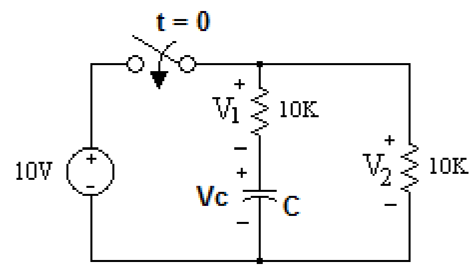
EE 210 **Name________________**
Hour Exam 3 **November 14, 2017**

1. You are given two RLC networks – one is in series and one is in parallel. Both are adjusted for critical damping. Fill in the table below to indicate whether the network will become overdamped, underdamped, or will remain unchanged for each case.

Case	Series	Parallel
Decrease R only		
Decrease C only		
Decrease L only		

2. For the circuit at right the switch closes at $t = 0$. Find the expression for $v_C(t)$ for $t > 0$. Take C = 0.2 farads. Show all work.



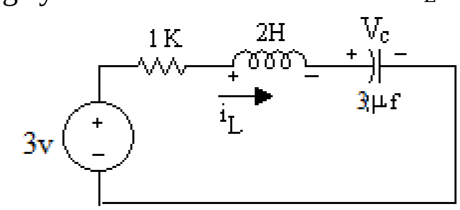
3. Mark each of the following 2nd order characteristic equations as to whether they represent underdamped, critically damped, overdamped, or impossible physical systems.

A) $s^2 + 4S + 2 = 0$
Circle one:
Over
Under
Critical
Impossible

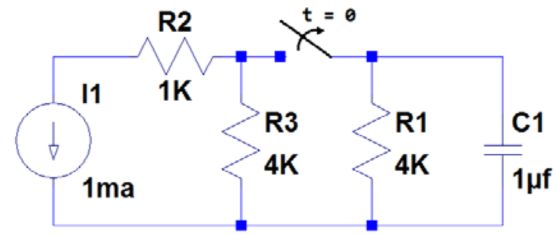
B) $s^2 + 4S + 12 = 0$
Circle one:
Over
Under
Critical
Impossible

C) $-s^2 - 4S - 6 = 0$
Circle one:
Over
Under
Critical
Impossible

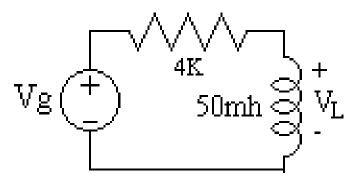
4. Find the characteristic equation for the following system in terms of the current i_L.



5. Find the value of the capacitor voltage at t = 4 msec



6. Write (but do not solve) the differential equation for V_L for the circuit below. Your equations should contain only V_L and V_g as variables. Do not assume that V_g is d.c.



7. Find the current *i* in Figure P7 below at t = 0^+. Show all work.

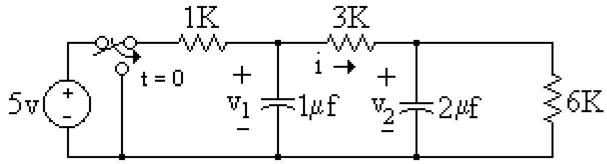


Figure P7

Find the current *i* at time t = 0^+.

8. Capacitor voltage and capacitor current are related by the equation: $i = C\frac{dv}{dt}$. Use this equation to show that capacitor voltage may not change instantaneously unless an infinite amount of current flows.