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Roll No:
(To be filled in by the candidate)

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004
SEMESTER EXAMINATIONS, APRIL 2019 (PHASE I)

MCA Semester: 1

18MX13 STRUCTURED PROGRAMMING CONCEPTS

Time : 3 Hours **Maximum Marks : 100**

INSTRUCTIONS:
1. Answer **ALL** questions. Each question carries 25 Marks.
2. Subdivision (a) carries 3 marks each, subdivision (b) carries 10 marks each and subdivision (c) carries 12 marks each.

1. a) Give tips to take decisions when to use and when not use Interpreter and Compiled form of programming Languages for software development. ?
   b) Discuss the various criteria for classification of Programming Languages. Based on these criterions fit the position of Programming Language C in the classification chart. Mention when to use and when not use C Language for software development.
   c) Discuss the various properties of good programming language with respect to programmer and language developer perspective. Enumerate reasons for the popularity of a programming language. Give simple illustrations in C for above said points
2. a) Distinguish Iteration from Recursion with an example.
   b) Compare and contrast the following programming language constructs:
      i. Expressions and Statements (5)
      ii. Else – If statements and Switch statements (5)
   c) i) A number is Armstrong number if the sum of its digits raised to the third power is equal to the number itself. For example, 371 is an Armstrong number, since $3^3 + 7^3 + 1^3 = 371$. In the following program user is supposed to enter a limit and the program prints all the Armstrong numbers from 1 to the user specified limit. Complete the program.

```
#include <stdio.h>
int main()
{ int number=1, originalNumber, indicator, result = 0, limit;
printf("Enter the limit: "); /* Read the limit from the user*/
scanf("%d", &limit);
while(_____)
{   /* Loop for updating the result */ originalNumber = number; result = 0;
while (_____)
    {  indicator = _____;
       result +=_____;
      originalNumber = _____;
   }
     if(_____)
          printf("%d is an Armstrong number.",number);
  _____;
}
return 0;
}
```

(OR)

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ii) Write a C program that accepts an array A of n integers and your program rearrange the elements of A such that it satisfy the following inequalities

A[0] < A[1] < · · · < A[m − 1] < A[m] > A[m + 1] > A[m + 2] > · · · > A[n − 1] for some (unknown) index m in the valid range. Let us call such an array a *hill-valued* array. The sequence A[0],A[1], . . . ,A[m−1],A[m] is called the ascending part of the hill, and the remaining part A[m],A[m+1], . . . ,A[n −1] is called the descending part of the hill. The element A[m] is the peak of the hill and is the largest element in the array

3. a) What are the outputs of this code?

```
struct _st {
  int x,y;
  struct _st *lnk1,*lnk2;
  }  a,b,c, *p;

   a.x=b.y=10;    a.y=b.x=15;
   c.x=a.x+b.x;   c.y=a.x+b.y;
   a.lnk1=&b; b.lnk1=&c; a.lnk2=&c; b.lnk2=&a;
   c.lnk1=c.lnk2=NULL;   p=&b;
   printf("val1=%d  val2=%d \n",p->lnk1->x,p->lnk2->y);
   printf("val3=%d val4=%d \n",p->lnk2->lnk1->x, p->lnk2->lnk1->y);
```

b) i) Give the uses of Name Spaces, Volatile and Const keyword [3]

ii) Find the output and describe the output generated by the following program [7]

```
# include <stdio.h>
int  funct1 (int );
int  funct2(int);
main() {
        int a=0,b=1,count;
          for ( count =1; count < = 5 ; ++count)
            {    b+=funct1(a++) + funct2(a++);
                 printf("%d",b++);
            }
        }
int  funct1( int a)
  {   static  int b;
          b= funct2(a++);
         return b++;
   }
int  funct2(int a)
 {static int b= 1;
         b+=1;
         return(b++  +  a++);
}
```

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c) i) Discuss the following aspects of structured programming with illustrations from C and compare the various alternatives

1) Call by Value and Call by Reference [4]

2) Storage Classes [5]

3) Parameters, place and role of main ( ) function. [3]

(OR)

ii) You are given two integer arrays. The first one is a set of integers. The second array, we call it Order array, is an array which directs the rearrangement by specifying the required position of each element in given array. You should sort the elements of integer array in ascending order by sorting the order array without using any additional arrays. You should write a c program to sort the number array by rearranging the values of order array but without using another array using dynamic array and pointer arithmetic operations..

An example is as follows: (Subscript starts with 0)

number array:	46	80	10	8	7	2	11	16	17	43
order array:	0	1	2	3	4	5	6	7	8	9
Output Order array :	5	4	3	2	6	7	8	9	0	1

4. a) What is the role of Scripting languages in Web Client and Server side applications development?

b) Compare and Contrast System programming Languages and Script languages in details.

c) Explain the following features of C language with real-life applications.

i) Low level programming features in C.

ii) Creation and uses of Static and Dynamic libraries in an application Programming

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