

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

00861

**M.Sc. (MACS)**

**Term-End Examination**

**June, 2014**

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

*Time :  $1\frac{1}{2}$  hours*

*Maximum Marks : 25*

*(Weightage : 20%)*

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**Note :** *Question 1 is compulsory. Answer any three questions from question 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 pieces of code.  
Justify your answers with short explanations.

$2 \times 5 = 10$

(a) `int i = 10, j = 5, s;  
if(i++ <= j + 5)  
s = i + j;  
else s = i / j;  
printf("s = %d", s);`

(b) **int** marks[]={49,53,67,78,69};

**int** i, temp;

**for**(i = 0; i < 4; i++)

**if**(marks[i] > marks[i+1])

        { temp = marks[i];

          marks[i] = marks[i+1];

          marks[i+1] = temp;

        }

printf("%d", temp);

(c) **struct** Nature

    { **char** Level[15];

**char** Mode\_of\_Delivery[15];

    };

**struct** IGNOU\_Programmes

    { **struct** Nature pNature;

**int** No\_of\_Study\_Centers;

**long int** No\_of\_Students;

    } MSc\_MACS = {"PG", "Distance", 8};

puts(MSc\_MACS.pNature.Level);

printf("No. of Students %d",

        MSc\_MACS.No\_of\_Students);

```
(d)  int i = 0;
      switch(i)
      { case 0: printf("%d+", ++i);
        case 1: printf("%d+", i--);
        case 2: printf("%d+...", ++i);
          break;
        default : printf("and so on...");
      }
```

```
(e)  char A[3][3]={{'A', 'B', 'C'},
                  {'D', 'E', 'F'},{'G', 'H', 'I'}};

      char*j = A;
      printf("%c", *(j+4));
```

2. (a) Explain **while** and **do-while** statements in 'C' language with an example for each. 2
- (b) Write a function which takes a 5×5 square matrix of real entries and returns its trace. 3
3. (a) Is there any error(s) in the following program ? If there is no error, what will be the output ? Justify your answer. 2

```
#include <stdio.h>
```

```
void main()
```

```
{ printf("There is /*some*/ error."); }
```

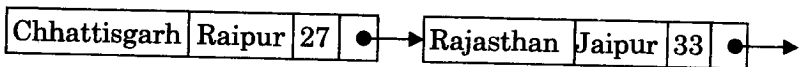
- (b) Declare a structure called "**comp**" that stores a complex number. Declare a variable of type "**comp**". Also, write a function that takes a comp variable as a parameter and returns its modulus. 3

4. (a) State any two advantages/disadvantages of circular queue over the linear queue. 2

(b) Write a 'C' program to evaluate the following function : 3

$$f(x) = \begin{cases} x + 1, & \text{if } x < 5 \\ x + 2, & \text{if } 5 \leq x \leq 10 \\ 0, & \text{otherwise.} \end{cases}$$

5. Assume that a singly linked list stores state names, their capitals and the no. of districts arranged in the ascending order of state names. For example,



Declare a node for this list. Also write a function called **initialize()** which initializes the list with the data "Chhattisgarh", "Raipur" and 27. 5