the information of book location in the library. User needs to enter the id of the book and program written will generate the output as the location of the book in the library.