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MMT–001

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.*

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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

× × × × ×