

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

M.Sc. (MACS)

Term-End Examination

December, 2015

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

Time : $1\frac{1}{2}$ 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. Use of calculator is **not** allowed.*

1. Write the output of the following fragments of code. Justify your answers with short explanations. $5 \times 2 = 10$

(a) `int x, y;`

`x = a;`

`y = x++;`

`printf("%d", x);`

(b) `int x, y;`

`x = 10;`

`y = ++x;`

`printf("%d", x);`

(c) `int z, x, y;`

`scanf("%d%d", &x, &y);`

`z = x;`

`x = y;`

`y = z;`

`z = 5;`

`printf("%d", z);`

(d) `#define ADD(a, b) a+b`

`int main( )`

`{ int x;`

`x = 3/ADD(1, 2);`

`printf("x = %d", x);`

`return 0;`

`}`

```

(e)  #include <stdio.h>

      int main( )

      {  int x[5] = {4, 7, 9, 3, 5};

         printf("%d", *(x+3));

         return 0;

      }

```

2. (a) Write the syntax for declaration of a Structure in 'C'. List the differences between Structure and Union in 'C'. 3
- (b) Explain the relationship between Arrays and Pointers in 'C'. 2
3. (a) Convert the following postfix expression to infix expression : 3

8, 9, 8, -, 10, 5, -, /, +
- (b) Explain the operations on a Stack. 2
4. (a) What is a Sparse Matrix ? What are its disadvantages ? How do you overcome them ? 3
- (b) Explain the differences between a Tree and a Binary Tree. 2

5. (a) Write a C function which takes a positive integer as its argument and returns 1, if the argument is a perfect square and 0, otherwise. 2
- (b) Write a program in 'C' to create a Singly Linked List of integers. 3
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