

Indian Institute of Engineering, Science and Technology, Shibpur
Dual Degree B.Tech.-M.Tech. 2nd 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?

$$[2 \times 5 = 10]$$

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 strlen (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.

$$[(2 + 2) + 4 = 8]$$