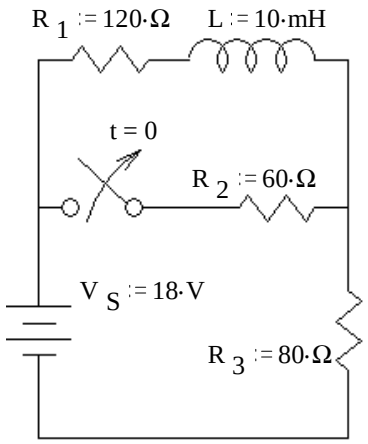
ECE 2210/00 Exam 2 given: Fall 13

(The space between problems has been removed.)

1. (35 pts) The switch has been closed for a long time and is opened (as shown) at time $t = 0$.

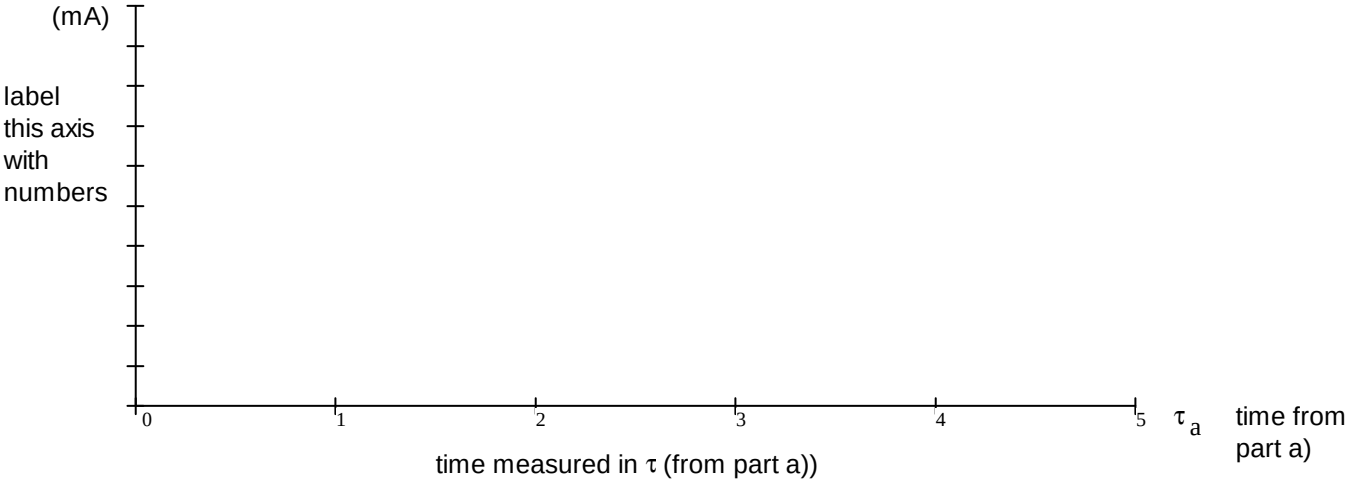


   a) Find the complete expression for $i_L(t)$.

   b) Find i_L at time $t = 2\tau$. $i_L(2\cdot\tau)$ = ?

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

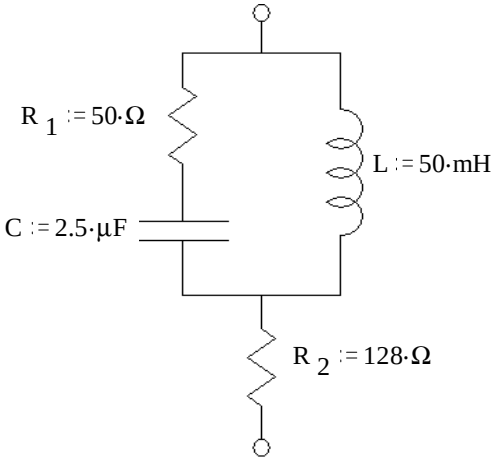
   d) Draw a sketch of the inductor current below. Show values on the vertical scale. The horizontal scale is marked in units of τ from part a).



2. (22 pts) Find $\mathbf{Z_{eq}}$ in simple polar form (give me numbers).

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

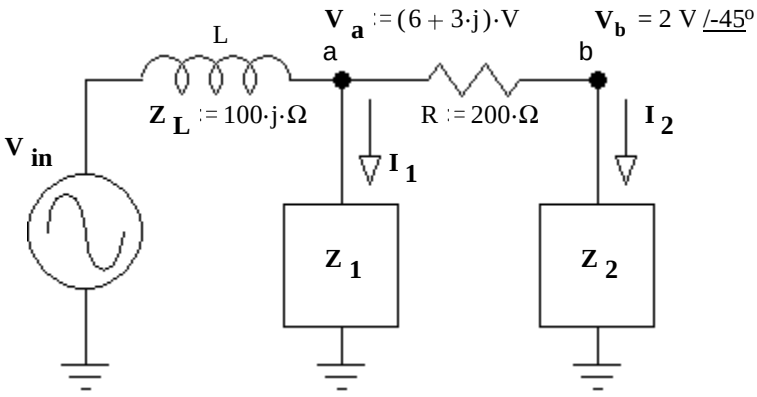
   $f = 636.62 \cdot Hz$



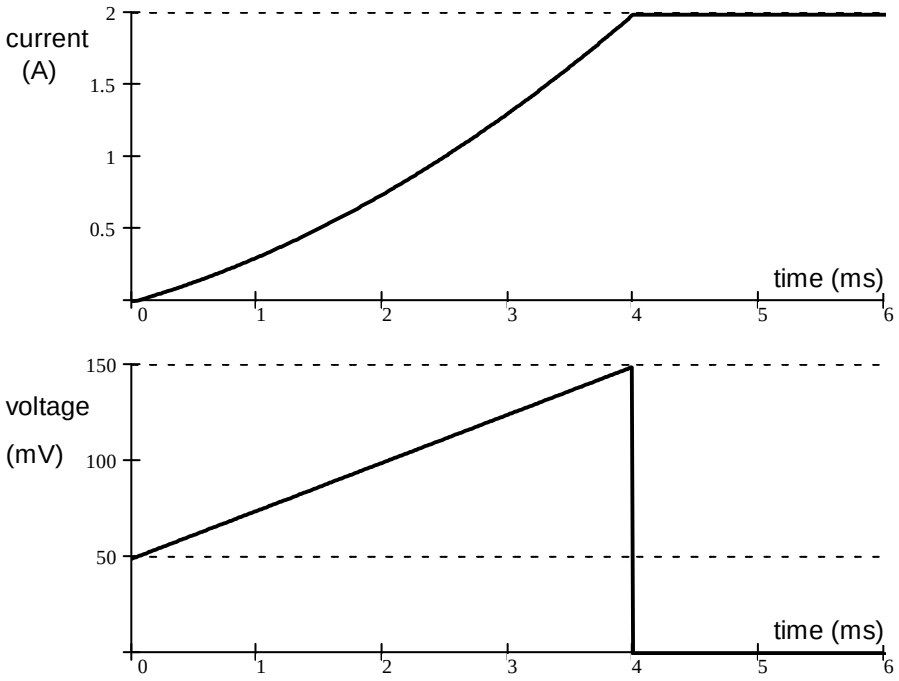
3. (27 pts) $\mathbf{V_a}$ is the nodal voltage at node a and $\mathbf{V_b}$ is the nodal voltage at node b.

   a) Find $\mathbf{Z_2}$.

   b) $\mathbf{I_1} := (20 - 30\cdot j)\cdot mA$ Find $\mathbf{V_{in}}$.



4. (16 pts) a) The current through some part and the voltage across the same part are shown below. Tell me what kind of part it is.

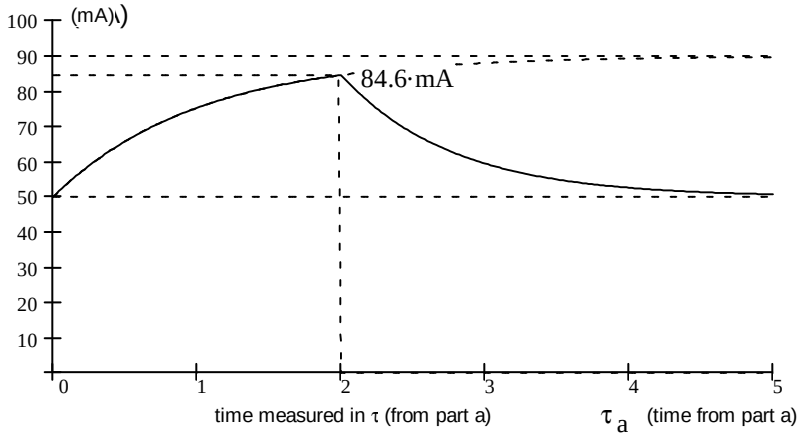


b) Find the part's value.

Answers

1. a) $90\cdot mA - 40\cdot mA\cdot e^{\frac{-t}{50\cdot \mu s}}$ b) $84.6\cdot mA$

c) $50\cdot mA + 34.6\cdot mA\cdot e^{\frac{-t}{64.8\cdot \mu s}}$ d)



2. 312 Ω /-22.6°

3. a) 62.8 Ω /-88.9° b) 9.97 V /47°

4. a) inductor b) 0.2·mH