Bengal Engineering and Science University, Shibpur
B.E. (AE, CE, ME, Met. & Min.) 1st Semester Examination, 2012
Introduction to Computing (CS – 1201)

Full Marks: 35 **Time: 2 hours**

Attempt Question 1 and any three from the rest
All answers must be written on a single answer-script
All parts of the same question must be answered together

Question 1

(a) Convert the decimal number 36.25 into binary. [4]

(b) Draw a logic gate circuit to implement the function **F = (X + Y + Z') . (X' + Y' + Z) + X.Y.Z**, where **X'** denotes the complement of X. [4]

(c) Distinguish between local and global variables in a C program. [3]

Question 2

(a) State the truth-table and logic gate implementation of a half-adder (which adds 2 bits).

(b) Using 1's complement or 2's complement binary arithmetic with 4-bit representation, (i) add the decimal numbers 2 and 5 (ii) subtract the decimal number 5 from the decimal number 2. [4 + 4]

Question 3

(a) Write a C program that takes two integers m and n as inputs from the user and then calculates and prints the sum of the following series: $1.n + 2.n^2 + 3.n^3 + \ldots + m.n^m$

(b) Write a C function that takes two integers as arguments and swaps the integers. Also write a main function that demonstrates the use of the swap function. [4 + 4]

Question 4

Write a C **function** *int OddEvenDiff (int arr[ ], int n)* that takes as arguments an array of integers and the number of elements in the array, and returns the difference between the sum of the even elements in the array and the sum of the odd elements in the array. For instance, *OddEvenDiff ({2, 4, 1, 5, 6}, 5)* will compute (2 + 4 + 6) – (1 + 5) and hence return 6. Write a **main function** that takes 10 integers as input from the user, stores the integers in an array, and then uses the above function on the array. [8]

Question 5

Write a C **function** *int substr(char str [], char sub [ ])* that takes two strings *str* and *sub* as arguments, and returns 1 if the string *sub* appears as a sub-string within the string *str*, and returns -1 otherwise. For example, if *str* is "Engineering" and *sub* is "ine", the function should return 1, while -1 should be returned if *str* is "Engineering" and *sub* is "iner". Write a **main function** that takes two strings as inputs from the user, and then uses the above function to check if the second input string is a sub-string of the first input string. [8]

Question 6

Define a C structure named *point* to store the coordinates of a point in the 2-d coordinate plane. Write a C program that takes the coordinates of two points as input from the user, stores the points using the structure defined above, and then computes and prints (i) the distance between the two points, (ii) coordinates of the mid-point of a line segment joining the two input points. [8]