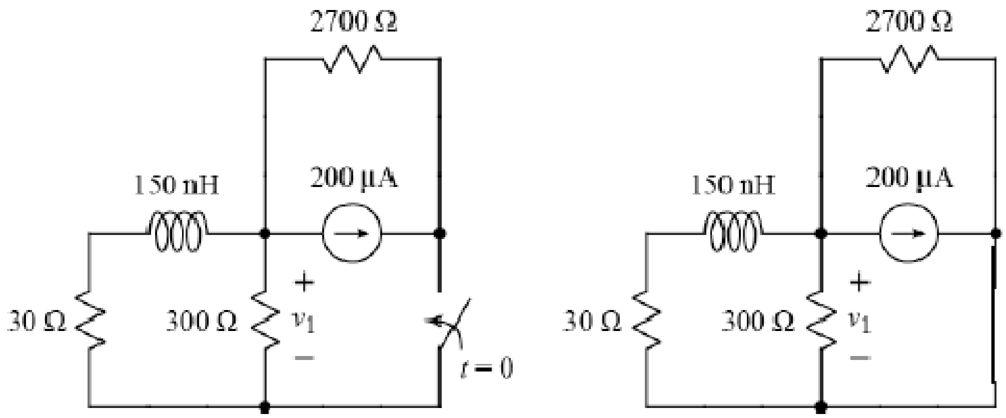
UNIVERSITY OF UTAH
ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT

ECE 1270 **HOMEWORK #6** Summer 2011

1.

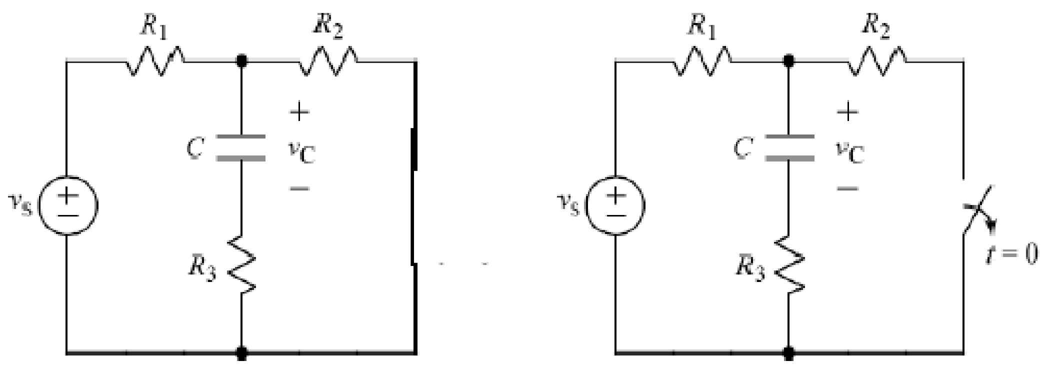


After being open(left circuit) for a long time, the switch closes at t = 0(right circuit).

a) Calculate the energy stored on the inductor as $t \rightarrow \infty$.

b) Write a numerical expression for $v_1(t)$ for $t > 0$.

2.

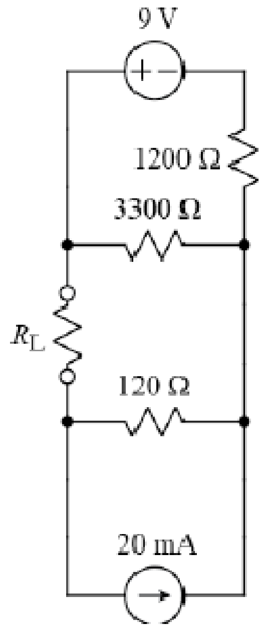


After being closed(left circuit) for a long time, the switch opens at t = 0(right circuit).

a) Write an expression for $v_C(t = 0^+)$.

b) Write an expression for $v_C(t > 0)$ in terms of no more than R_1, R_2, R_3, v_s, and C.

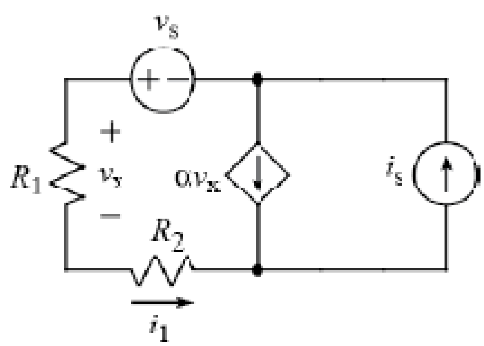
3.



a) Calculate the value of R_L that would absorb maximum power.

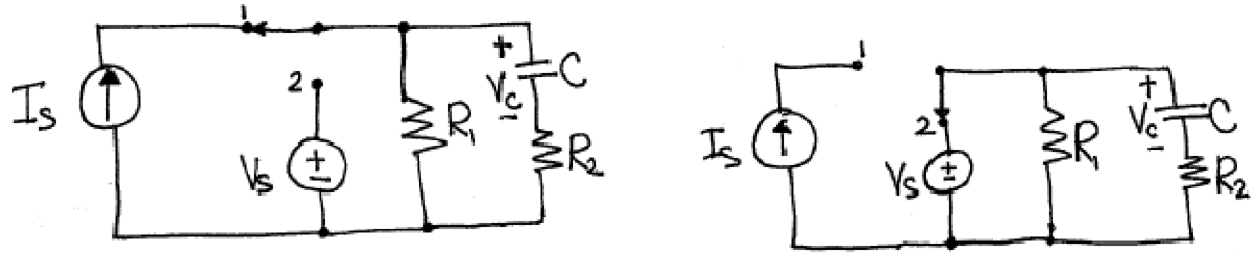
b) Calculate that value of maximum power R_L could absorb.

4.



Using superposition, derive an expression for i_1 that contains no circuit quantities other than i_s, v_s, R_1, R_2, and α. Note: $\alpha > 0$.

5.

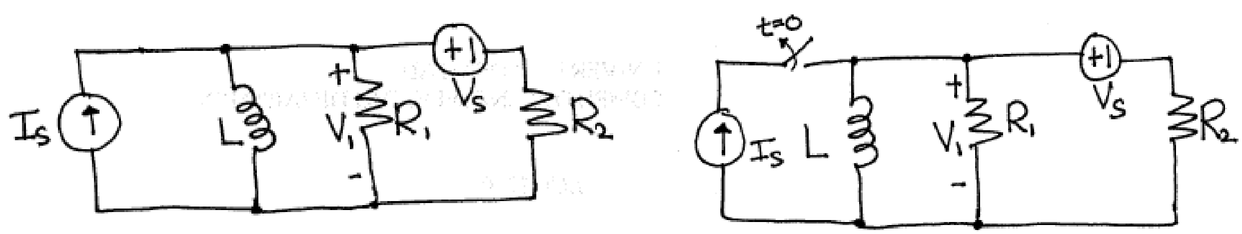


After being in position 1(left circuit) for a long time, the switch moves to position 2 at t=0(right circuit).

a) Write an expression for $v_C(t > 0)$ in terms of no more than R_1, R_2, V_s, I_s, and C.

b) Write an expression for the energy stored on the capacitor as $t \to \infty$ in terms of no more than R_1, R_2, V_s, I_s, and C.

6.

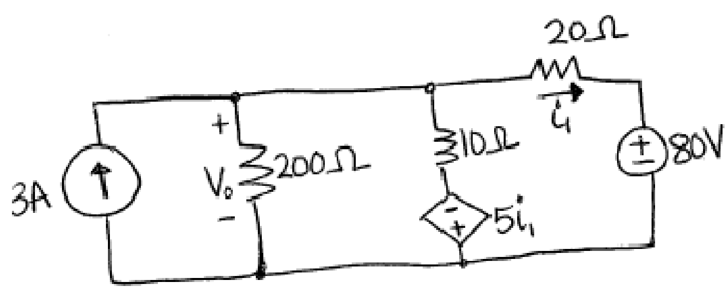


After being closed(left circuit) for a long time, the switch opens at t = 0(right circuit).

a) Write an expression for $v_1(t > 0)$ in terms of no more than R_1, R_2, V_s, I_s, and L.

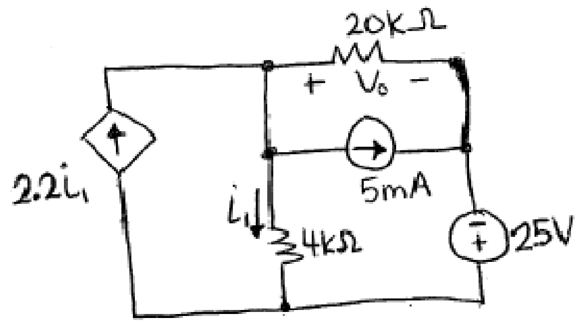
b) Write an expression for the energy stored on the inductor as $t \to \infty$ in terms of no more than R_1, R_2, V_s, I_s, and L.

7.



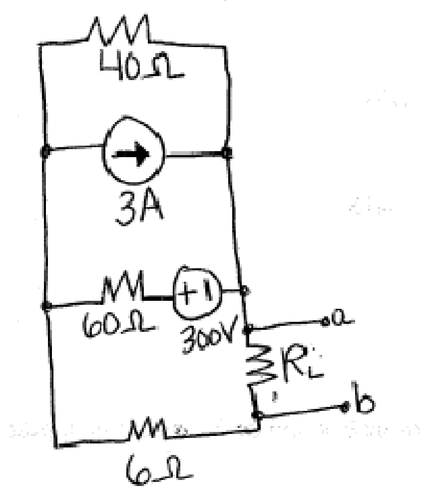
Using superposition, derive a value for i_1.

8.



Using superposition, derive an expression for V_o.

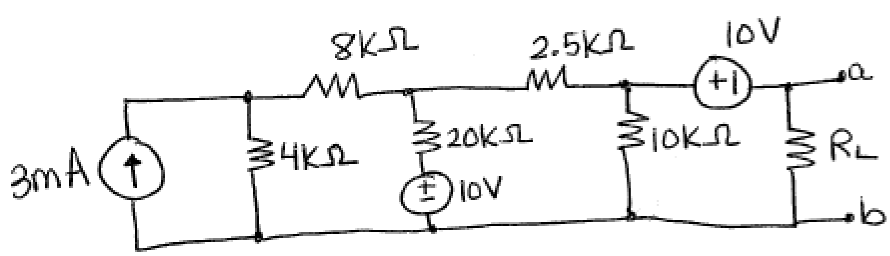
9.



a) Calculate the value of R_L that would absorb maximum power.

b) Calculate that value of maximum power R_L could absorb.

10.



a) Calculate the value of R_L that would absorb maximum power.

b) Calculate that value of maximum power R_L could absorb.