



Indian Institute of Engineering Science and Technology, Shibpur
B.Tech. 2nd Semester Final Examinations, 2021
Introduction to Computing (CS 1201)

Time: $1\frac{1}{2}$ Hours

Full Marks: 50

- Answer question number 1 and any three questions from the rest. For programming problems use C language.
- On the top of the answer script write Name of the Examination, Name of the Subject, Subject Code, Date of Examination, Name of the Student, Examination Roll Number, G-Suite ID and Number of Sheets uploaded.
- Before uploading scanned copy of answer script, rename it as your examination roll number.pdf

1. Answer any ten questions.

- (a) Convert decimal number 0.513 to octal.
- (b) Write a macro to express the area of a circle.
- (c) Explain an exit controlled loop with an example.
- (d) “A function in C language may return more than one value at a time” — Comment critically.
- (e) What is the difference between system software and application software?
- (f) Discuss the basic difference between conditional and iterative constructs with suitable examples.
- (g) Write a function *swapv(.)* to swap the values of two variables.
- (h) Write a function to print a string in reversed order.
- (i) Write a program to create a text file ‘file1.txt’.
- (j) Discuss the functionality of a static variable using a code segment.
- (k) Design XOR gate using NAND gate.

[2×10= 20]

2. (a) Show that NOR gate is a universal logic gate.

- (b) Design a full adder showing its block diagram, truth table, minimized logic expression and corresponding logic circuit.

[5+5]

3. (a) What are the different ways of representing negative numbers in binary number system? Discuss with examples.

- (b) Use 2’s complement method of subtraction to subtract N from M, where $M=(25)_{10}$ and $N=(30)_{10}$.

[5+5]

4. (a) Define a structure to represent *complex* numbers. Write a function that will accept two complex numbers as arguments, add these two complex numbers and return the sum to the calling function.

- (b) Write a program to copy one existing file (source file, say *file1.txt*) into another named file (destination file, say *file2.txt*) such that both the file names will be taken as input through *command line arguments*.

Example: \$./a.out file1.txt file2.txt

Here, the contents of file1.txt have to be copied to file2.txt. \$ represents the command prompt.

[5+5]

5. (a) What is dynamic memory allocation? Write a program to dynamically allocate space in memory for *n* number of integers using *malloc(.)* where *n* is the input at runtime. Then find the maximum and minimum of these numbers.

- (b) Using pointers, write a function that receives a string and a character as arguments and deletes all recurrences of this character in the string. The function should print the modified string.

[5+5]