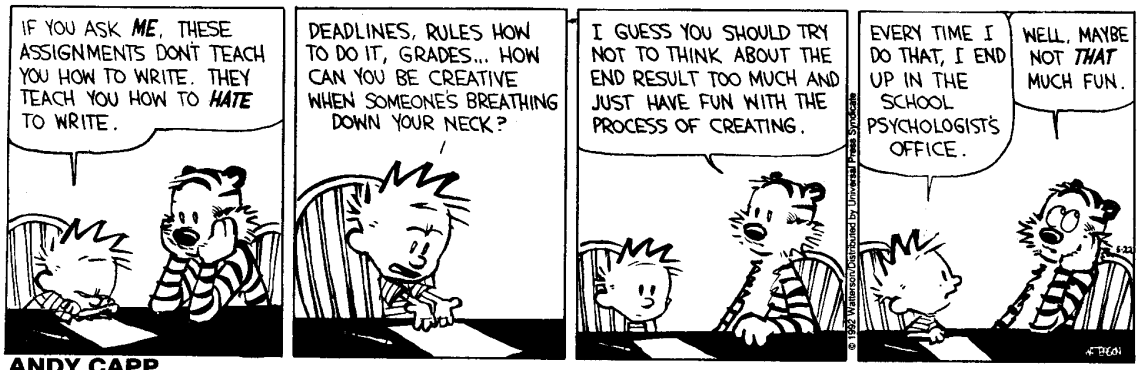
EE 302, Introduction to Electrical and Computer Engineering

Dr. Archie Holmes, Jr.

Exam #3

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 11 pages and 4 problems along with some extra credit questions
Give units to all answers where applicable

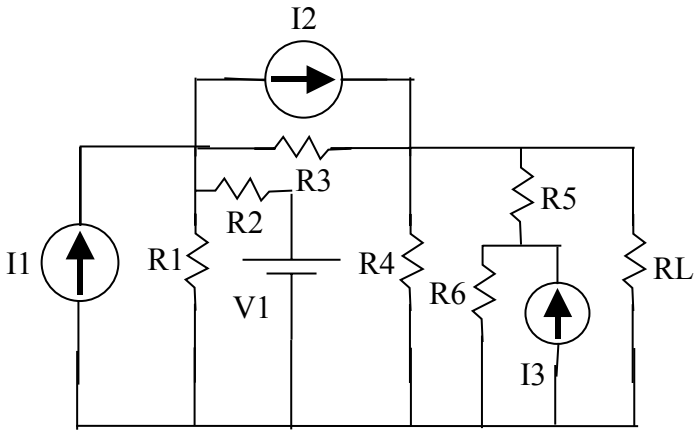
Problem #1	_____
Problem #2	_____
Problem #3	_____
Problem #4	_____
Bonus (Extra Credit)	_____
Total	_____

This information will be provided when I return the exam

Class Average = _____

Standard Deviation = _____

PROBLEM #1: GENERAL CIRCUIT ANALYSIS I: SET UP (30 POINTS)



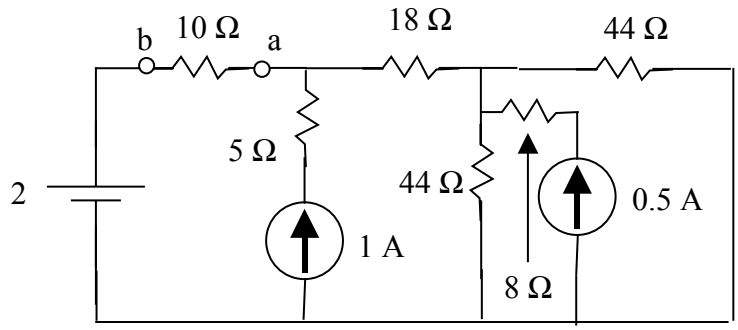
(a) If node voltage analysis is used to evaluate the circuit above, how many nodes are there? What is the **minimum** number of unknown node voltage values?

(b) If loop current analysis is used to evaluate the circuit above, how many closed loops are there? What is the **minimum** number of unknown loop current values?

(c) Draw **all** the circuits I would use to analyze this problem using superposition.

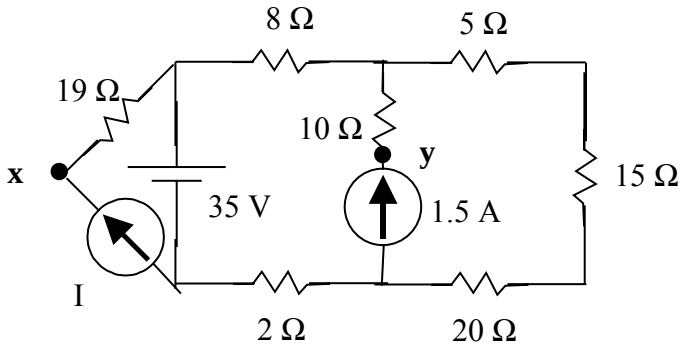
PROBLEM #2: SUPERPOSITION & THEVENIN/NORTON CIRCUITS (20 POINTS)

Determine the Thevenin and Norton equivalent circuits when the 10-Ω resistor is considered the load resistor using any method(s) you chose.



PROBLEM #3: GENERAL CIRCUIT ANALYSIS I (25 POINTS)

Using **<u>any</u>** of the methods discussed in class, find ***I*** so that $v_{xy} = 0$.



PROBLEM #4: STERO DESIGN (25 POINTS)

You have been charged with designing a new stereo system for your employer, Holmes Audiophile. The general schematic of the system is shown below:

Your goal is to design an efficient system using our new H300W amplifier which is capable of supplying a **maximum** power of 90 W.

a) You are first to characterize how the speakers available work with the amplifier *individually*. Using the information provided to complete the following table.

Speaker	Resistance	Power Received
Subwoofer	8 Ω	
Bookshelf Speaker A	4 Ω	73.47 W
Bookshelf Speaker B		59.83 W
Bookshelf Speaker C	8 Ω	

b) The first stereo system, the H300W-D uses the subwoofer and two speakers where **all** of the speakers receive the same power. Design the speaker system to be optimized with the H300W amplifier. Which speaker will you use and how are the connected?

Bonus (10 points). Design the H300W-Q system which uses a subwoofer and four speakers and all speakers receive the same power. Again, which speakers would you chose and how would they be connected to each other.

BONUS SECTION (UP TO 7 POINTS)

1) Beginning in October of each year, the US Supreme Court hears cases on such issues as reproductive rights, separation of church and state, and freedom of speech. Name as many of the current Supreme Court Justices as you can. 1/2 point for each correct one.

2) What ship brought the Pilgrims over to the Americas? Where were they purported to land? Why were the Pilgrims coming to America in the first place?

3) What are the best & worst movies you have seen in 1999?