

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

01151 M.Sc. (MACS)
Term-End Examination
June, 2019

**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 segments of code. Justify your answers with short explanations. 5×2=10

(a) main()

```
{  
    printf("%x", -1 << 4);  
}
```

(Assume that logical shift will be performed)

(b) main()

```
{  
    int i = 10;  
    i = ! i > 14;  
    printf("i = %d", i);  
}
```

```
(c) #include <stdio.h>
main()
{
    int x = 7, y = 8;
    printf("%d", x ++ - ++y);
    return 0;
}
```

```
(d) #include <stdio.h>
main()
{
    int i;
    for (i = 0, i <= 5, i++);
    printf("%d", i);
}
```

```
(e) S()
{
    static int x = 0;
    x += 1;
    printf("x = %d\n", x);
}
main()
{
    int i;
    for (i = 1; i < 5; i++)
        S();
    return (0);
}
```

2. (a) Convert the following expression from infix to postfix :
$$5 * 2 + 3 - 2/4$$
 2
- (b) Write a program to check whether a number is prime or not. 3
3. (a) Write a recursive function for finding n! for a non-negative integer n. 2
- (b) Explain typedef and enum data types with one example each. 3
4. (a) Explain the function calloc with an example. 2
- (b) Write a function to check whether one string is a substring of another string or not. 3
5. (a) Write function to perform the following tasks on a singly linked list : 3
- (i) Traversal of link list
- (ii) Delete a node from link list
- (b) Write an expression using the tertiary if-then-else operator that returns the maximum of three numbers. 2
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