ECE 210 — Exam # 3

Estimated time for completion: <1 hour
5 April 2013

Rules of the Exam

Rule 1: The examination period begins at 1:10pm on Friday 5 April 2013 and ends at 2:00pm on Friday 5 April 2013.

Rule 2: There are three problems.

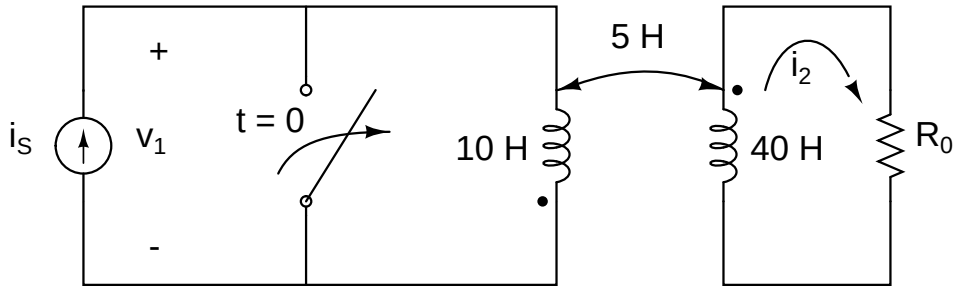
Rule 3: The exam is closed book and closed notes but you may use a 4" x 6" sheet of paper with notes during the exam. You may use a calculator.

_____

Name

Problem 1. (5 pts.) In the circuit below, the switch has been closed for a very long time and there is no energy stored in the circuit before the switch opens.

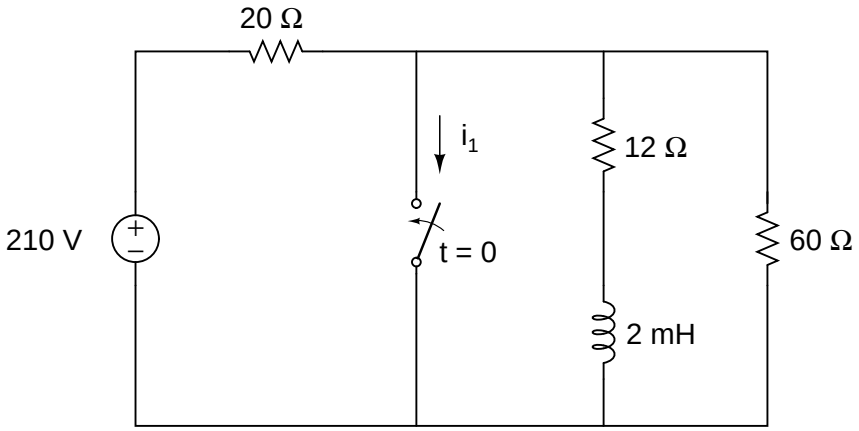
The current source $i_s(t) = 8 - 8e^{-400t}$ mA



Use KVL to derive an equation for $i_2(t)$ for $t \geq 0$. (You do not need to solve the equation.)

Find the expression for the voltage $v_1(t)$ for $t \geq 0$.

Problem 2. (5 pts.) In the circuit below, the switch has been open for a very long time and closes at $t = 0$.

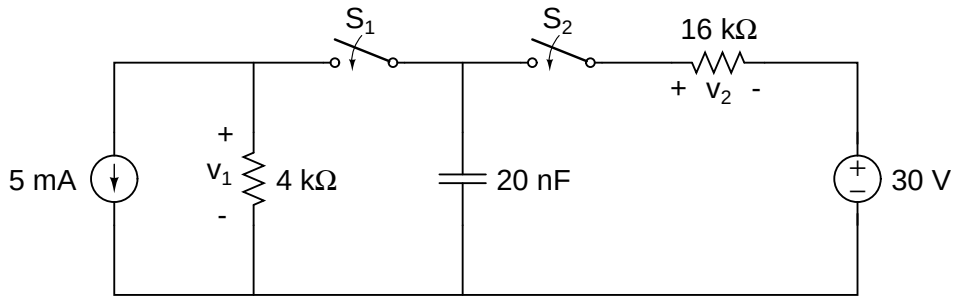


What is $i_1(0^+)$? _____

What is $i_1(\infty)$? _____

Write an equation for $i_1(t)$ for $t \geq 0^+$?

Problem 3. (10 pts.) Consider the circuit below. For $t < 0$, both switches are open and there is no energy stored in the capacitor. At $t = 0$, switch S_1 closes; at $t = 10\mu$s, switch S_2 closes.



What is $v_1(0^-\mu\text{s})$? _____ What is $v_2(0^-\mu\text{s})$? _____

What is $v_1(0^+\mu\text{s})$? _____ What is $v_2(0^+\mu\text{s})$? _____

What is $v_1(5\mu\text{s})$? _____ What is $v_2(5\mu\text{s})$? _____

What is $v_1(15\mu\text{s})$? _____ What is $v_2(15\mu\text{s})$? _____

Extra Page 1

Extra Page 2

Extra Page 3