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**MMT-001**

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

**Term-End Examination**

**December, 2025**

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

*Time : 1½ Hours*

*Maximum Marks : 25*

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***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 calculator is not allowed.*

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1. Write the output of the following segments of codes. Justify your answers with short explanations : 2×5=10

(a) `int main()`

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

(b) `int main()`

```
{ int a = 4603, b = 0;
  while (a)
  { b = b + a%10;
    a = a/10;
  }
  printf {"%d", b);
  return 0;
}
```

```
(c) int some_fun (int n)
    { if (n > 0)
      if (n%2 == 0)
        return (n + some_fun (n - 2));
      else
        return (n - 1 + some_fun (n - 2));
      else
        return 0;
    }

void main()
{
  printf("%d", some_fun(10)_some_fun (9));
}

(d) main()
{  char a;
   for (a = 'A'; a <= 'Z'; ++ a)
     printf ("%d, ", a);
}
```

(e) main()

```
{    int a = 5, b = 7;

    int *p, *q;

    p = &a;

    q = &b;

    a = a + b;

    b = a - b;

    a = a - b;

    printf ("%d, %d", *p, *q);

}
```

2. (a) In what ways does the control string in the printf( ) function differ by the control string in the scanf( ) function ?

Explain.

2

- (b) Write a C function that implements the following function : 3

$$f(x) = \begin{cases} x & , 0 \leq x < 1 \\ x^2 - 1, & 1 \leq x < 2 \\ \frac{1}{x} & , 2 \leq x \leq 4 \end{cases}$$

3. (a) Write a C function that takes two array arguments  $x$  and  $w$  as input,  $x$  contains a list of integers and  $w$  contains the corresponding weights ranging from 0 to 1. The function returns the weighted average of the list of integers. The function must flag an error message if any of the weights does not lie in the range  $[0, 1]$ , or if the sum of all the weights exceeds 1. 3

- (b) Give syntax for declaring one-dimensional and two-dimensional array. Write function for traversing one-dimensional array. 2
4. (a) Describe the use of any *two* functions from the library `string.h`. 3
- (b) Give the structure of a singly linked list. Write function for traversal of a singly linked list. 2
5. (a) What is meant by dynamic memory allocation ? Explain the relevant functions used with examples. 3
- (b) Differentiate between Stack and Queue. 2

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