EE 210 **Name_____**
Hour Exam 3 **November 13, 2018**

1. A *series* RLC circuit has too much oscillation in response to a step function. To *decrease* the oscillation which of the following should be done. (Circle all items which will decrease the oscillation).

A) decrease the resistance
B) decrease the inductance
C) decrease the capacitance
D) increase the resistance
E) increase the inductance
F) increase the capacitance

2. The solution to a differential equation describing the current in a series RLC circuit is given by:

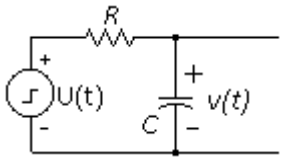
$i(t) = 2.5e^{-2t} + 3.53^{-5t} + 12$

A) What is the characteristic equation for the system?

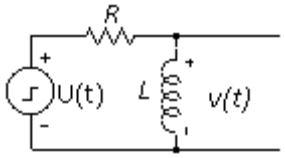
B) What is the steady state response for the system?

C) Is this system overdamped, underdamped, or critically damped?

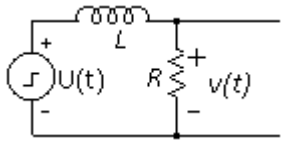
3. For each problem below find the equation for *v(t).* In each case the input is a unit step, R = 1K, C = 1µf, and L = 1H.



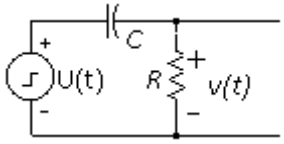
A) *v(t)* = _____



B) *v(t)* = _____

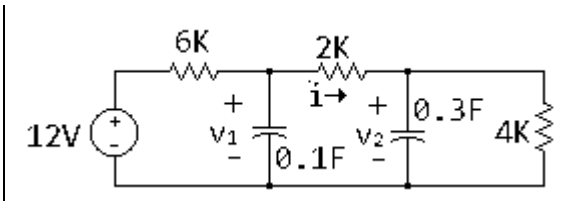


C) *v(t)* = _____



D) *v(t)* = _____

4. For the circuit below find the value of v_1, v_2 and i. Show your work. The 12 volt source is d.c.

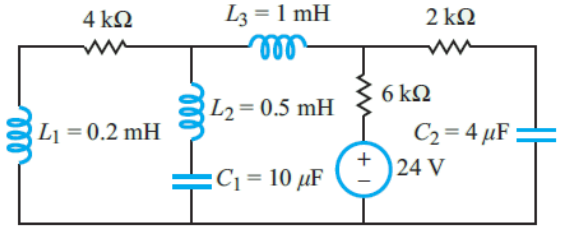


5. For the circuit below find the value of the voltage across the capacitors C_1 and C_2 and the current through the 4K resistor. Show your work. The 24 volt source is d.c.

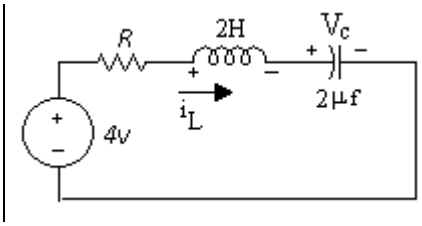
V_{c1} = _____

V_{c2} = _____

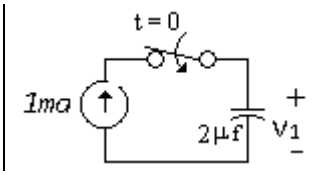
i_{4K} = _____



6. Find the *range* of value of R in the following circuit to make the circuit *overdamped.* Show your work.



7. The switch in the following circuit is closed at t = 0 and the capacitor is charged by the 1ma current source. Write the equation for V_1



8. Find the equation for the output voltage V of the series RLC circuit shown.