INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR

Computer Science and Engineering

Switching Circuits and Logic Design (CS21002)

Class Test – I (Spring)

Name: _____ *Roll number:* _____

Date: Wed, Jan 20, 2021 *Marks:* 35 *Time:* 8:10-9am (FN)

Answer ALL the questions using xournal or similar software to edit the PDF

Q1: Your roll number is of the form $nnDDx_2nnx_1x_0$. Consider the decimal number $x_2x_1x_0 =$_____. Let B be its binary equivalent. Run the *double dabble* (also called *add-3 and shift*) algorithm to convert the binary number B to BCD showing each step clearly. The operations should be either `L Sft` for left shift or `Add 3`. The entries for D2, D1 and D0 should be their values after application of the indicated operation. 25

Operation	B2	B1	B0	$x_2x_1x_0 =$_____
Initial	0000	0000	0000	$B =$_____
L Sft	0000	0000	_____	_____
L Sft	0000	0000	_____	_____
L Sft	0000	0000	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Finish	$x_2 =$_____	$x_1 =$ _____	$x_0 =$ _____	

Q2: Your roll number is of the form $nnDDnnnx_1x_0$. Consider the decimal number x_1x_0 =_____.

Represent 49 and -x_1x_0 in 8-bit signed 2's complement representation; then perform the following operations on your representations, showing each step clearly:

(a) 49+(-x_1x_0) 5

Item	Binary representation
x_1x_0 =	_____
-x_1x_0 (2's complement)	_____
49	_____
+ (-x_1x_0)	_____
Result _____	_____

(b) (-x_1x_0)+(-49) 5

Item	Binary representation
49	_____
-49 (2's complement)	_____
-x_1x_0	_____
+ (-49)	_____
Result _____	_____