Due Date: in class, 02/01/2023

1. Below is the circuit diagram for a CMOS NOR gate with two inputs (A and B).

    a) Using a table identify the status of each transistor in the circuit (ON or OFF) for the four possible combinations of inputs, and the corresponding output (Z).

    b) Draw the switch-level model for each of the four possible combinations of inputs.
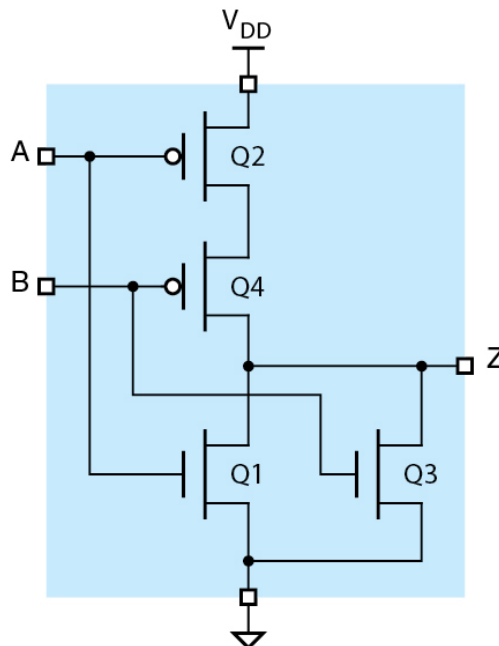
2. Perform the following number system conversions and name the method that you use (Summation, Division, Substitution) for the conversion.

a. $(11000.0111)_2 = (?)_{16}$

b. $(137023)_8 = (?)_2$

c. $(10011011)_2 = (?)_{16}$

d. $(D3B6)_{16} = (?)_2$

e. $(101101.0111)_2 = (?)_8$

f. $(1011101)_2 = (?)_{10}$

g. $(10101.1001)_2 = (?)_{10}$

h. $FEED)_{16} = (?)_{10}$

i. $15C1.93)_{16} = (?)_{10}$

j. $207)_{10} = (?)_2$

k. $73016)_8 = (?)_{10}$

l. $22439)_{10} = (?)_{16}$

m. $(175.175)_{10} = (?)_2$

n. $(7562.45)_{10} = (?)_8$

3. What is the radix r in $(365)_r = (194)_{10}$?

4. Add/subtract the following pairs of binary numbers:

	101110		101110		11011101		11011101
a) +	100101	b) -	100101	c) +	1100011	d) -	1100011

5. What is the 8-bit signed-magnitude and two's-complement representations for:

      a) +105,   b) +81   c)-112   d) -47

6. Perform the arithmetic operations, shown below, in a 4-bit two's-complement system. Show your work, and indicate if overflow occurs. Also, perform the operations in the decimal base.

    i. $1110 + 0111$
    ii. $1110 - 0111$
    iii. $1100 + 1011$
    iv. $1100 - 1011$

7. Perform the following arithmetic operations for unsigned binary numbers. Show your work. Also, perform in the decimal base.

    i. 1010×1100
    ii. 1111001×011101

8. What is the radix r in $(365)_r = (194)_{10}$?

 9. What is the decimal equivalent of the largest binary integer that can be obtained with 12 bits?