No of Pages : 2 Course Code : 20MX12

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

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, MARCH 2022

MCA Semester: 1

20MX12 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
3. Course Outcome : Table

Qn.1	CO1.	Qn.2	CO2.	Qn.3	CO3.	Qn.4	CO4.

1. a) Give tips to take decisions when to use and when not use Interpreter based and Compiler based 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 [6]

      ii. Else – If statements and Switch statements [4]

   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]

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 $A[0] < A[1] < \cdots < A[m-1] < A[m] > A[m+1] > A[m+2] > \cdots > A[n-1]$ 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

d)

a) Given an array, the reverse Array function tries to reverse it using pointers. Fill it up the blanks in the below code to achieve the functionality.

Example:

Input Array is {-1, 5, -8, -4, 5, 3} and 0utput is {3, 5, -4, -8, 5, -1}

```
#include <stdio.h>
// Function to swap two memory contents
void swap(int* a, int* b)
{ int temp = *a; *a = *b;*b= temp;}

void reverseArray(int array[], int array_size)
{
// leftPointer pointing at the beginning of the array
 int *leftPointer =       (1) ;
// rightPointer pointing at end of the array
int *rightPointer =     (2) ;
while (            (3)          )
{
swap(leftPointer, rightPointer);
        (4)          ;
        (5)          ;
}
}
```

b)

i Compare and contrast Void Pointer and NULL Pointer with an example. [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++);
}
```

C).

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

i. Call by Value and Call by Reference [4]

ii. Storage Classes [5]

iii. Functions and Macros . [3]

[OR]

ii. Write a C program to sort two dimensional array of strings using pointers and dynamic memory. Identify the possible test cases for testing the program.

```
Input:
"AAAAAAA"    "ZZZ"     "YYY"
"KKKK"        "OOOO"    "PPP"
"GGG"         "HH"      "I"


Output
"AAAAAAAA"    "GGG"     "HH"
"I"           "KKKK"    "OOOO"
"PPP"         "YYY"     "ZZZ"
```

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) i. Explain the features of C language suitable for System programming and C's relevancy in current programming world. [6]

ii. Discuss the role of Markup languages for Web programming. [6]

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