ECE 209 — Exam # 3

Estimated time for completion: <1.25 hour
21 November 2017

Rules of the Exam

Rule 1: The examination begins at 9:30am on Tuesday 21 November 2017 and ends at 10:45pm on Tuesday 21 November 2017.

Rule 2: There are three problems.

Rule 3: The exam is closed book and closed notes. You may use an 8.5" x 11" sheet of paper with notes and a calculator.

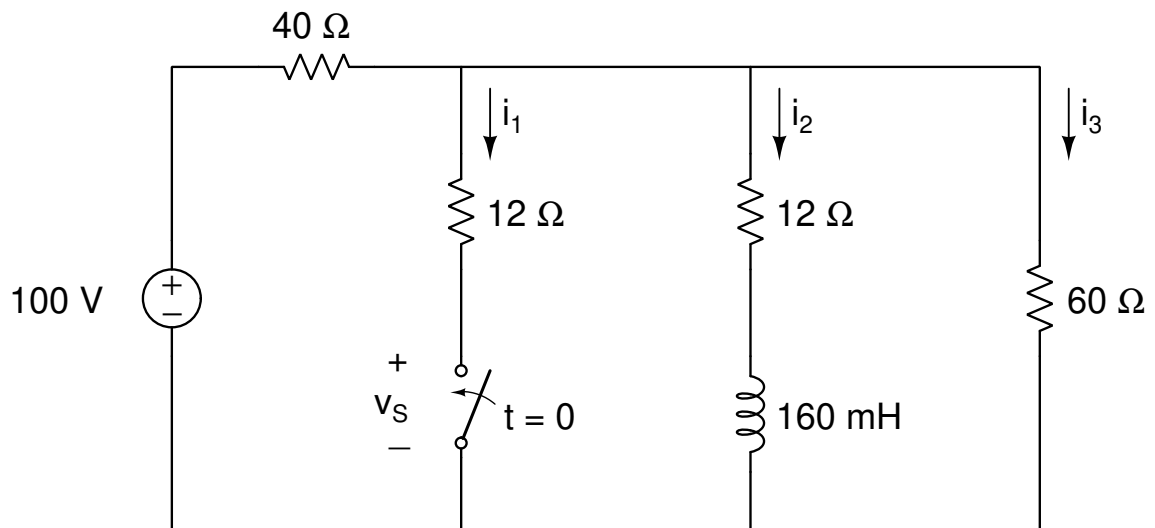**Rule 4**: Do not leave the room until you have completed the exam.

Rule 5: To receive full credit for an answer include the units along with the numerical answer.

Rule 6: <u>Show all work</u> - answers without supporting work will not receive credit.

Name

Problem 1 (30 points)

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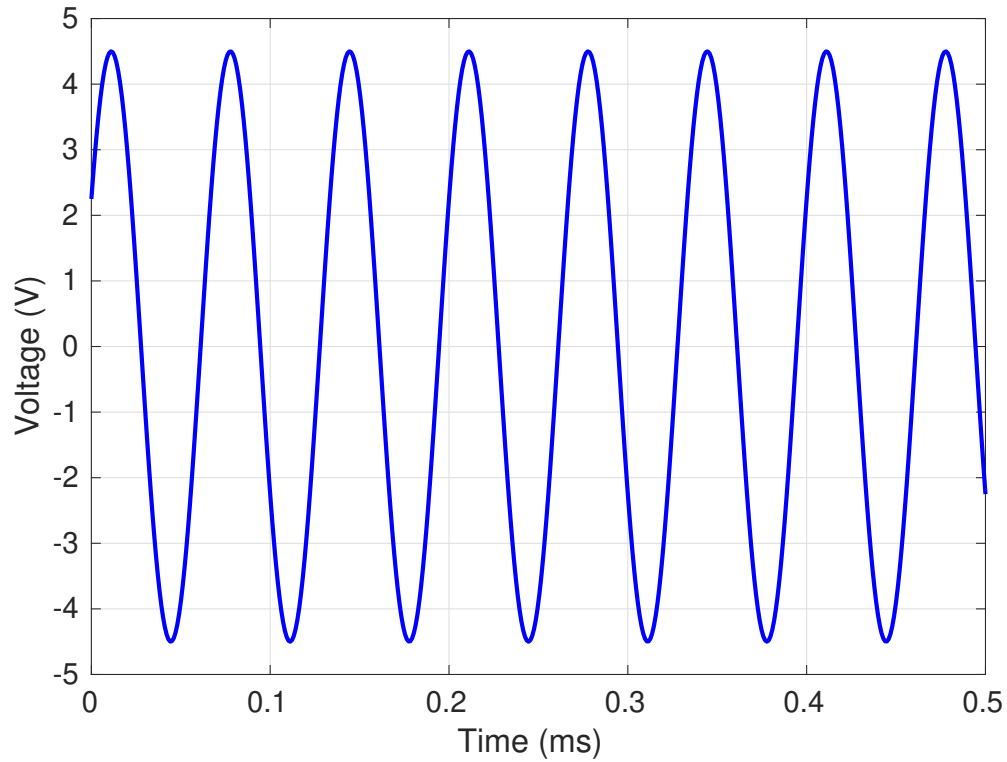

What is the time constant of the circuit for $t > 0$? _____

Complete the table below:

	$t = 0^-$	$t = 0^+$	$t = 10$ ms	$t = \infty$
i_1				
i_2				
i_3				
v_S				

Problem 2 (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 $v(t)$ _____

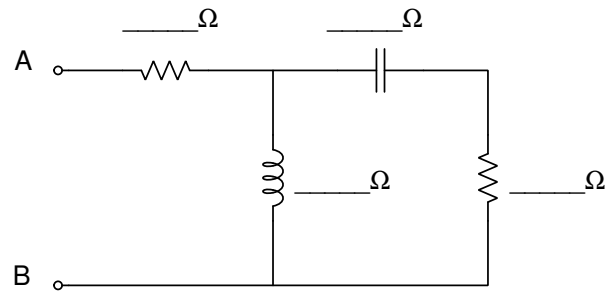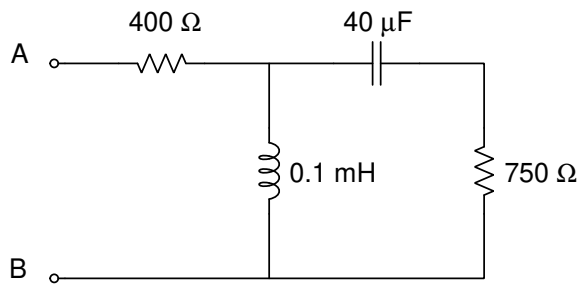**Problem 3** (30 points)

Perform the following operations. Express your result in either rectangular (Cartesian) or polar notation.

$2\angle 60° - 4j =$ _____

$(4\angle 40° \times 2\angle 40°) + (8 + j8) =$ _____

Convert the circuit on the left to the frequency domain when the frequency is 1 kHz.

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

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