M.Sc. (MATHEMATICS WITH APPLICATIONS IN COMPUTER SCIENCE)
M.Sc. (MACS)
Term-End Examination
June, 2021

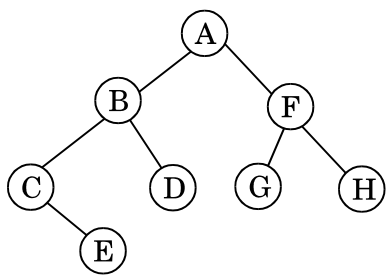
MMT-001 : PROGRAMMING AND DATA STRUCTURES

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 only. Use of calculators is* ***not*** *permitted.*

1. (a) Write Inorder, Preorder and Postorder traversal of the Binary Tree given below : *3*



(b) Write a program in 'C' to explain the use of the following STRING functions : *2*

(i) strcmp()

(ii) strcat()

2. (a) What is the difference between Binary Tree and Binary Search Tree ? Construct a Binary Search Tree with keys

5, 7, 3, 10, 19, 4, 6. *2*

(b) Write a macro in C language to find the greatest of three given numbers. *3*

3. Write a program for implementation of a 'Singly Linked List'. The implementation should include Creation, Insertion and Display operations. *5*

4. (a) Write a function to find the Greatest Common Divisor (GCD) of two integers. *3*

(b) Explain the push, pop and top operations of a stack. *2*

5. Find the output of the following; justify your answers : *5×2=10*

(a)

```
#include <stdio.h>
#define N 5
int main()
{   int i, j, k;
    for (i=1; i<=N; i++)
    {   for (k = N; k > = i; k – –)
        {   printf (" ");
            for (j = 1; j < = i; j ++)
            {   printf ("%d", j);
                printf ("\n"); }
        }
    }
return 0;
}
```

(b)
```
main()
{   char s[10];
    int i;
    for (i = 0; i<10; i++)
      {  s[i] = i + 65; }
      for (i=0; i<10; i++)
      { printf ("%c", s[i]); }
}
```

(c)
```
main()
{  int x;
   x = 0;
   for ( ;  ; )
   {  if (x>=10) break;
      else
      printf ("%d\n", x++);
   }
   printf ("Thats all friends\n");
}
```

(d)
```
main()
{ int i;
  for (i = 1; i < 6; i++)
  { if (i = = 3)
        continue;
    printf ("%d", i);
  }
}
```

(e)
```
main()
{  char *string;
   char letter;
   letter = 'a';
   string = "test of time";
   printf ("%c%s", letter, string);
}
```