EE 302, Introduction to Electrical and Computer Engineering

Dr. Archie Holmes, Jr.

Exam #1

Name: _____

SSN: _____

Please remember….

- **Read the entire exam before starting**
- **If you feel you need more information than is given, please ask!!!**
- **Show all work for credit!!!**
- **Relax!!!**

This exam contains 10 pages and 6 problems along with some extra credit questions
Give units to all answers where applicable

Problem #1	_____
Problem #2	_____
Problem #3	_____
Problem #4	_____
Problem #5	_____
Problem #6	_____
Bonus (Extra Credit)	_____
Total	_____

This information will be provided when I return the exam

Class Average = _____

Standard Deviation = _____

PROBLEM #1. INTELLECTUAL PROPERTY (10 POINTS)

a) Explain the difference between trade secrets and patents.

b) Explain why certain companies (e.g., Microsoft) chose to protect their products with copyrights instead of patents.

PROBLEM #2. BINARY REPRESENTATION AND ARITHMETIC (20 POINTS)

a) How many bits would you need to represent -533_{10} as a signed binary number? Provide the binary representation of this number.

b) Do the following arithmetic in binary: (43 - 39) x (6+5). Show all your work for credit.

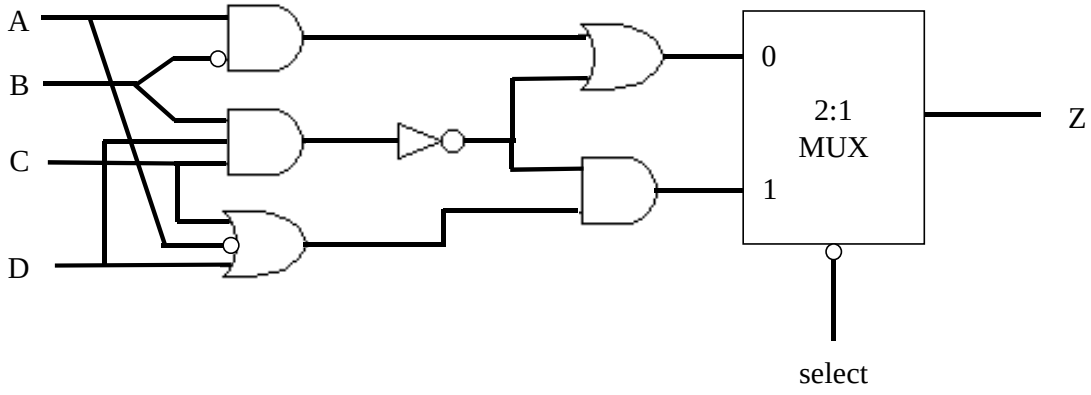
PROBLEM #3. SIMPLIFYING ALGEBRAIC EXPRESSIONS (16 POINTS)

Express the following Boolean expression in terms of its minimum sum-of-products **and** product-of-sums form.

$$Z = W'X'Y'Z' + WX'Y'Z + W'XY'Z' + WXY'Z + W'XY'Z + WXYZ + W'X'Y'Z$$

PROBLEM #4. GATE REPRESENTATION OF LOGIC EXPRESSIONS (10 POINTS)

Write the two Boolean expressions for the output Z of the following circuit.



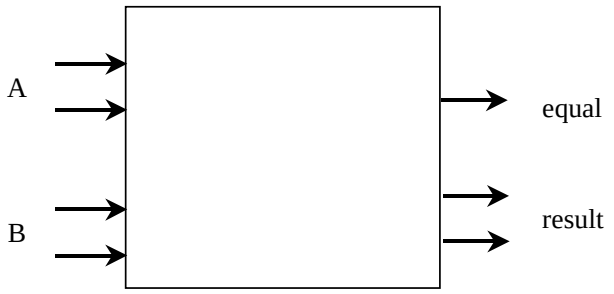
PROBLEM #5. TWOS COMPLEMENT CIRCUIT (20 POINTS)

a) Provide the complete truth table for a circuit which takes the twos complement of a binary nibble.

b) Provide simplified Boolean expressions for the MSB and LSB of the circuit's output.

PROBLEM #6. LOGIC DESIGN II (24 POINTS)

The goal of this is to design a circuit which determine whether the two 2-bit inputs (*A* and *B*) are different than each other.



If the inputs are different, the *equal* output is zero and result holds the larger of the two inputs. If the inputs are equal, then the output *equal* is set to one and *result* is in a don't care state. In your solution provide the simplified Boolean expressions for each output and the logic circuit diagram. **SHOW YOUR WORK!!!**.

EXTRA CREDIT (4 POINTS TOTAL)

The Academy of Motion Picture Arts and Sciences recently announced its nominees for Best Picture of 1998. Which picture do you believe should (not necessarily will) win?

___ Elizabeth
___ Life Is Beautiful
___ Saving Private Ryan
___ Shakespeare in Love
___ The Thin Red Line
___ How should I know!! Who has time to watch a movie?!?

During this semester, an impeachment vote was taken in the Senate on two separate charges for President Clinton. What were the two charges?

How many Grammys did Lauryn Hill win (FYI, she was nominated for 10 Grammys this year)?