University ☺f P☺rtland
Sch☺☺l ☺f Engineering

EE 261-Electrical Circuits-3 cr. hrs.
Spring 2011

Midterm Exam # 3

(Monday, April 18, 2011)
(Closed Book Exam, Three Formula Sheets Allowed)
(Total Time: 55 minutes)

Did you know that yesterday in the 21st century was the 221st anniversary of Benjamin Franklin's death? ☺ (He died on April 17, 1790, at age 84.)

Name:_____☺

Signature:_____☺

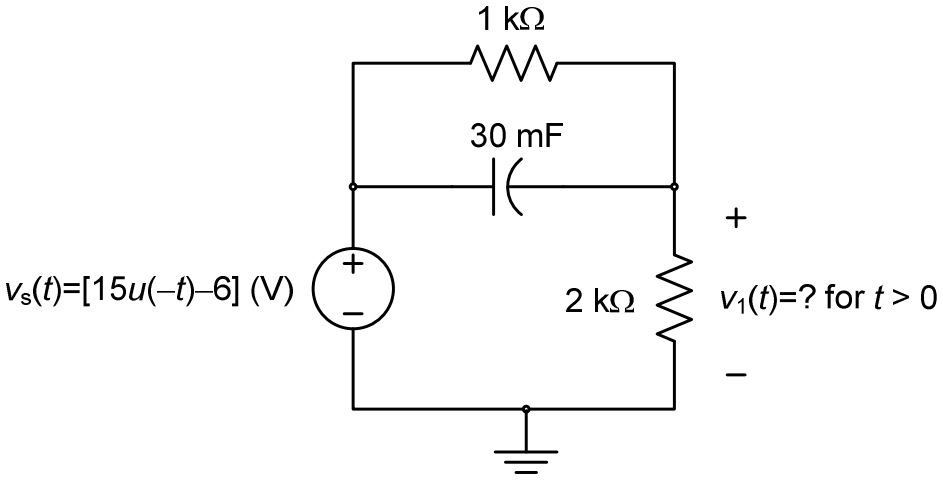
"An honest mind possesses a kingdom."
Lucius Annaeus Seneca (4B.C.–65A.D.)

"Honest people are the true winners of the universe."
Anonymous

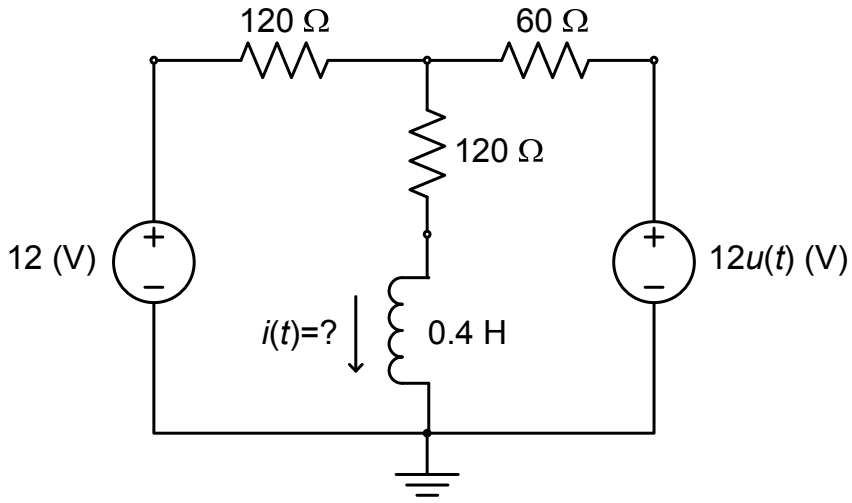
NOTE: On all the problems, please show all your work, and provide the appropriate units for your answers. Also mark on the schematic to show any currents or voltages that you define in your solution. Please also box your answers!
This table is to be used by Inan to record the grades:

Problem # 1 (30 points)	Problem # 2 (30 points)	Problem # 3 (40 points)	Total Score (100 points)

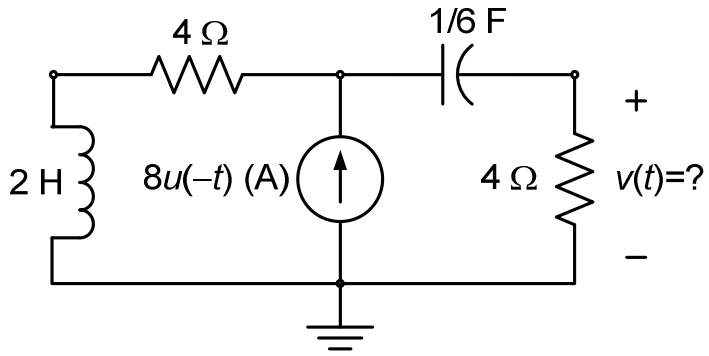
1. (15 mins., 30 points) For the electric circuit as shown, find the complete mathematical expression in simplified form for the voltage waveform $v_1(t)$ for $t > 0$ that appears across the 2 kΩ resistor. Please present your solution step by step and provide justifications.



2. (15 mins., 30 points) In the electric circuit as shown, find the complete mathematical expression in simplified form for the current waveform $i(t)$ for $t \geq 0$. Please present your work step by step with justifications provided.



3. (20 mins., Total: 40 Points) Consider the second-order circuit shown.



(a) (15 points) Solve for the roots (s_1 and s_2) of the characteristic equation of the above circuit for $t > 0$.

(b) (10 points) Based on the results of part (a), write the general mathematical expression for the voltage $v(t)$ for $t > 0$ across the 4 Ω resistor on the right. (At this stage, leave the constant coefficients in your answer as unknown quantities.)

(c) (15 points) Find the values of the coefficients of the $v(t)$ expression found in part (b) using the initial and final conditions.