1. After being open for a long time, the switch closes at $t = 0$.
Calculate the energy stored on the capacitor as $t \to \infty$.

2. For the circuit in problem 1, write a numerical expression for $i(t)$ for $t > 0$.

3. After being open for a long time, the switch closes at $t = 0$. Write an expression for $i_L(t > 0)$ in terms of no circuit quantities other than $R_1, R_2, R_3, v_s$, and $L$. 

![Diagrams of circuits](image-url)
4. 

\[ \text{30 V} \quad 60 \Omega \]
\[ \quad 30 \Omega \]
\[ a \quad R_L \quad b \]
\[ 2 \text{ A} \]

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

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

5. 

Using superposition, derive an expression for \( v_1 \) that contains no circuit quantities other than \( i_s, v_S, R_1, R_2, \) and \( \beta \), where \( \beta > 0 \).