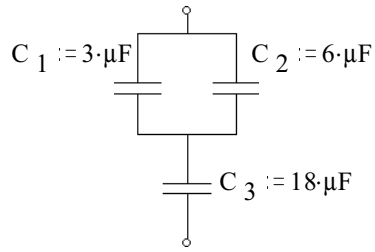


ECE1050/60 Exam 2 given: Fall 02 (The space between problems has been removed.)

1. (12 pts) The following questions are similar to what you might see on the FE exam. You should be able to answer each of these in 2 minutes or less.

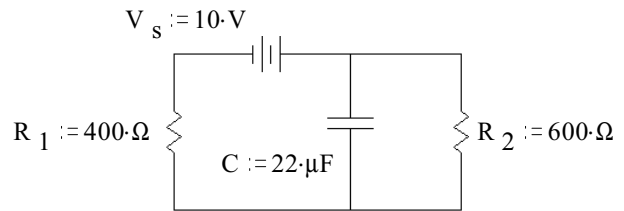
a) What is the equivalent capacitance of the capacitors shown?

- (A) 1.8 μF
- (B) 6 μF
- (C) 20 μF
- (D) 27 μF



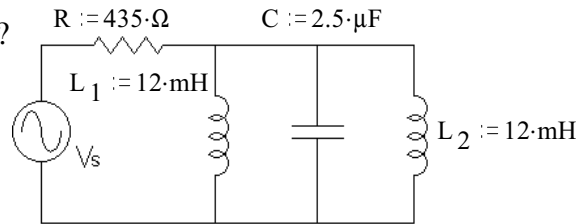
b) The circuit shown has reached steady-state. The energy stored in the capacitor is most nearly:

- (A) 0.18 mJ
- (B) 0.40 mJ
- (C) 0.79 mJ
- (D) 1.1 mJ



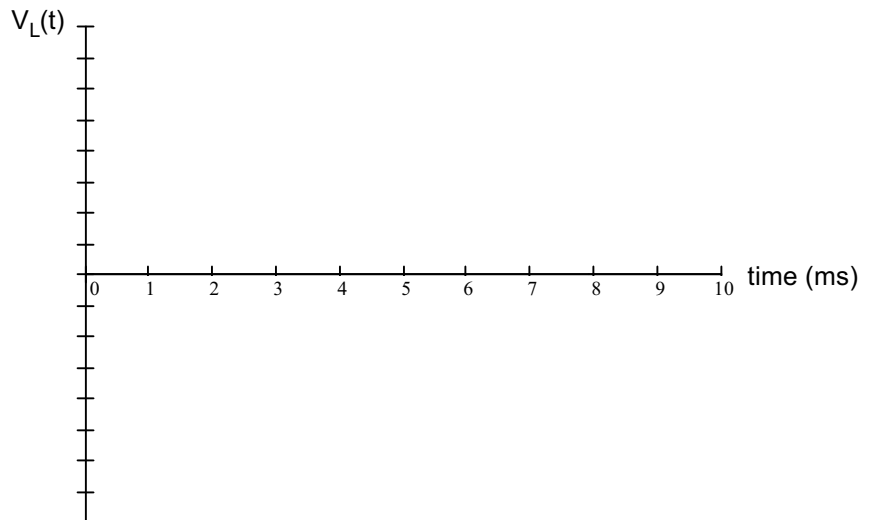
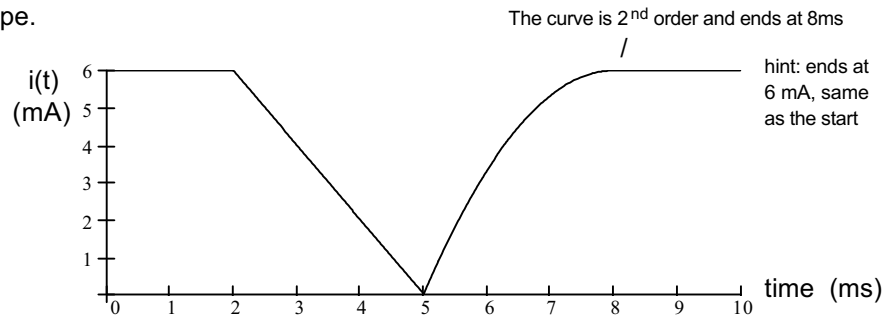
c) What is the resonance frequency of the circuit shown?

- (A) 650 Hz
- (B) 920 Hz
- (C) 1.3 kHz
- (D) 8.2 kHz



2. (20 pts) The current through a 100 mH inductor is shown below. Make an accurate drawing of the inductor voltage. Make reasonable assumptions where necessary. Label your graph.

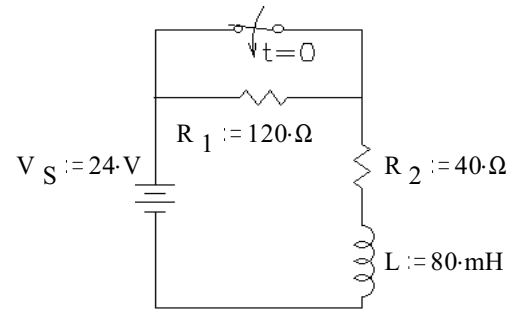
Note: You will be graded on the accuracy (volt level) of your plot at 0, 2, 5, 8, and 10 ms, so calculate those values and plot them carefully. Between those points our plot must simply be the correct shape.



ECE1050/60 Exam 2 Fall 02 p2

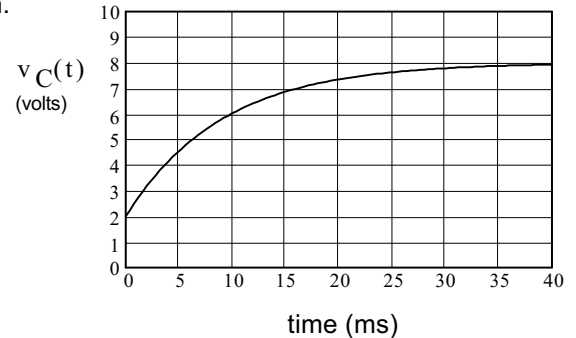
3. (27 pts) The switch has been open for a long time and is switched down (closed, makes contact) at time $t = 0$.

- a) Find the complete expression for $i_L(t)$.
- b) What is $i_L(3\text{ms}) = ?$
- c) At time $t = 3\text{ms}$ the switch is opened again. Find the complete expression for $i_L(t')$, where t' starts at $t = 3\text{ms}$. Be sure to clearly show the time constant.



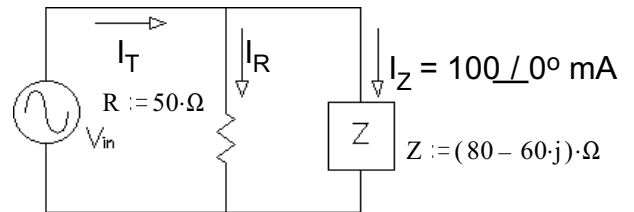
4. (6 pts) The capacitor voltage of a simple series RC circuit is shown.

- a) What was the initial voltage across the capacitor?
- b) What is the DC source voltage of this RC circuit?



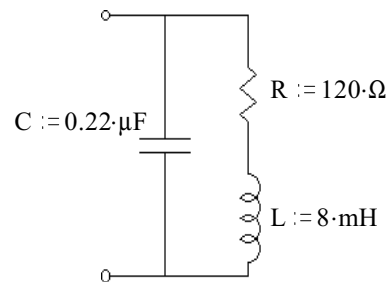
5. (20 pts)

- a) Find V_{in} in polar form.
- b) Find I_T in polar form..
- c) Circle 1: i) The source current leads the source voltage
ii) The source voltage leads the source current



6. (15 pts) Find Z_{eq} , express in in polar or rectangular form:
For partial credit, you must show work and/or intermediate results.

$Z_{eq} = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}j$
OR $Z_{eq} = \underline{\hspace{2cm}} / \underline{\hspace{2cm}}^\circ$ $f := 2\text{-kHz}$



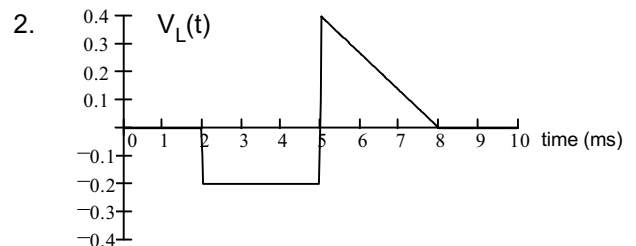
1.a) B b) B c) C

3.a) $i_L(t) := 600\text{-mA} - 450\text{-mA} \cdot e^{-\frac{t}{2\text{ms}}}$
b) 500mA c) $i_L(t) := 150\text{-mA} + 350\text{-mA} \cdot e^{-\frac{t}{0.5\text{ms}}}$

4.a) 2V b) 8V

5.a) $V_{in} = 10V / -36.9^\circ$ b) $I_T = 286\text{mA} / -24.8^\circ$ c) i

6. $190\Omega + 51.9j\Omega = 197 / 15.3^\circ$



EE 1050/60 Exam 2

Name _____

Scores:

Page 1&2 _____ of a possible 32 pts

Page 3&4 _____ of a possible 33 pts

Page 5&6 _____ of a possible 35 pts

Total _____ of a possible 100 pts