ECE 209 — Exam # 3

Estimated time for completion: <75 minutes
24 November 2015

Rules of the Exam

Rule 1: The examination period begins at 11:00pm on Tuesday 24 November 2015 and ends at 12:15pm on Tuesday 24 November 2015.

Rule 2: There are three problems.

Rule 3: Show all work and state all assumptions. Make sure to include the units along with a numerical answer.

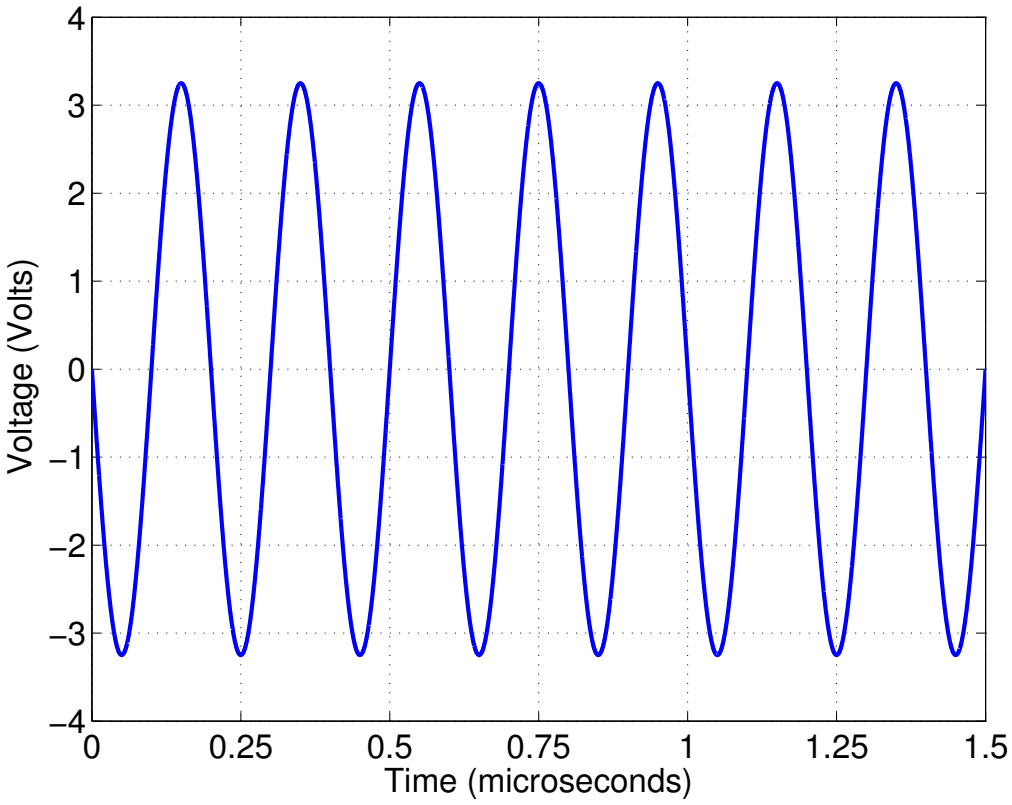
Rule 4: The exam is closed book and closed notes. You may have an 8.5" x 11" sheet of paper with notes. You may use a calculator.

_____

Name

Problem 1 (40 points)

Part A: Consider the voltage waveform shown below:



What is V_{RMS}? _____

What is the peak-to-peak voltage? _____

What is the frequency in Hz? _____

What is the equation for $v(t)$? _____

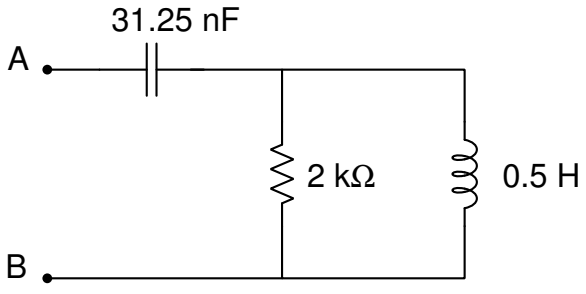
What is **V** the Phasor representation of $v(t)$ _____

Part B: Perform the following operations:

$2\angle 60^\circ + j =$ _____

$(4\angle 40^\circ \times 2\angle 40^\circ) + (3 - j8) =$ _____

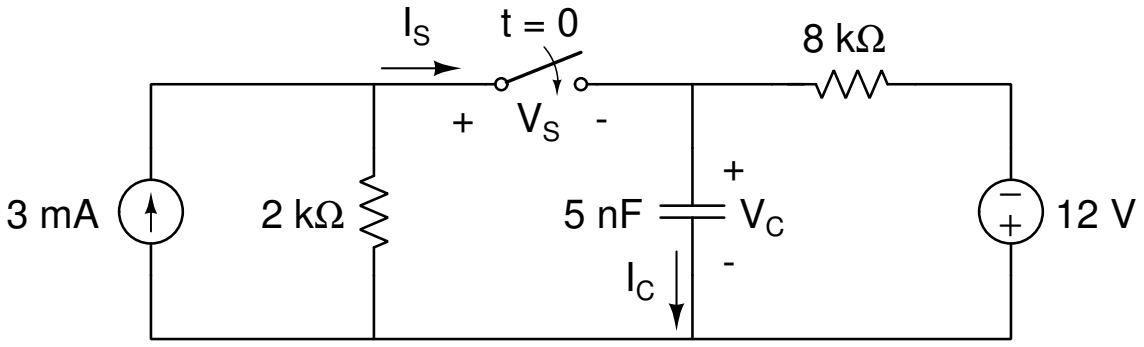
Part C: When terminals **A** and **B** in the circuit below are connected to a voltage source $v_g(t) = 64\cos(8000t)$ V



What is the equivalent impedance between terminals **A** and **B**? _____

Problem 2 (40 points)

In the circuit below, the switch has been open for a very long time and closes at $t = 0$.

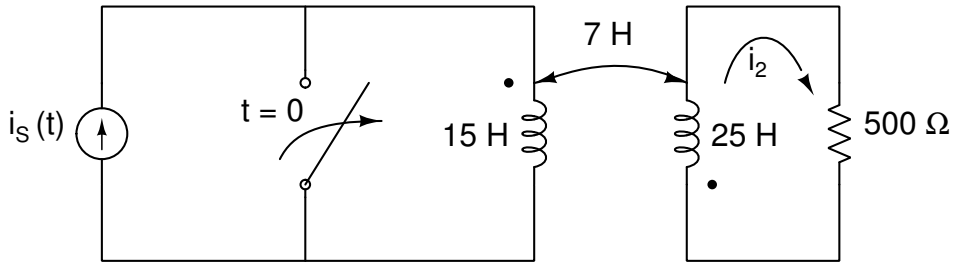


Complete the table below:

	$\mathbf{t = 0^-}$	$\mathbf{t = 0^+}$	$\mathbf{t = 5\ \mu s}$	$\mathbf{t = \infty}$
V_c				
I_c				
V_s				
I_s				

Problem 3 (20 points)

In the circuit below, the switch has been closed for a very long time and opens at $t = 0$. There is no energy stored in the circuit at the time the switch opens.



What is $i_2(0^-)$ _____

What is $i_2(0^+)$ _____

For $t \geq 0$, write the differential equation that governs the behavior of $i_2(t)$ _____
(Note: you do not need to solve the equation)

Name: _____

Name: _____

Name: _____