No. of Printed Pages : 4

MMT-001

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

00310

M.Sc. (MACS)

Term-End Examination

June, 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** allowed.*

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1. Write the output of the following segments of code. Justify your answers with short explanations. *5×2=10*

(a)

```
int main( )
{  int n = 123, x = 0;
   while (n > 0)
      {  x + = n%10;
         n / = 10;
      }
   printf ("%d", x);
}
```

(b)
```
int main( )
{  int a = 2, b = 3;
   printf ("%d+%d = %d", a, b, a+b);
   return 0;
}
```

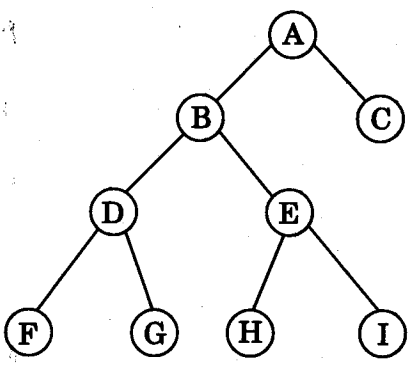
(c)
```
int main( )
{  int i = 10;
   {  int i = 20;
      printf ("%d\n", i);
   }
   printf ("%d", i);
   return 0;
}
```

(d)
```
int main( )
{  int i, j;
   for(i = 0; i < = 4; i++)
   {  for (j = 0; j < = i; j++)
         printf ("%d", j);
      printf ("\n");
   }
   return 0;
   }
```

(e)
```
int main( )
{  int x = 1, y = 2;
   printf ("%d", x+++y);
   return 0;
}
```

2. (a) Write a program in 'C' to compute the factorial of the input integer using recursion. *3*

(b) Write preorder traversal of the following binary tree : *2*



3. (a) Write any two differences between a function and a macro. *2*

(b) Write a function in 'C' to check whether the input string consists of at least one vowel in lower case. *3*

4. (a) Explain the operations that can be performed on a Queue. *2*

(b) Evaluate the following postfix expression : *3*

6, 5, 7, +, 1, 9, *, /, –

5. (a) Write the syntax for defining a node of a Doubly Linked List containing floating point data. Also write a function create_node( ) which creates a new node and returns the pointer to it. *3*

(b) Define the term 'Binary Search Tree'. List the operations that can be performed on a Binary Search Tree. *2*