EE101. Quiz 4 on Capacitance, Inductance, RC and RL Circuits
Fall 2011

No help is allowed on this quiz – no neighbors, notes or books.
Only your excellent brain plus paper, pencil and a simple calculator.
Put boxes around your answers and use the back of the page if necessary.
Don't forget to use the formula sheet provided as part of the quiz.

NAME: (print):
Major:

1. (2 pts.) **Non-ideal capacitors and inductors**
   a. Briefly describe how a real capacitor differs from an ideal one? Draw a circuit diagram to illustrate your answer.

   b. Briefly describe how a real inductor differs from an ideal one? Draw a circuit diagram to illustrate your answer.

2. (2pts.) Find the equivalent inductance for this circuit across the terminals a and b.
3. (3 pts) At $t = 0$ the circuit at right has a voltage across the capacitor $v_C = 45 \text{ V}$.

   a. Describe what happens to the energy in the circuit as time passes after $t = 0$ and how much energy is left in the circuit as time goes to infinity.

   b. Derive a mathematical expression for $v_C(t)$ for $t \geq 0$.

4. (3 pts.) a. In the circuit at right find $\alpha$, $\omega_0$, $s_1$ & $s_2$

   b. What type of source-free response will the circuit have? Draw a sketch.