No. of Printed Pages : 3

MMT-001

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

M.Sc. (MACS)

00135

Term-End Examination

June, 2018

MMT-001 : PROGRAMMING AND DATA STRUCTURES

Time : 1 $\frac{1}{2}$ hours *Maximum Marks : 25*

(Weightage : 20%)

Note : *Question no. **5** is **compulsory**. Answer any **three** questions from questions no. **1** to **4**. All programs should be written in 'C' language. Use of calculators is **not** permitted.*

1. (a) Evaluate the following expression, which is in RPN, clearly showing all the stages : 2

5, 3, 6, +, 4, 5, –, *, +

(b) Write a function which takes a 5 × 5 square matrix of real entries and returns its trace. 3

2. (a) Declare a data structure called 'Triangle' having three members a, b and c of type *unsigned int*. Write a function that checks whether the three members of the structure are the sides of a triangle or not. 3

(b) Write the properties of 'Auto' and 'Static' variables, with at least one example. 2

3. (a) Write a function in 'C' to compute the sum of the first 'n' terms of sin (x) series. *3*

(b) Write the syntax of 'Switch()' statement and explain with an example. *2*

4. (a) Assume that a queue is defined as follows :

```
const max = 100;
typedef struct V_type {
    element type queue [max];
    float front, rear;
}Q type;
```

Write a function to insert a new element to the queue. *3*

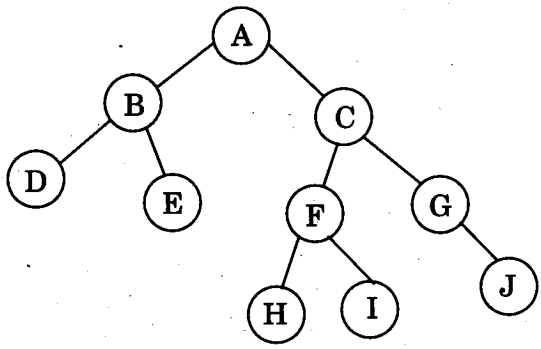
(b) Differentiate between a 'function' and a 'macro'. *2*

5. Find the output of the following. Justify your answer. *5×2=10*

(a)

```
main() {
    int x = 100; y = 200;
    exchange (&x, &y);
    printf("x = %d y = %d\n", x, y);
}
exchange (int *a, int *b)
{
    int t;
    t = *a; *a = *b; *b = t; }
```

(b) The 'post order' traversal of the following Binary Tree :



(c)
```
main() {
    int a = 0; n = 1857;
    while (n > 0) {a = a*10 + n%10;
    n /= 10; }
    printf("% d\n", a);
}
```

(d)
```
main() {
  int a[5] = {2, 3};
  printf ("\n%d", %d, %d", a[2], a[3], a[4]);
}
```

(e)
```
# include < stdio.h>
int main() {
    int X[5] = {4, 7, 9, 3, 5};
    printf("%d", * (X + 3));
    return 0;
}
```