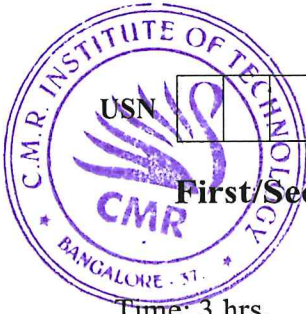15PCD13/23

USN

First/Second Semester B.E. Degree Examination, July/August 2022
Programming in C and Data Structures

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define data type. Discuss various data types supported in C language with suitable example.
   (05 Marks)
   b. Define input-output functions. Discuss types of input-output functions in C. **(06 Marks)**
   c. What is an algorithm? Write an algorithm to find whether a given number is palindrome or not. **(05 Marks)**

OR

2 a. Explain the following operators with suitable examples:
   (i)   Unary operator
   (ii) Compound assignment operator
   (iii) Ternary operator **(06 Marks)**
   b. Evaluate the following expressions:
   (i) int p = 5, q = 6, r = 7, s = 8, t;
        t = ((((p + q)/2) − 3) * s) + p * s;
   (ii) int p = 5, q = 6, r = 7, s = 8, t;
        t = p + q < q + r && r/p = = s * p || q | p > r ; **(04 Marks)**
   c. What is a token? What are the different types of tokens available in C language? **(06 Marks)**

Module-2

3 a. Explain with the syntax for-statement. Write a C program to find the sum of first N natural numbers (1 + 2 + 3 + ……n) **(06 Marks)**
   b. Explain the syntax of if, if-else and nested if-else with suitable examples. **(06 Marks)**
   c. What are unconditional branch statement? Explain. **(04 Marks)**

OR

4 a. What are the difference between while and do-while statement? **(04 Marks)**
   b. Write an algorithm and C program to compute sin(x) using Taylor series approximation given by $\sin(x) = x - \left(\dfrac{x^3}{3!}\right) + \left(\dfrac{x^5}{5!}\right) - \left(\dfrac{x^7}{7!}\right) + \dots$ Draw the corresponding flow chart.

   (12 Marks)

Module-3

5 a. Define an Array. What are the rules to be followed while using arrays? **(04 Marks)**
   b. Develop a C program to multiply two given matrices A, B and store the result in C.

   (09 Marks)

    c. Which of these following statements are legal? If legal explain why:

       char name[50];

       int number = 6;

      (i)   gets(name);

      (ii)   puts (number, name);

      (iii) gets (number);

      (iv) puts (name);

      (v)   puts (number, "VTU");

      (vi) gets ("%s", name);   **(03 Marks)**

OR

6 a. What are string variable? How are string variable declared?   **(04 Marks)**

    b. What are the different ways of passing parameters to the function? Explain with example.

                                                            (06 Marks)

    c. Write a C program to copy one string to another without using build-in function (strcpy).

                                                            (06 Marks)

Module-4

7 a. What is type definition? What are user-defined datatypes?   **(05 Marks)**

    b. What is a structure? What are the various methods of passing structure to function? Explain.

                                                            (07 Marks)

    c. Explain Array of Structure with example.   **(04 Marks)**

OR

8 a. What is a file? What are the various mode in which a file can be opened/created? **(04 Marks)**

    b. Write a C program to copy one file to another file using fgetc( ) and fputc( ) function.

                                                            (04 Marks)

    c. What are command line arguments? Explain with example.   **(04 Marks)**

    d. Explain any two file handling functions with suitable example.   **(04 Marks)**

Module-5

9 a. What is preprocessor? Explain any three preprocessor directives.   **(05 Marks)**

    b. Write a program using Pointers to compute sum, mean and standard deviation of all elements stored in an array of "n" real numbers.   **(07 Marks)**

    c. Find the values stored in the variables a, b and c at the end of the program.

```
void main ( )
{
    int  a, b, c,   *x, *y;
    a = 20;
    b = 25;
    c = 30;
    x = &a;
    y = &c;
    *y = *x + b – 5;
    b = b – (*x);
    *x = *y – c;
}
```

                                                                               (04 Marks)

OR

10 a. What is a pointer? Distinguish between call by value and call by reference. **(04 Marks)**

     b. What is a stack? What are the various operations that can be performed on stack? **(06 Marks)**

     c. Define binary tree? What are the different ways of traversing the tree?   **(06 Marks)**

* * * * *