

COE 202, Term 132

Digital Logic Design

Assignment# 2

Due date: Thursday April 17

Q.1. It is required to design a circuit that receives a 4-bit unsigned number $A=A_3A_2A_1A_0$ and produces **5-bit output** $C= C_5C_4C_3C_2C_1C_0$. The circuit implements the following functions based on the values of the three selection inputs: S_2 , S_1 and S_0 .

$S_2 S_1 S_0$	Function
0 0 0	$C = A + B$
0 0 1	$C = A - B$
0 1 0	$C = 2 * A$
0 1 1	$C = A + 1$
1 0 0	$C = A - 1$
1 0 1	$C = 1$ if $A == B$
1 1 0	$C = 1$ if $A > B$
1 1 1	$C = 1$ if $A < B$

- (i) Show the block diagram design of your circuit using MSI components like Adder, Multiplexor, as needed.
- (ii) Model your design in logic works.
- (iii) Test your design and verify its correctness by simulation. Show snapshots of your simulation to demonstrate its correctness. For each function, test at least 2 input combinations of your choice to demonstrate correct functionality.

Include snapshots of simulation output to illustrate the correctness of your circuit. Submit your solution as a word document along with the circuits in one zipped file.