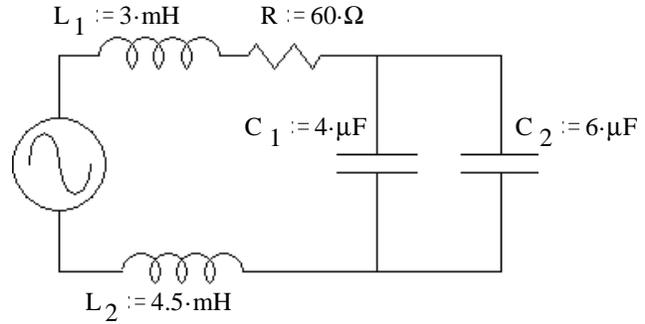


ECE 2210/00 Exam 2 given: Fall 11

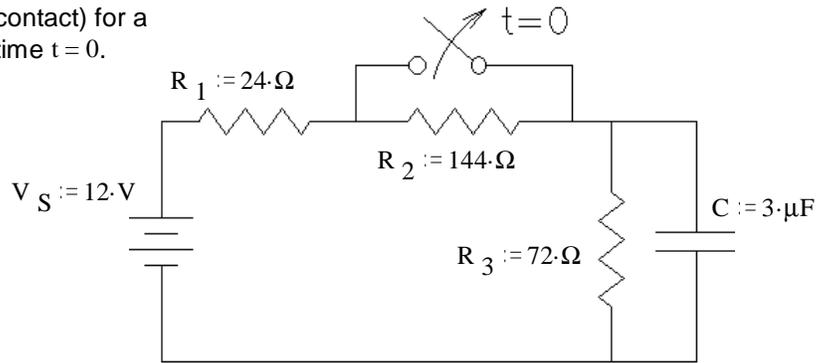
(The space between problems has been removed.)

1. (10 pts) Find the resonant frequency (or frequencies) of the circuit shown (in cycles/sec or Hz).



2. (30 pts) The switch has been closed (making contact) for a long time and is switched open (as shown) at time $t = 0$.

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

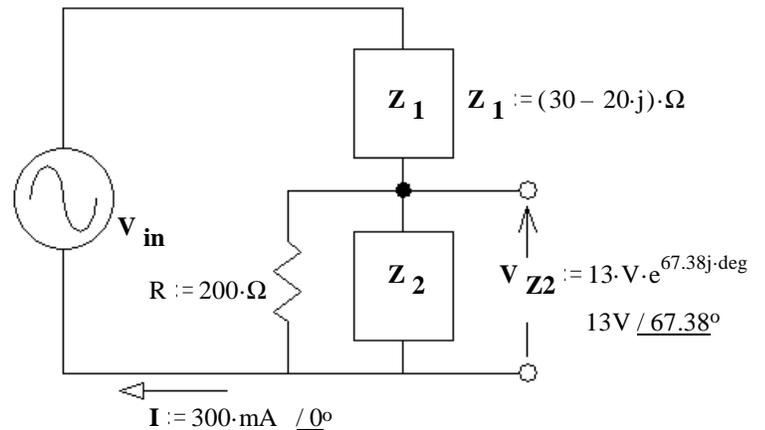


b) What is v_C when $t = 1.5\tau$? $v_C(1.5\tau) = ?$

c) At time $t = 1.5\tau$ the switch is closed again. Find the complete expression for $v_C(t')$, where t' starts at $t = 1.5\tau$. Be sure to clearly show the time constant.

3. On next page (out of order)

4. (23 pts) a) Find V_{in} .



b) Find Z_2 in polar form.

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

ii) The source voltage leads the source current

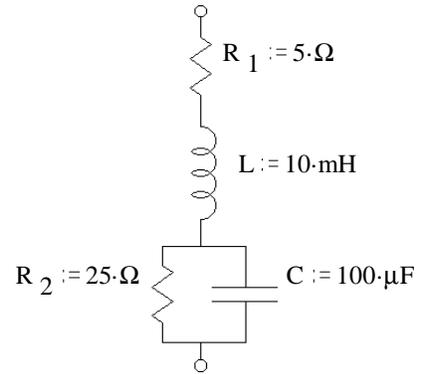
d) By how much? I.E. what is the phase angle between the voltage and current?

ECE 2210/00 Exam 2 Fall 11 p2

3. (18 pts) Find Z_{eq} in simple polar form (give me numbers).

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

$f = 31.831 \cdot \text{Hz}$

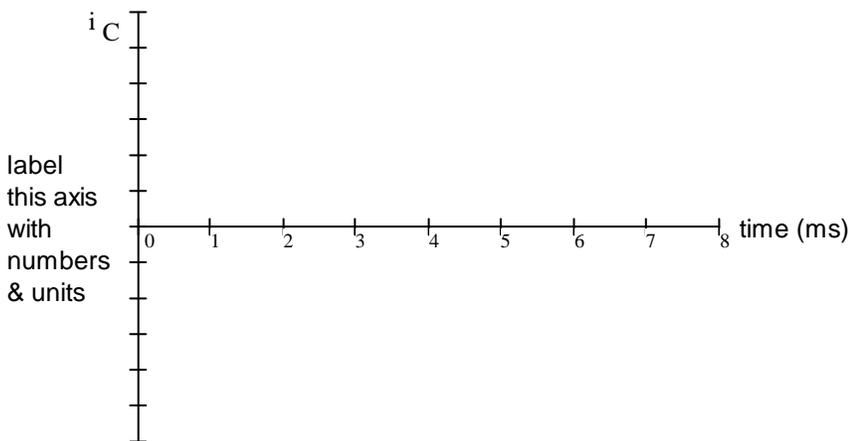
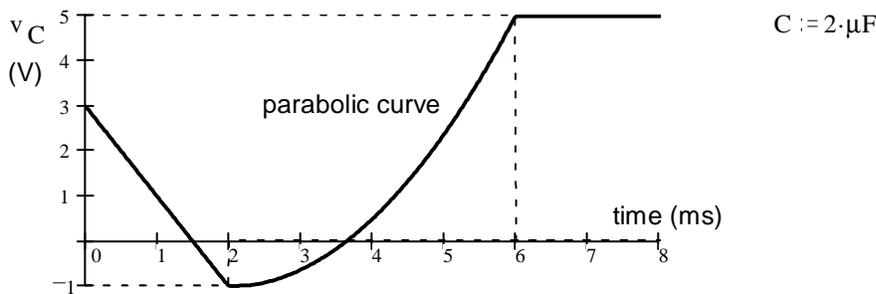


5. 19 pts) The voltage across a capacitor is shown below. Make an accurate drawing of the capacitor current. Make reasonable assumptions where necessary. Label your graph.

Note: You will be graded on the accuracy of your plot at 0, 2, 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.

You **MUST SHOW** how you calculate your values starting from the original relationships between voltage and current.

That is: **Start with the interger and/or differential equations for the capacitor!**



Answers

1. 581 Hz 2. a) $3.6 \cdot V + 5.4 \cdot V \cdot e^{-\frac{t}{151 \cdot \mu s}}$

b) 4.8 V c) $9 \cdot V - 4.2 \cdot V \cdot e^{-\frac{t}{54 \cdot \mu s}}$

3. $26.25 \Omega \angle -17.75^\circ$ 4. a) $15.2V \angle 23.2^\circ$

b) $46.2 \angle 79.7^\circ \Omega$ c) ii) d) 23.2°

