Computer Science I Midterm Exam **Indian Statistical Institute**
Duration: 3 hrs

Answer any 10 of the following - 2 marks each

1. Finish this program with one statement

```
int main() {
        printf("Hello World\n");
        ……..
}
```

2. In computing, …… is used to represent negative numbers
3. To store the value 10^{40} / 3 with decimals in a variable, declare the variable as a ……. data type
4. To store the value "Hello", use a …….. data type
5. An array is a contiguous location in memory of ……. data types
6. int x; func(x); x here is passed by …….. and in func(&x) x is passed by ……
7. To access an element in an array, one uses the …….. of an array element
8. In C, 9 / 2 will yield …….. and 5 / 2.0 will give …….
9. …….. is used to determine the size of a data type on a computer
10. If the starting byte is 0, declaring int i : 10; int : 0; int j : 4; forces the byte offset of j to ……. byte
11. The function ……. is used to determine the length of a string

Answer the following as True or False - 2 marks each

1. The printf statement below will always execute

```
int X = 0;
if (X != 0)
    printf ("Value of X is %d", X);
```

2. (x ? y : z) is an example of a repetitive control structure
3. A string is an array of float datatype
4. The code below will print 10

```
int x[] = {10, 20, 30, 40, 50};
int *ip = x;
printf("%d\n", *(++ip));
```

5. "%p" can be used as the format specifier for strings.

Answer the following - 5 marks each

1. What is the output of the following program

```
int main(void) {
        int i = 2;
        printf ("%d\n", i++);
        printf ("%d\n", --i);
        char X = 'a'; X += 5;
        printf("%c\n", X);
        i<<=2;
        printf ("%d\n", --i);
        return 0;
}
```

2. Rewrite the following code to return an array containing all the factors of x

```
int factors(int x) {
        int i,c=0;
        for(i=2;i<=(x/2);i++) if(x%i==0) c++;
        return c;
    }
```

3. Correct the following code without changing any of the statements or the order of statements:

```
 /* month_name: return name of n-th month otherwise return error*/
char month_name(int n)
{
    char *name[] = {"Illegal month","January", "February", “March","April", "May", "June","July",
"August", “September","October", "November", “December" };

     return ( (n < 1 I n > 12) ? name[1] : name[n] );
}
```

4. What is the output of the following program?

```
#include <stdio.h>
int x = 100;
void testscope()  {
   int i = 70;
   printf("function scope %d \nglobal scope %d \n", i, x);
}
int main(void) {
   // your code goes here
   int i = 10;
   printf("main scope %d \nglobal scope %d \n", i, x);
   testscope();
   if (i) {
                int i = 50;
                printf("block scope %d \nglobal scope %d \n", i, x);
   }
   return 0;
}
```

5. How many times will the for loop given below execute?

```
    int i, j=0;
    for (i = 10; i > j; i—)
            j+=2;
```

Answer any 9 of the following - 5 marks each

1. Write a do-while loop to compute the sum of the digits of a number
2. Use typedef to declare a struct data type to hold X and Y coordinates of a point. Declare a pointer variable of this type.
3. Write a for loop to reverse a string
4. Write a recursive function to compute the factorial of a number
5. Write a function that converts from decimal to binary
6. Write a function that swaps two integers. Use pass by reference.
7. Write a Switch-CASE that prints ‘vowel’ if a character is a vowel, ‘consonant’ if any other alphabet, ‘number’ if its numeric and ‘other’ if any other character.
8. Write a function to print an integer as a character string
9. Write a version of calloc called ‘mycalloc’ that uses a call to malloc to allocate n blocks of memory of m bytes each.
10. Design a table to hold 10 rows and 10 columns of alphanumeric data. Each instance of the table element will either contain a number or a character and a pointer.