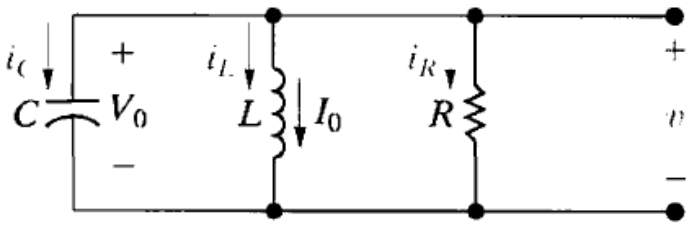
EE2210 Electric Circuits Spring 2018

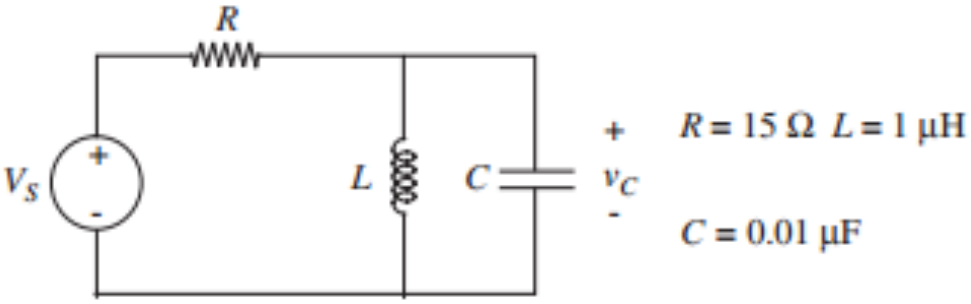
Quiz 3 (Total 120 points)

It is a closed-book, closed-note quiz. Cheating leads to 0% score. Calculator is allowed. Please show the process of thinking/calculation. Indicate your final answers clearly. Unit is needed if applicable.

1. The circuit elements in the following circuit are R = 200 Ω, C = 200 nF, and L = 50 mH. The initial inductor current is -45 mA, and the initial capacitor voltage is 15 V.
   a) Calculate the initial current in each branch of the circuit. (15%)
   b) Find v(t) for $t \geq 0$. (15%)
   c) Find $i_L(t)$ for $t \geq 0$. (15%)

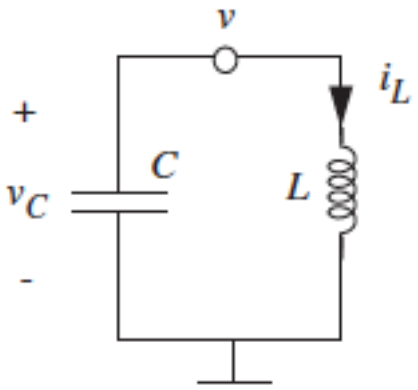


2.
   a) Is the zero input response of the circuit shown in the following figure under-damped, overdamped, or critically-damped? (10%)



   b) What is the form of the zero input response (v_C) for the same circuit in part (a)? Make a rough sketch. (20%)

3. In the following undriven LC circuit, assume C = 1 μF and L = 100 μH, and the initial condition $i_L(t=0)=0$ A, and $V_C(t=0)=1$ V. Find the expression of $i_L(t)$ and $V_C(t)$ for $t > 0$. (20%)



4. For the following circuit, find and sketch the zero-input response, $v_2(t)$ for $t > 0$. Assume $v_2(t=0)=1$ V, $v_2(t=0)=0$ V. (25%)