

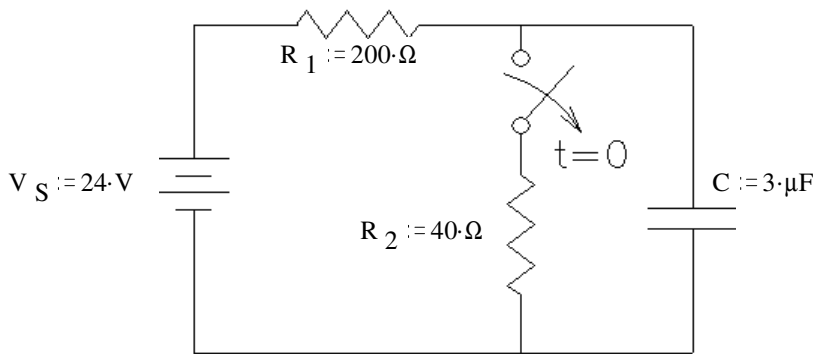
ECE2210/00 Exam 2 given: Spring 08 (The space between problems has been removed.)

1. (26 pts) The switch has been closed for a long time and is opened (as shown) at time $t = 0$.

a) Find the complete expression for $v_C(t)$.

b) What is v_C when $t = 2\tau$?

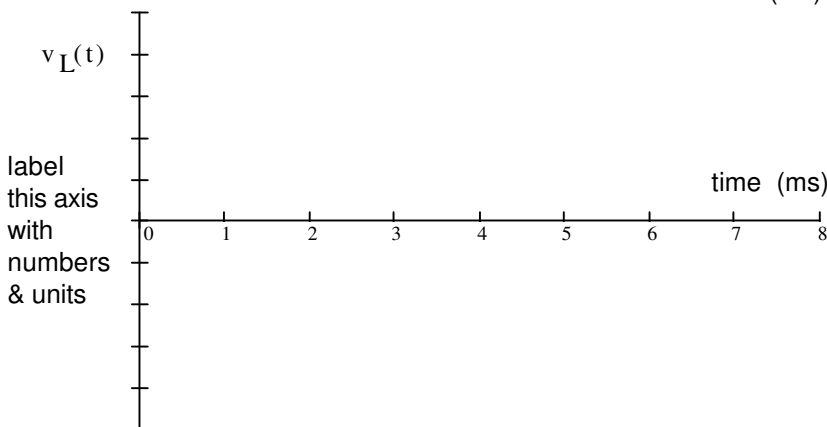
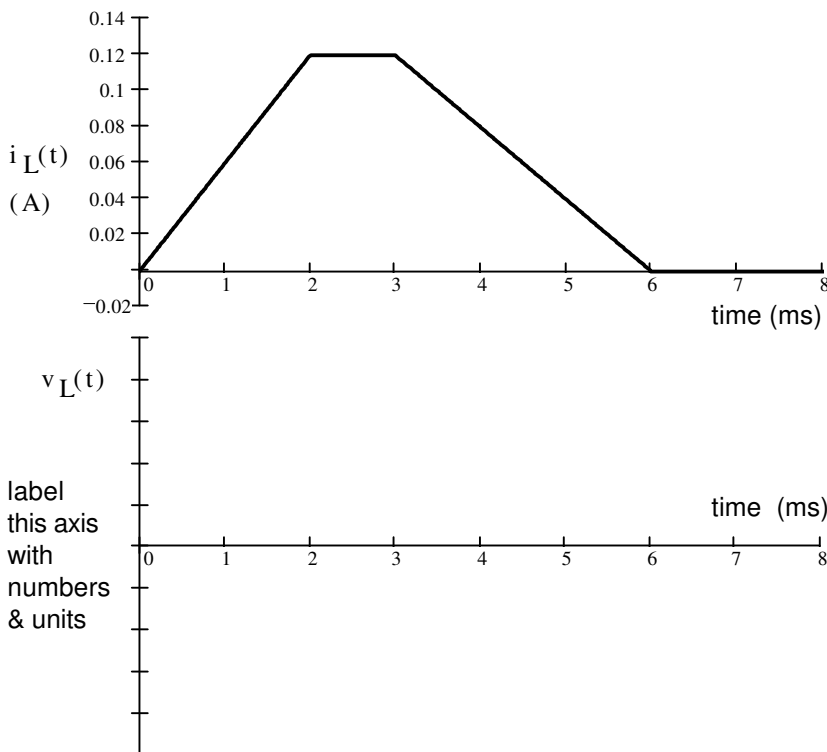
c) At time $t = 2\tau$ the switch is closed again. Find the complete expression for $v_C(t')$, where t' starts at $t = 2\tau$. Be sure to clearly show the time constant.



2. (16 pts) The current through a 0.06 H inductor is shown below. Make an accurate drawing of the inductor voltage. Make reasonable assumptions where necessary. Label your graph.

Note: You will be graded on the accuracy of your plot at 0, 2, 3, 6 and 8 ms, so calculate those values and plot or label them carefully. Between those points your plot must simply be the correct shape.

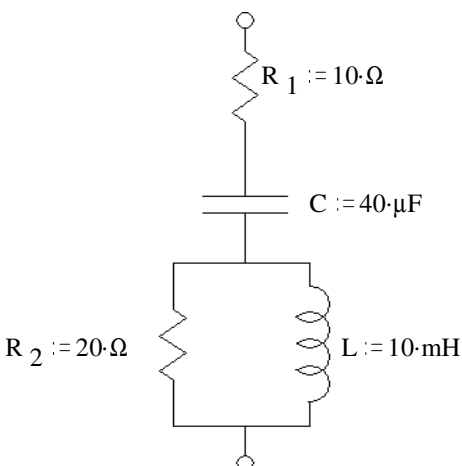
$L := 0.06 \cdot H$



3. (20 pts) Find Z_{eq} in simple polar form (give me numbers).

For partial credit, you must show work and/or intermediate results.

$f = 159.155 \cdot Hz$



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4. (22 pts)

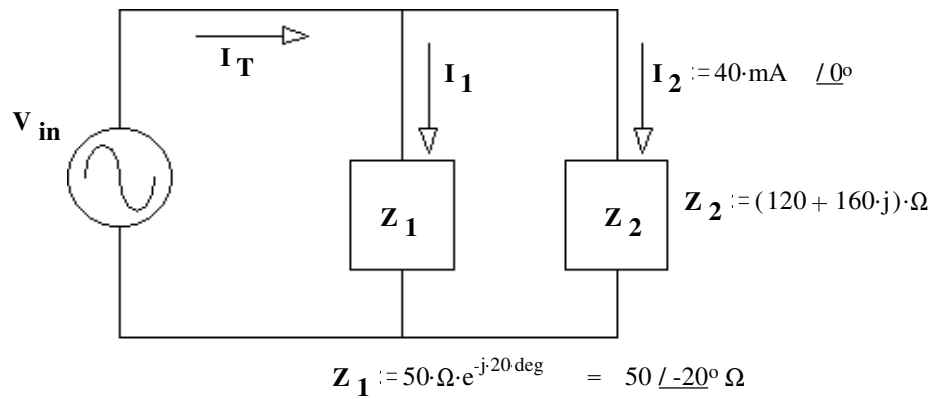
a) Find V_{in} in polar form.

b) Find I_T .

c) Circle 1: i) The source current leads the source voltage

ii) The source voltage leads the source current

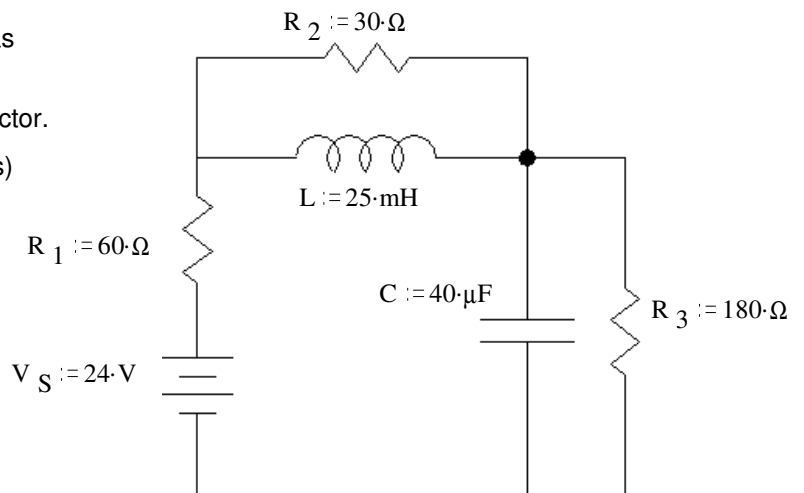
d) By how much? I.E. what is the phase angle between the voltage and current?



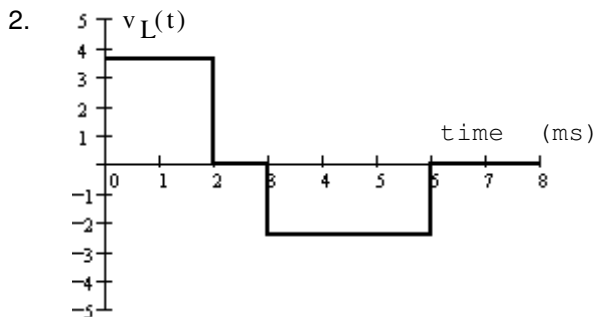
5. (16 pts) The following circuit has been connected as shown for a long time.

Find the energy stored in the capacitor and the inductor.

Also show the values of the voltage(s) and current(s) necessary to answer this question.



1. a) $24 \cdot \text{V} - 20 \cdot \text{V} \cdot e^{\frac{-t}{0.6 \cdot \text{ms}}}$ b) 21.3 · V c) $4 \cdot \text{V} + 17.3 \cdot \text{V} \cdot e^{\frac{-t'}{0.1 \cdot \text{ms}}}$



3. $22.0 \Omega / -50.5^\circ$

4. a) $8 \text{V} / 53.13^\circ$ b) $176 \text{mA} / 60.6^\circ$

c) i) d) $7.43 \cdot \text{deg}$

5. a) $0.125 \cdot \text{mJ}$ b) $6.48 \cdot \text{mJ}$

ECE 2210 Exam 2 Arn Stolp

Name _____

Scores:

Pages 1 & 2 _____ of a possible 42 pts

Pages 3 & 4 _____ of a possible 42 pts

Page 5 _____ of a possible 16 pts

Total _____ of a possible 100 pts