VE215
Assignment #6
Fall 2016

Problem 1

Calculate $v(t)$ for $t > 0$ in the circuit of Fig. 1.

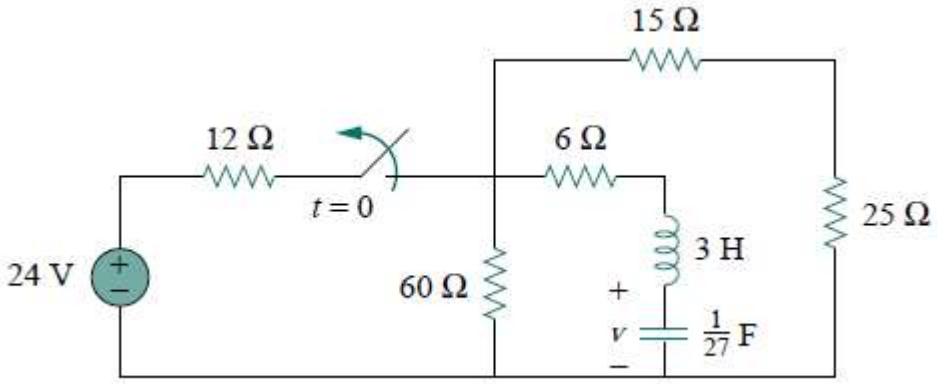

Figure 1

Problem 2

Derive the differential equation relating v_o to v_s in the op amp circuit of Fig.1.

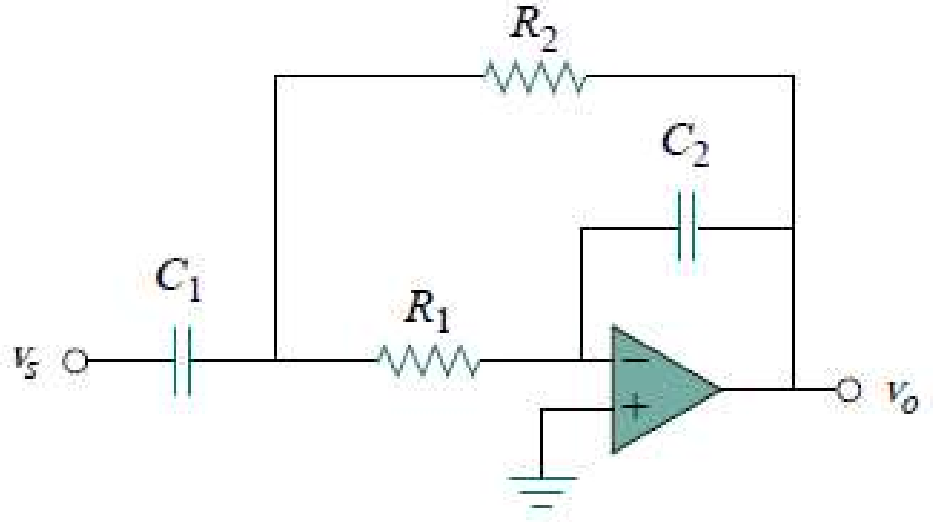

Figure 2

Problem 3

An automobile airbag igniter is modeled by the circuit in Fig. 3. Determine the time it takes the voltage across the igniter to reach its first peak after switching from *A* to *B*. Let $R = 3\ \Omega$, $C = 1/30$ F, and $L = 60$ mH.

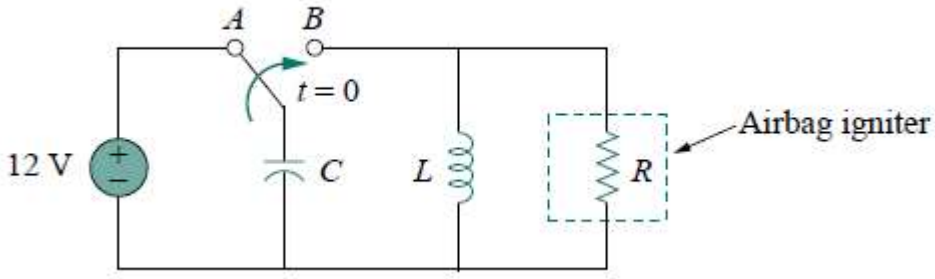

Figure 3

Problem4

The circuit in Fig. 4 is the electrical analog of body functions used in medical schools to study convulsions. The analog is as follows:
C1 = Volume of fluid in a drug
C2 = Volume of blood stream in a specified region
R1 = Resistance in the passage of the drug from the input to the blood stream
R2 = Resistance of the excretion mechanism, such as kidney, etc.
v0 = Initial concentration of the drug dosage
v(t) = Percentage of the drug in the blood stream
Find v(t) for t > 0 given that C1 = 0.5 μF, C2 = 5 μF, R1 = 5 M Ω, R2 = 2.5 M Ω, and v0 = 60u(t) V.

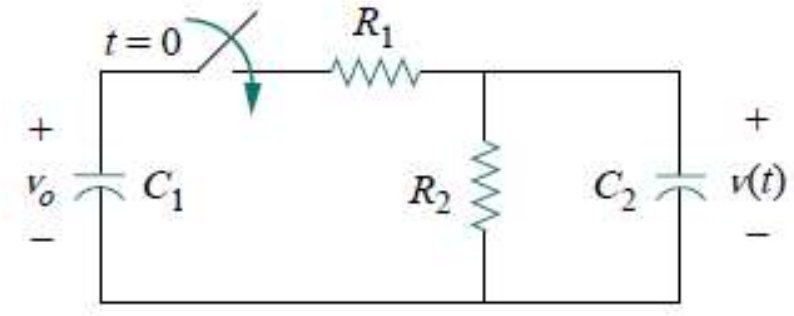

Figure 4