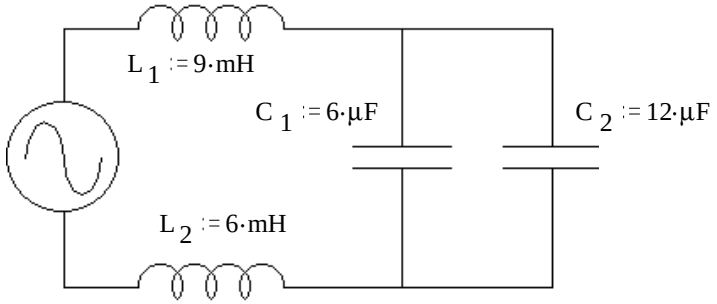
ECE 2210/00 Exam 2 given: Fall 21

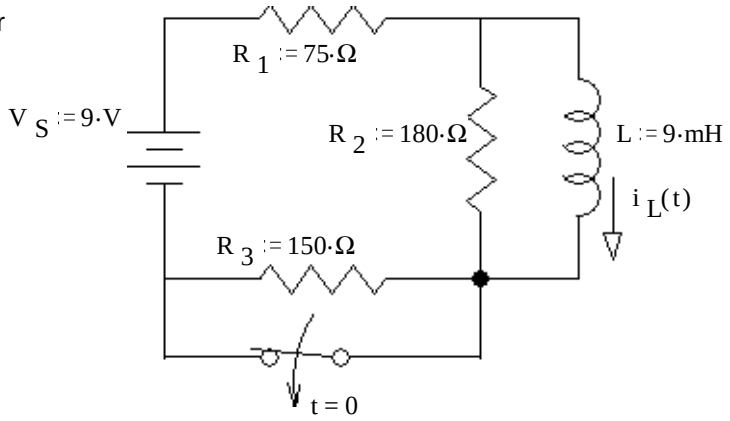
(Some space has been removed)

1. (9 pts) Find the resonant frequency (or frequencies) of the circuit shown (in cycles/sec or Hz).



2. (28 pts) The switch has been open (not making contact) for a long time and is switched closed (as shown) at time $t = 0$.

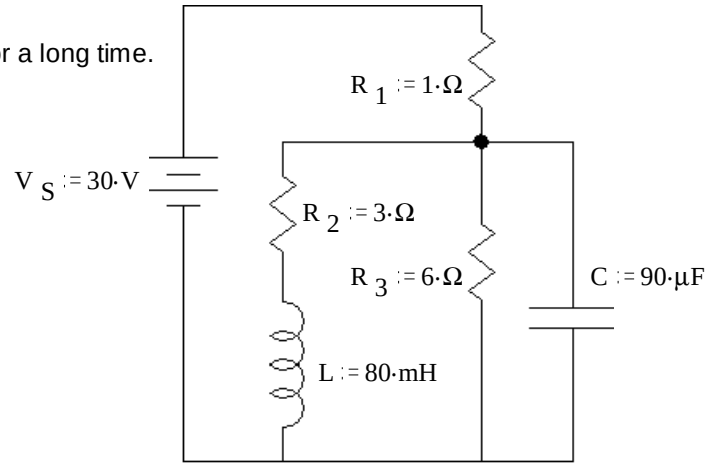
   a) Find the complete expression for $i_L(t)$.



   b) Find i_L at time $t = 1.2\tau$. $i_L(1.2\cdot\tau) = ?$

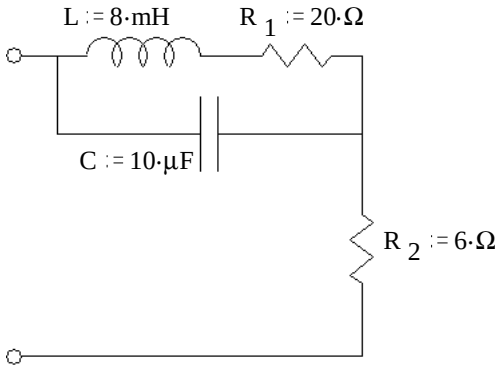
   c) At time $t = 1.2\tau$ the switch is opened again. Will the time constant be different now? If yes, find the new time constant.

3. (15 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.



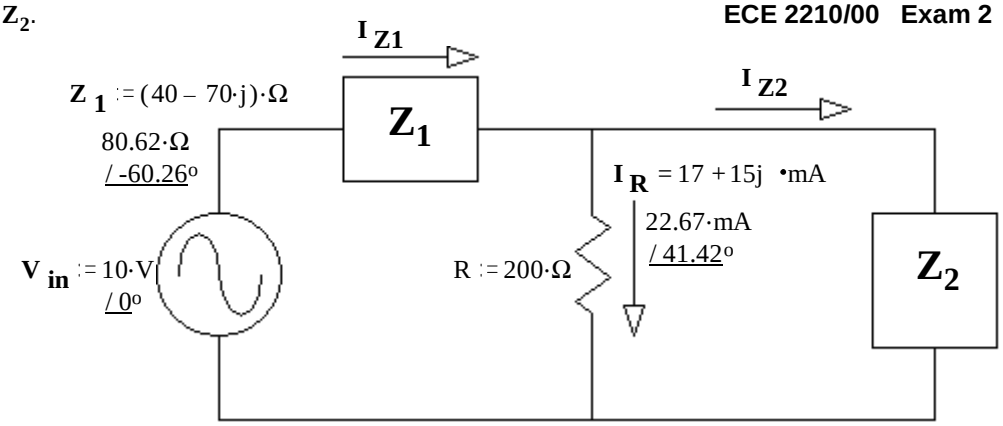
4. (20 pts) $\mathbf{Z_{eq}}$ is the total impedance between the two terminals.
   Find $\mathbf{Z_{eq}}$ in polar form (give me numbers).
   You must show work and/or intermediate results.

   f := 795.78·Hz $\mathbf{Z_{eq}}$ = ?



5. (28 pts) Find $\mathbf{I_{Z1}}$, $\mathbf{I_{Z2}}$ & $\mathbf{Z_2}$.

a) Find $\mathbf{I_{Z1}}$ in any form.



b) Find $\mathbf{I_{Z2}}$ in any form.

c) Find $\mathbf{Z_2}$ in polar form.

Answers

1. 306·Hz 2. a) $120\cdot mA - 80\cdot mA\cdot e^{-\frac{t}{0.17\cdot ms}}$ b) 95.9·mA c) 90·µs 3. 18·mJ 1.78·J 4. 34Ω /-61.9°

5. a) $(72.92 + 52.62\cdot j)\cdot mA$ b) $(55.92 + 37.62\cdot j)\cdot mA$ = 67.4mA / 33.93° c) 67.3·Ω / 7.49° **ECE 2210/00 E2 F21 p3**