M.Sc. (MATHEMATICS WITH APPLICATIONS IN COMPUTER SCIENCE)
M.Sc. (MACS)

⎕⎕8⤳5   **Term-End Examination**
December, 2019

MMT-001 : PROGRAMMING AND DATA STRUCTURES

Time : 1½ hours   *Maximum Marks : 25*

(Weightage : 20%)

*Note : Question no. 1 is **compulsory**. Answer any **three** questions from questions no. 2 to 5. All programs should be written in 'C' language only. Use of calculators is **not** permitted.*

1. Write the output of the following pieces of code in 'C'. Justify your answer with short explanations.   *10*

   (a)   **main**()
   ```
   {
       int x = 10, y = 20, z = 5, i;
       i = x < y < z;
       printf("ln %d", i);
   }
   ```

   (b)   **main**()
   ```
   {
       int i = - 3, j = 2, k = 0, m;
       m = ++i && ++j || ++k;
       printf("ln %d %d %d %d", i, j, k, m);
   }
   ```

(c) **main**()
{
    float a = 0·7;
    if (a <= 0·7)
{
    printf("C");
}
    else
{
    printf("C++"); }
}

(d) **#define** Max(a, b) (a > b ? a : b)
    main()
{
    int x;
    x = Max(3 + 2, 2 + 7);
    printf("%d", x);
}

(e) **main**()
{
    int a = 10, *j;
    void *k;
    j = k = &a;
    j++; k++;
    printf("ln %u %u", j, k);
}

2. (a) Assume the following structure for every node of a queue, and write a function to insert a node to the queue : *3*

const max = 100;

type def struct q_type

{

int queue [m a x];

int front, rear;

}

Qtype;

(b) Write a macro to find the biggest of three given integers. *2*

3. (a) Write a recursive function to print the Fibonacci series. *2*

(b) When is the indexed sequential, file organization used ? What are the two approaches used in indexing in this file organization ? *3*

4. (a) Explain "call by value" and "call by reference" with an example of each. *2*

(b) How does a Binary tree differ from a Binary search tree ? Illustrate the differences also through an example. *3*

5. (a) Define a structure called 'student' to store the name, age and roll number of a student. *2*

(b) Write printf statements in C language for printing the number 573·429, using

   (i) 8 places, right justified;

   (ii) 8 places, left justified up to two decimal digits; and

   (iii) scientific notation. *3*

———