Computer Science & Engineering Department
Indian Institute of Technology Kharagpur

CS10001 Programming and Data Structures
Class Test I

Duration: 1 hrs **Total Marks: 20**

Name:
Roll No:
Section:

Question 1 (5)	2 (2)	3 (2)	4 (3)	5 (3)	6 (5)	Total (20)

1. For questions 1.1 to 1.5 assume that variables *a* and *b* have data type *int* and variable *c* and *d* have data type *float*. Also, *a = 9*, *b = 8*, *c = 16.0*, and *d = 6.0*. For each question write the value assigned to the variable *z*. Data type of *z* is *float*. **[5 X 1]**

1.1. `z = a + c / 4 * d / 3 + b;` **25.0**

1.2. `z = c + a / 4 * b / 3 + d ;` **27.0**

1.3. `z = (int) c / a * b / 3 ;` **2.0**

1.4. `z = a / b * b % 5 % 3 ;` **0**

1.5. `z = ( a >= c ) ? a : c ;` **16.0**

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2. Write the output of the following program in the box below **[2]**

```
int main() {
     char x = 'w';
     switch(x)
     {
          case 'a': printf("Append");
                    break;
          case 'w': printf("Write");
          case 'r': printf("Read");
                    break;
          default : printf("Open");
                    break;
     }
     return 0;
}
```

WriteRead

3. Write the output of the following program in the box below. **[2]**

```
int main() {
     int a = 5 ;
     b = f ( a ) ;
     printf ( “%d %d “, a, b );
     return 0;
}

int f ( int a ) {
     a++ ;
     printf (“%d “, a);
     return a ;
}
```

6 5 6

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4. The following program should print the sum of the series

$1 + x^2/2! + x^4/4! + \ldots + x^{2N}/2N!$

Fill in the blanks in the program. **[3]**

```
int main() {
   int i, N ;
   float x, S, term;

   S    =  0          ;

   term =  1          ;

   printf ( "Enter N and x" ) ;
   scanf("%d %f", &N, &x);

   for ( i = 1 ; i <= N+1 ; i++ ) {
        S =  S + term;

        term =  term*x*x/(2*i* (2*i –1))  ;

   }
   printf ("The sum of the series is %f ",S) ;
}
```

5. The following program prints the most significant digit of an integer *n*. Fill in the blanks with only one statement per blank space. **[3]**

```
int main( ) {
     int n;
     printf ( "Enter n" ) ;
     scanf ( "%d", &n ) ;

     while ( n>=10          ) {

       n = n /10;

     }
     printf ( " The most  significant digit is %d", n ) ;
     return 0;
}
```

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6. Write a C program which reads a sequence of positive integers till the user types –1. It counts the lengths of the non-decreasing subsequences, and prints the maximum among them. For example, for input {6, 7, 2, 29, 17, 5, 5, 11, 6, 7, 8, –1} the non-decreasing subsequences are: {6, 7}, {2, 29}, {17}, {5, 5, 11} and {6, 7, 8}. Thus the answer should be 3.

Assume that the first integer read is not –1 and a single integer is a sequence of length 1 **[5]**

```
int main ( ){
        int prevno, curno, curlength, maxlength ;

        curlength = 1; maxlength = 0;
        scanf (“%d”, &prevno) ;
        scanf (“%d”, &curno) ;
        while (curno != -1) {
                if (curno >= prevno)
                        curlength++;
                else {
                        if (curlength > maxlength)  {
                                maxlength = curlength;
                        }
                        curlength = 1;
                 }
                 prevno = curno ;
                 scanf (“%d”, &curno) ;
        }
        if (curlength > maxlength)
              maxlength = curlength;
        printf (“Maximum length is %d\n”, maxlength) ;
        return 0;
}
```

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Rough Sheet