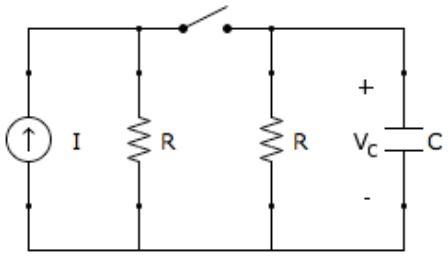
EEE 33 Problem Set 2
Due date: 4 August 2011

GENERAL INSTRUCTIONS:

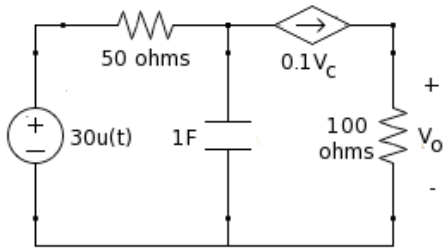
Use only black and/or blue ballpoint pens. Write your name, student number, section and DC instructor's name one the upper right hand corner of each of your answer sheets. Show your complete solution. Anything written on the reverse side of your answer sheet will not be considered.

Problem 1



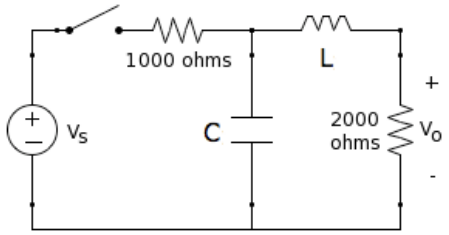
The switch in the figure is **open** for $t < 0$, **closed** for $0 \leq t < t_1$, and **open** for $t \geq t_1$, where $t_1 = 3RC$. Find and plot the voltage $V_c(t)$.[1]

Problem 2



Find $V_o(t)$ for $t \geq 0$.

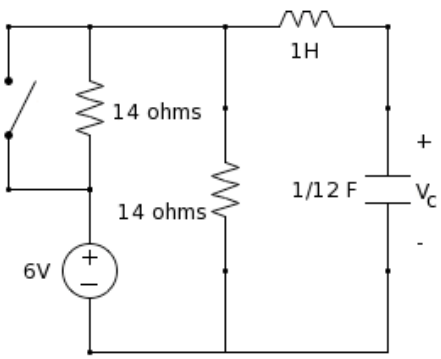
Problem 3



The switch in the figure is **open** at $t < 0$ and **closed** at $t \geq 0$. Find possible values for L and C if the *natural response* is described by the equation:

$$V_{o,n}(t) = ae^{-8000t} + be^{-12000t},\ t \geq 0$$

Problem 4



The switch in the figure is **closed** at $t < 0$ and **open** at $t \geq 0$. Find $V_c(t)$ for $t \geq 0$.

[1] Anant Agarwal and Jeffrey Lang, course materials for 6.002 Circuits and Electronics, Spring 2007. MIT OpenCourseWare (http://ocw.mit.edu/), Massachusetts Institute of Technology. Downloaded on 27 July 2011.

Problem 5

The differential equation for $V_o(t)$ of a given system was found to be:

$$\frac{d^3V_o}{dt^3} + 8\frac{d^2V_o}{dt^2} + 21\frac{dV_o}{dt} + 18V_o = 0$$

Find $V_o(t)$ for $t \geq 0$ if:

- $V_o(0^+) = 7\,\text{V}$,
- $\frac{dV_o}{dt}(0^+) = -15\,\text{V/s}$, and
- $\frac{d^2V_o}{dt^2}(0^+) = 32\,\text{V}/s^2$