

Indian Institute of Engineering, Science and Technology, Shibpur  
 Dual Degree B.Tech.-M.Tech. 2<sup>nd</sup> Semester (CS/IT/ETC/EE/Arch) Examinations, 2017  
 Introduction To Computing (CS - 1201)

Time: 2 hours

Full Marks: 35

(Answer Question No. 1 and any three from the rest. 1 mark is reserved for neatness.

All parts of the same question must be answered together.

For the programming problems use C language.)

1. (A) Consider the following code segment of programs to find the output(s) of the programs and justify your answers in short:

(a)      int X = 25;  
           printf("%x, %d", X, X);

(b)      int \*P, X = 50;  
           P = &X;  
           printf("%d, %d", \*P, X++);

(c)      int X = 6 \* 5 / 3 + 8;  
           int Y = X / 2;  
           printf("%d, %d", X, Y);

(d)      int X = 0;  
           if (++X)  
               printf("T");  
           else if (X == 1)  
               printf("F");

- (B) What is the Octal equivalent of the Hexadecimal number 85?

[2 × 5 = 10]

2. (a) Construct the truth table and draw the logic circuit diagram, if possible using minimum no. of two-input logic gates only, for a three bit Full Adder. The Full Adder must be designed using Half Adders.

[(3 + (3 + 2)) = 8]

3. (a) State the difference between *while* and *do-while* loops with suitable example.  
 (b) Write a program to compute  $x^y$ , where  $x$  and  $y$  are unsigned integers. Do not use the standard library function *pow()*.

[(2 + 2) + 4 = 8]

4. (a) Write a recursive function to compute the factorial of a number  $n$  and also write the program to test the function, where  $n$  is the input given by the user.  
 (b) Write a function *int range (int arr[], int num)* that takes an integer array and its length as arguments, and returns the difference between the maximum element and the minimum element in the array. For instance, *range ([2, 4, 7, 1, 3], 5)* should return  $7 - 1 = 6$ .

[3 + 5 = 8]

5. (a) Write a function *int strl (char arr[])* to calculate the length of a string without using any standard library function and also write the complete program to test the function.  
 (b) Write a program to allocate space for  $n$  integer numbers using dynamic memory allocation and then populate the numbers. Finally, sort these numbers in ascending order.

[3 + (2 + 3) = 8]

6. (a) What are the differences between *structure* and *union*? Explain it with suitable example(s).  
 (b) Write a program to create a file (say *myfile.txt*) and store  $n$  number of records of students with the fields as *RollNo*, *FullName* and *FullMarks* in that file, where  $n$  is the input given by the user.

[(2 + 2) + 4 = 8]