

**M. SC. (MATHEMATICS WITH
APPLICATIONS IN COMPUTER
SCIENCE) [M. Sc. (MACS)]**

Term-End Examination

June, 2025

**MMT-001 : PROGRAMMING AND DATA
STRUCTURE**

Time : 1½ Hours

Maximum Marks : 25

Note : *Question No. 1 is compulsory. Answer any **three** questions from Q. Nos. 2 to 5. All programs should be written in C language. Use of calculators is not allowed.*

1. Write the output of the following C codes. Justify your answers with short explanations : 10

(i) void main()

```
{  int x = 1, y = 1;
    y ++ - x --;
    -- x ++ + y;
    printf ("%d", x ++ + y);
}
```

(ii) void main()

```
{  int n = 123, x = 0;
    while (n > 0)
    {   x += n% 10;
        n /= 10;
    }
    printf ("%d", x);
}
```

(iii) void main()

```
{  int i = 10, k = 0, j;
    for (j = 1; j != 10; j = k - i)
    {   k = j ? i : k + i;
        printf ("% d\n", k);
    }
}
```

(iv) void main()

```
{  int a[5] = {1, 3, 5, 7, 9};  
  
    int i, sum = 0;  
  
    for (i = 0; i < 5; i++)  
  
        sum += a[i] * a[4 - i];  
  
    }  printf ("%d", sum);
```

(v) void fun (int *x, int *y)

```
{  *x = *x - *y;  
  
    *y = *x + *y;  
  
    *x = *y - *x;  
  
}
```

void main()

```
{  int x = 1, y = 2;  
  
    fun (&x, &y);  
  
    printf ("%d, %d", x, y);  
  
}
```

2. (a) Write a program in C language for the addition of two matrices. 3
- (b) Explain the terms 'call by value' and 'call by reference' with examples. 2
3. (a) Write any *two* advantages and any *two* disadvantages of pointers in 'C'. 2
- (b) Explain the concept of recursion in programming with the help of an example. 3
4. (a) List any *two* advantages or disadvantages of a circular queue over a linear queue. 2
- (b) Explain the use of the functions `fscanf( )` and `fprintf( )`, with a short program. 3

5. (a) Draw the binary tree whose inorder and preorder traversals are as follows : 3

Inorder : E A C K F H D B G

Preorder : F A E K C D H G B

- (b) Explain the difference between a 'structure' and a 'union'. 2

x x x x x