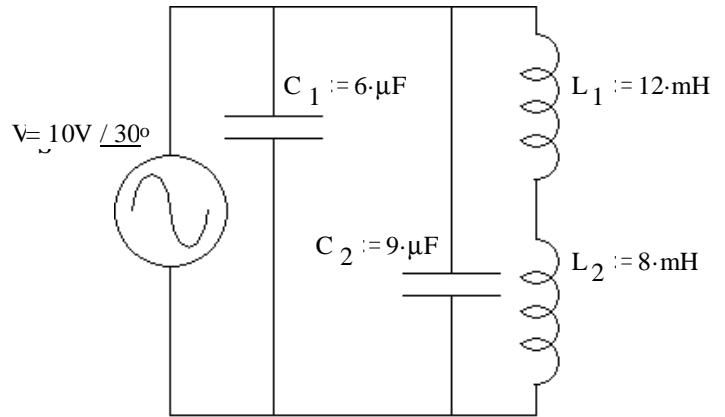


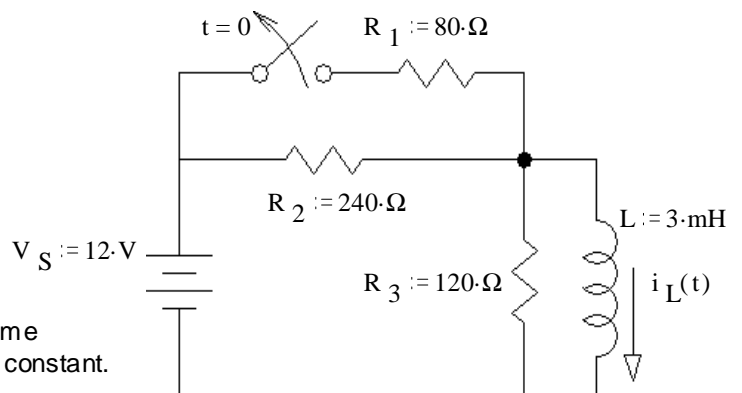
ECE 2210/00 Exam 2 given: Spring 09 (The space between problems has been removed.)

1. (11 pts) Find the resonant frequency (or frequencies) of the circuit shown (in cycles/sec or Hz).



2. (29 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 $i_L(t)$.

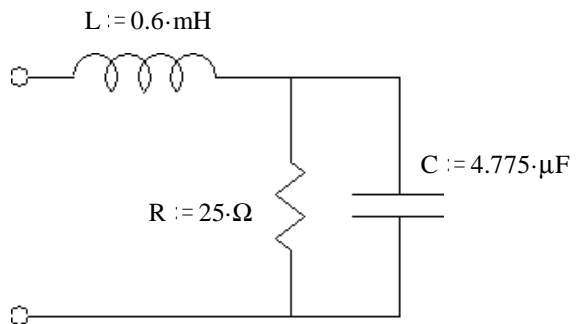


b) At time $t = 1.5\tau$ the switch is closed again. Will the time constant be different now? If yes, find the new time constant.

3. (19 pts) Find Z_{eq} in simple polar form (give me numbers).

You must show work and intermediate results.

$f := 1000 \cdot \text{Hz}$

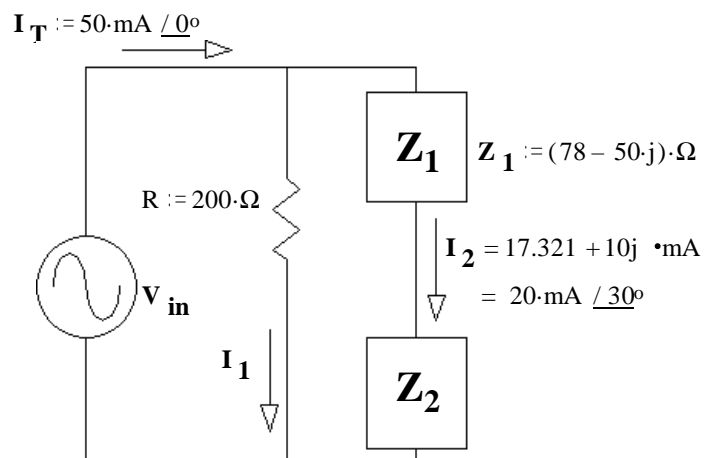


4. (23 pts)

a) Find I_1

b) Find V_{in} in polar form.

c) Find Z_2



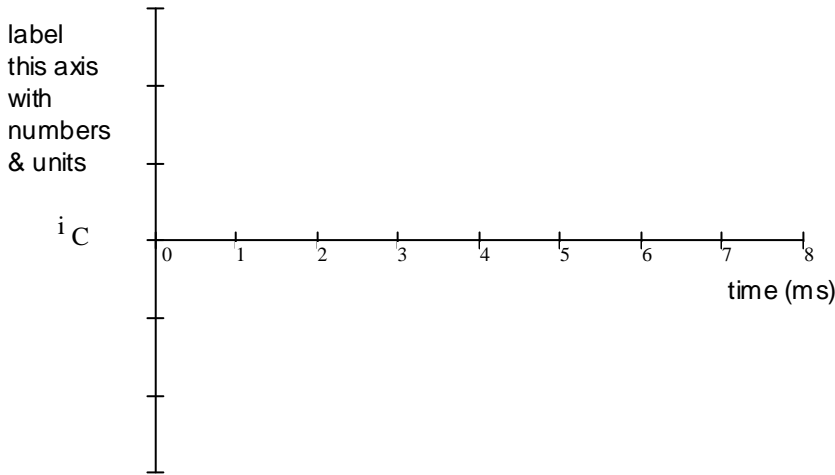
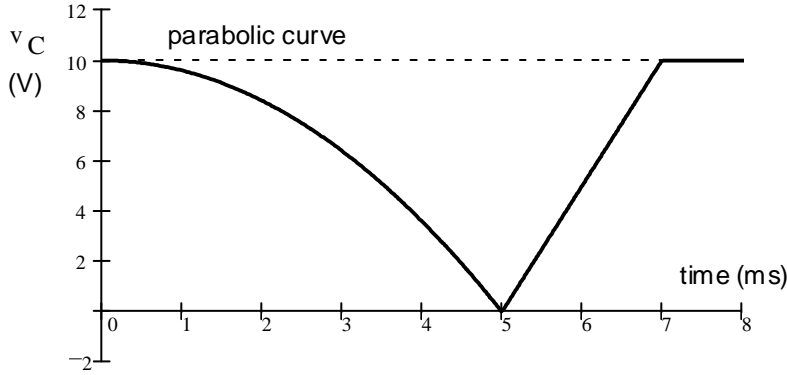
ECE 2210/00 Exam 2 Spring 09 p2

5. (18 pts) The voltage across a $6 \mu\text{F}$ capacitor is shown below. Make an accurate drawing of the capacitor current. Make reasonable assumptions where necessary. Label your graph.

Note: You will be graded on the accuracy of your plot at 0, 5, 7 and 8 ms, so calculate those values and plot or label them carefully. Between those points your plot must simply be the correct shape.

You **MUST SHOW** how you calculate your values.

$C := 6 \cdot \mu\text{F}$



Answers

1. 291·Hz

2. a) $50 \cdot \text{mA} + 150 \cdot \text{mA} \cdot e^{\frac{-t}{37.5 \cdot \mu\text{s}}}$

b) $75 \cdot \mu\text{s}$

3. $18.0 \Omega / -27.2^\circ$

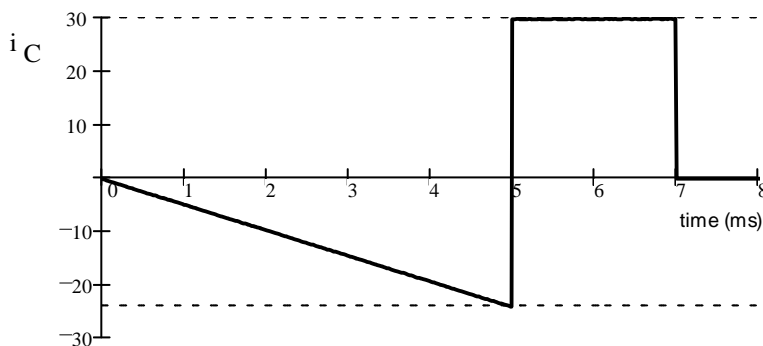
4. a) $I_1 = 34.18 \text{mA} / -17.01^\circ$

b) $V_{in} = 6.84 \text{V} / -17.01^\circ$

c) $Z_2 = 253 / -52.2^\circ \Omega$

5. 0 - 5ms: ramps from 0 to -24mA 5ms - 7ms: flat at +30mA

Beyond 7ms: 0mA



ECE 2210 Exam 2 Am Stolp

Name _____

Scores:

Pages 1 & 2 _____ of a possible 40 pts

Pages 3 & 4 _____ of a possible 42 pts

Page 5 _____ of a possible 18 pts

Total _____ of a possible 100 pts