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MMT-001

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

Term-End Examination

June, 2026

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

Time : 1½ Hours

Maximum Marks : 25

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

1. Write the output of the following segments of code in C. Justify your answers with short explanations. 5×2=10

(i) void main()

```
{ int a = 1, b = 0, c = 2;
    printf ("%d", a && b + c);
}
```

(ii) void main ()

```
{ int i = 7, j = 8;
    printf ("%d", i+++++j);
}
```

(iii) void main ()

```
{ char x[ ] = "PROGRAM";
    int i ;
    for (i = 0; x[i]; ++i)
        if (x[i] == * (x + i))
            printf ("%c", x[i]);
        else
            printf ("%c", x[6 - i]);
}
```

(iv) # define min (a, b) (a < b ? a : b)

```
void main ( )  
{   int x;  
    x = min (1 + 4, 2 + 1)  
    printf ("%d", x);  
}
```

(v) void main ()

```
{   int a = 10;  
    {   int a = 20;  
        printf ("%d\n", a);  
    }  
    printf ("%d", a);  
}
```

2. (a) The value of the nodes of a binary search tree for inorder and preorder traversals, respectively, are given below :

5, 6, 8, 11, 12, 18, 43

11, 6, 5, 8, 18, 12, 43

Construct the binary search tree. 3

- (b) Write a recursive function to compute the factorial of a number. 2
3. (a) Evaluate the following postfix expression : 2
- 6, 5, 7, +, 3, 2, *, /, -
- (b) Define a node for a doubly linked list of integers using pointer implementation. Also write a function that prints the n^{th} node of this list. 3
4. (a) Explain the difference between break and continue statements, using examples. 2
- (b) Convert the following nested do-while loop into a nested for loop : 3
- ```
i = 0;
do
{ i = i + 1;
 j = i;
 do
 { if ((i + j) % 2 == 0)
 printf ("%d", i + j);
 else printf ("%d", i - j);
 j = j + 1;
 } while (j <= 5);
} while (i <= 5);
```

5. (a) Explain the difference between call-by-value and call-by-reference, with an example for each. 3
- (b) What do you understand by a queue ? Describe the operations that can be performed on a queue. 2

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