MMT-001

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

00408

Term-End Examination

June, 2015

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 calculator is **not** allowed.*

1. (a)   Write a 'C' function that implements the strcpy ( ) function of C library.   2

    (b)   Define a node for a doubly linked list of integers using pointer implementation. Also write a function that prints the nth node of this list.   3

2. (a) Write the following operators in the descending order of their precedence :

$$+ \quad <= \quad ! \quad += \quad \%$$

Also, for each of the above operators specify whether it is left associative or right associative. *2*

(b) Construct a binary search tree for

5, 7, 4, 10, 3, 9, 15, 25, 2

and delete node 10. *3*

3. (a) What are the values of the following expressions ?

(i) 3/5

(ii) 3/(float)5

(iii) 3/5.0

(iv) (int) (3/5.0)

Justify your answer. *2*

(b) Write a 'C' program to check how many terms of the series given must be summed before the total exceeds 30000.

$$1^2 + 2^2 + 3^2 + ... \, n^2.$$ *3*

4. Explain in brief the following :

(a) **extern** declaration *1*

(b) Bitwise AND operator *1*

(c) Lvalue and Rvalue *1*

(d) **break** and **continue** *2*

5. Write the output of the following pieces of code in 'C' language. Justify your answer.   *5×2=10*

(a)   main()
       { int x=2;
         int y;
         y=x>0 ? 1 : (x =0 ? 0 :–1);
         printf("%d",y);
         x=–2;
         y=x>0?1 : (x =0 ? 0 :–1);
         printf("\n%d",y);
       }

(b)   int func(int n)
       { if (n>0)
         return n+func(n–2);
         else
         return 0;
       }
       main()
       { int n=10;
         printf("%d", func(n));
       }

(c)   main()
       { int x=0;
         for(x=1;x<4;x++);
         printf("x=%d", x);
       }

(d)　main()
```
{ int a=10, b=20;
  swap(a, b);  printf("\n");
  printf("a=%d, b=%d", a, b);
}
void swap(int x, int y)
{ int temp;
  temp=x; x=y;  y=temp;
  printf("\n x=%d, y=%d", x, y);
}
```

(e)　main()
```
{ int x=3;
  if(x>11)  printf("Delhi");
     else if (x>22) printf("Mumbai");
           else if (x>33) printf("Chennai");
               else printf("Kolkata");
}
```