

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

M.Sc. (MACS)

Term-End Examination

December, 2016

**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 only. Use of calculator is not permitted.

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

(a)

```
int a, b;
for (a = 5; a > 0; a --) {
    for (b = a - 1; b > 0; b --)
        printf("%d", b);
}
printf("\n");
```

(b)

```
int n = 9999, s = 0;
while (n > 0) {
    s+ = n %10;
    n/ = 10;
}
printf("%d\n", s);
```

```
(c) int a[5] = {1, 2, 3, 4, 5}, *P, x;
    P = a;
    printf ("%d\n", *P + 4);
    x = (*P > 1) ? 1 : 0;
    printf ("%d\n", x);
```

```
(d) f() {
        static int a = 1;
        a = a - 1;
        printf ("x = %d\n", a);
    }
int main() {
    int i;
    for (i = 1; i < 4; i++)
        f();
    return 0;
}
```

```
(e) int x = 9, y, z;
    y = x++; z = y; y = --y;
    printf ("%d, %d, %d", x, y, z);
```

2. (a) Write any two differences between a Macro and a Function in 'C' language. 2
- (b) Write a 'C' program that finds the maximum of a list of integers. 3

3. (a) What is 'Call by value' and 'Call by reference'? Explain with an example. 3
- (b) Evaluate the following expression which is in RPN, clearly showing all the stages : 2
- 2, 3, +, 4, %, 2, 2, 3, +, *, +
4. Write the functions for the following stack operations in a stack holding character data. (Assume that the stack is implemented using linked list): 5
- creation
 - push
 - pop
 - isempty
5. Explain each of the following with an example :
- (a) calloc() function in 'C' language 2
- (b) Node structure in a doubly linked list with integer data 1
- (c) Any one string function in 'C' language with their prototypes 2
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