# ECE 209 — Exam # 3

Estimated time for completion: <50 minutes
3 April 2015

Rules of the Exam

**Rule 1**: The examination period begins at 1:10pm on Friday 3 April 2015 and ends at 2:00pm on Friday 3 April 2015.

**Rule 2**: There are three problems and one extra-credit problem.

**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.

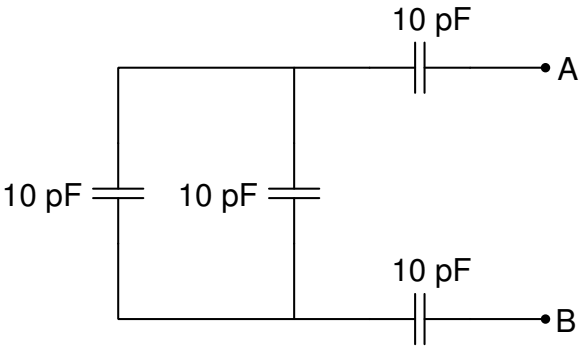
**Rule 5**: Please put your name on each page of the exam.

_____

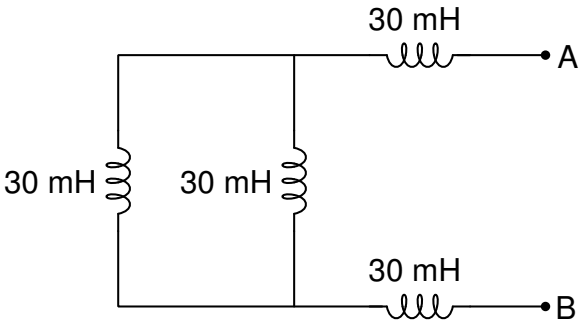
Name

Name: _____

**Problem 1** (30 points)



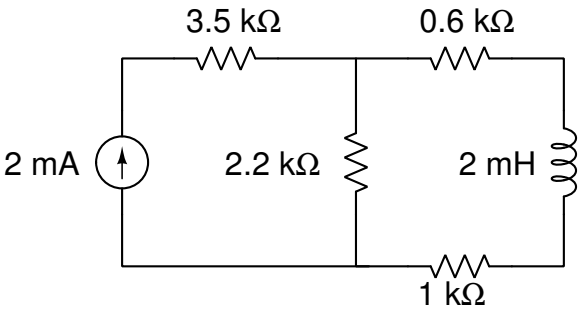

What is the equivalent capacitance between terminals A and B? _____



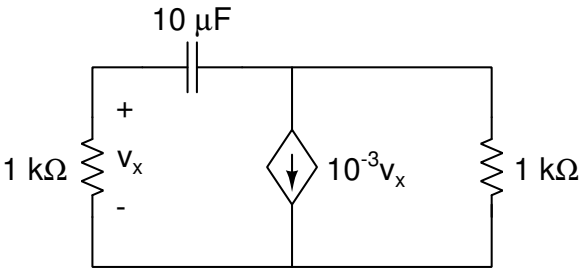

What is the equivalent inductance between terminals A and B? _____

Name: _____

**Problem 2** (30 points)




What is the time constant associated with this circuit? _____

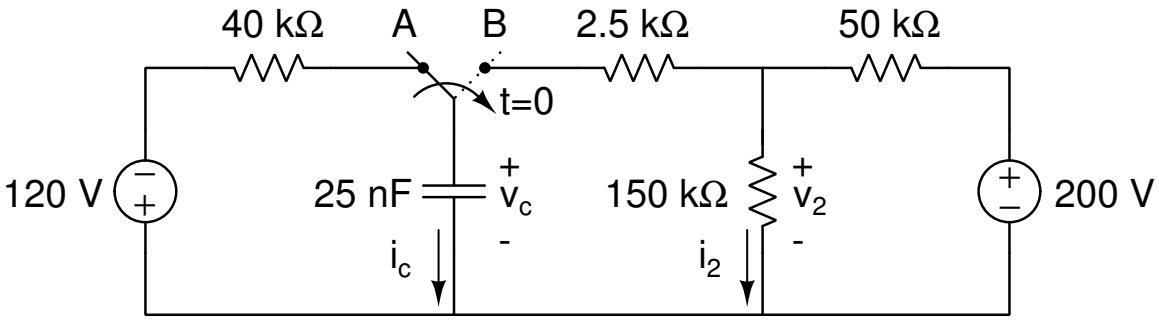



What is the time constant associated with this circuit? _____

Name: _____

**Problem 3** (40 points)

In the circuit below, the switch has been in position A for a very long time and moves to position B at $t = 0$.




Complete the table below:

| | | |
|---|---|---|
| $i_c(0^-) =$ | $i_c(0^+) =$ | $i_c(\infty) =$ |
| $i_2(0^-) =$ | $i_2(0^+) =$ | $i_2(\infty) =$ |
| $V_c(0^-) =$ | $V_c(0^+) =$ | $V_c(\infty) =$ |
| $V_2(0^-) =$ | $V_2(0^+) =$ | $V_2(\infty) =$ |

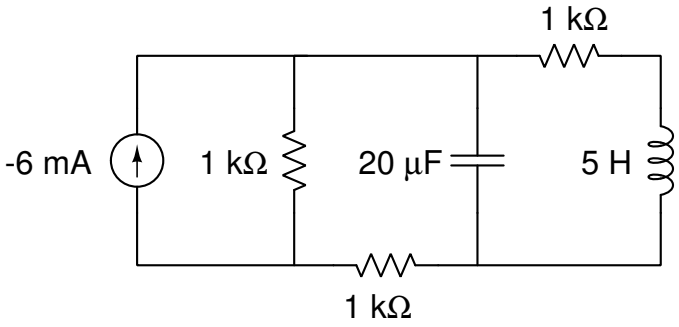
For $t \geq 0$, what is $v_c(t)$? _____

For $t > 0$, what is $i_c(t)$? _____

Name: _____

**Extra Credit** (15 points)

Consider the circuit below:




How much energy is stored in the 5H inductor? _____

How much energy is stored in the 20$\mu$F capacitor? _____

How much power is dissipated by the circuit? _____