29. The two voltage sources have been in the circuit of figure P8.29 for a long time. Compute $i_L(t)$ for $t \geq 0$. Plot your answer using MATLAB or equivalent for $0 \leq t \leq 5\tau$.

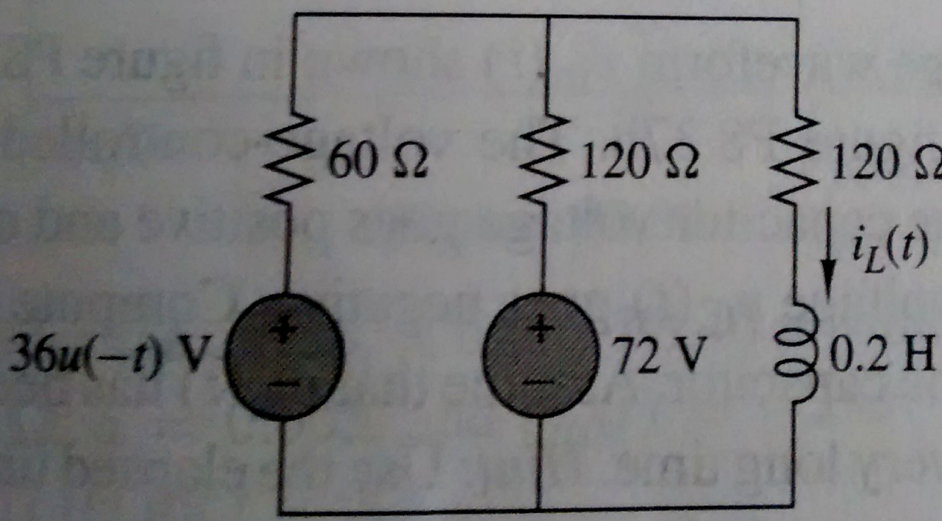

Figure P8.29

30. The two voltage sources have been in the circuit of figure P8.30 for a long time. Compute $v_C(t)$ for $t \geq 0$. Plot your answer using MATLAB or equivalent for $0 \leq t \leq 5\tau$.

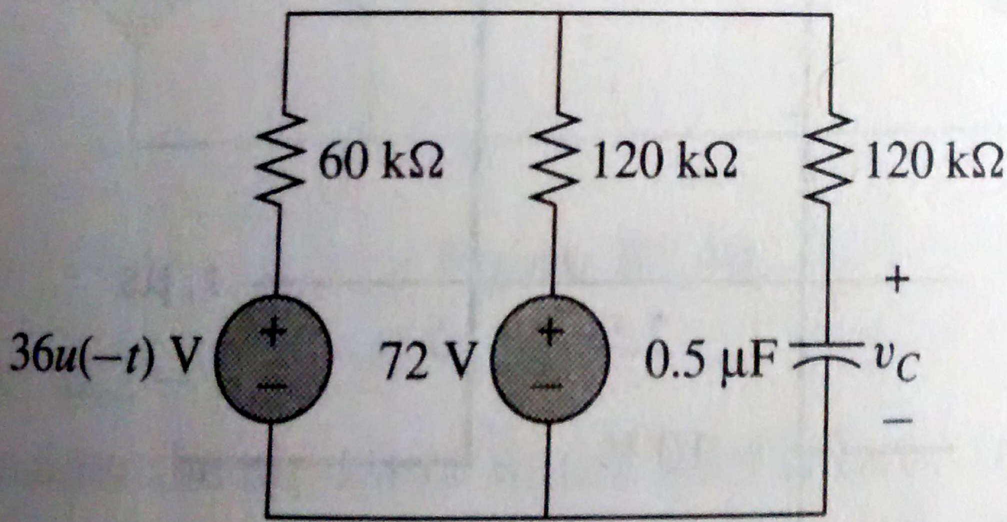

Figure P8.30

33. Consider the circuit of figure P8.33 in which the indicated source excitations are valid for all time.

(a) Compute the response $i_L(t)$ for $t \geq 0$. Plot for $0 \leq t \leq 5\tau$, where τ is the circuit time constant.

(b) Find the inductor voltage $v_L(t)$ for $t > 0$ directly using equation 8.23.

(c) What are the new responses if the value of each source is doubled?

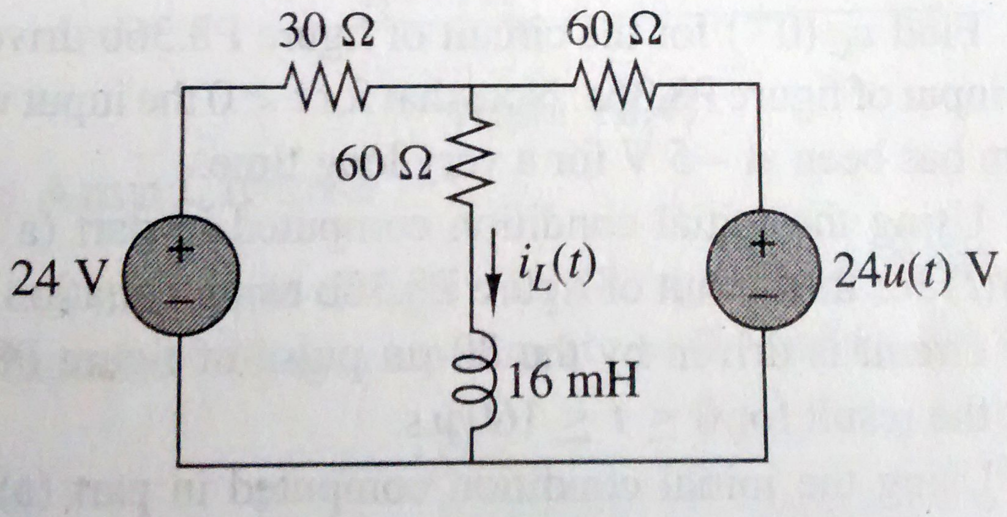

Figure P8.33

35. Consider the circuit of figure P8.35 in which the switch opens at $t = 0.5$ s.

(a) Find $v_C(0^-)$.

(b) Find $v_C(0^+)$. Justify your answer.

(c) Compute the time constant τ_1 valid for $0 \le t < 0.5$ s.

(d) Construct an expression for $v_C(t)$ valid for $0 \le t < 0.5$ s.

(e) Compute $v_C(0.5^+)$.

(f) Compute the time constant τ_2 valid for $t \ge 0.5$ s.

(g) Find an expression for $v_C(t)$ valid for $t \ge 0.5$ s.

(h) Sketch the waveform for $0 \le t \le 2.4$ s using MATLAB.

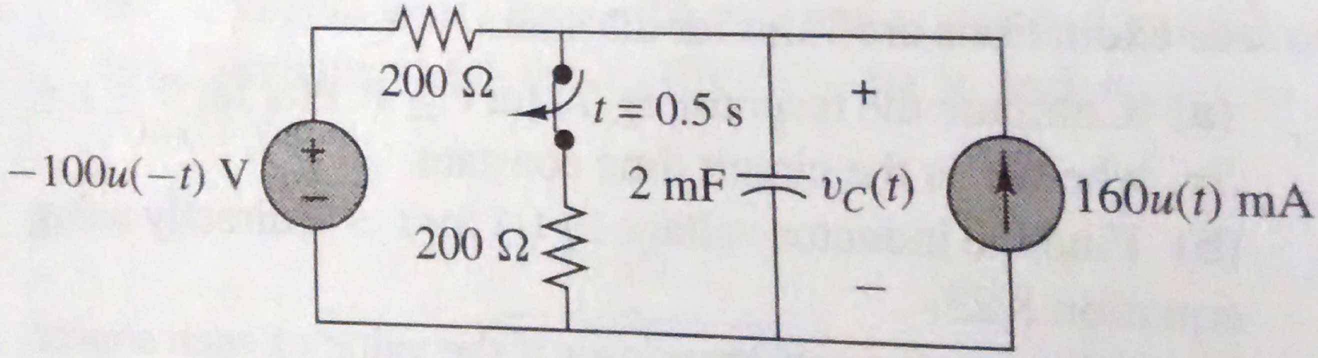

Figure P8.35

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12. For the circuit of figure P9.12, determine L so that the frequency of the sinusoidal response, for $t > 0$, is 5000 Hz. (Be careful about units!) Now find $v_C(0^-)$, $v_C(0^+)$, $i_C(0^-)$, $i_C(0^+)$, and $v_C(t)$ for $t > 0$.

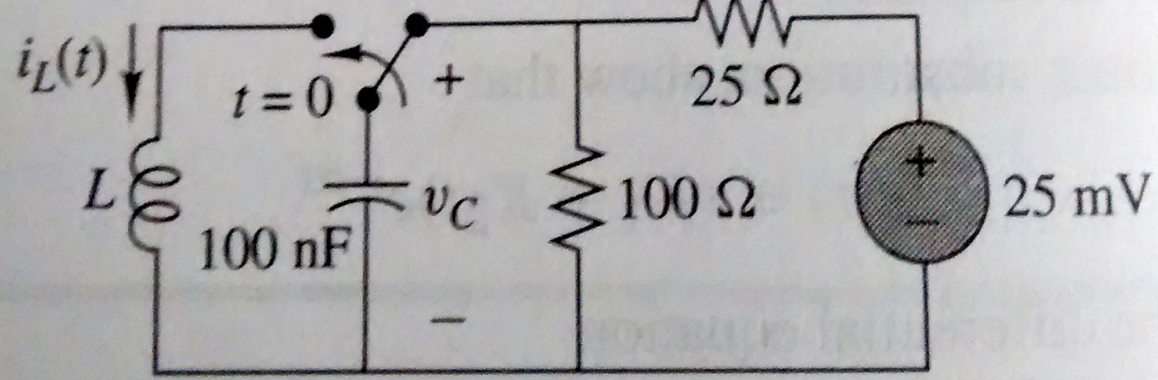

Figure P9.12

18. In figure P9.18, the switch S has been at position A for a long time and is moved to position B at $t = 0$.

(a) Find $v_C(t)$ for $t > 0$.

(b) Find $i_L(0^+)$, $i_L(\infty)$, and $i_L(t)$ for $t > 0$.

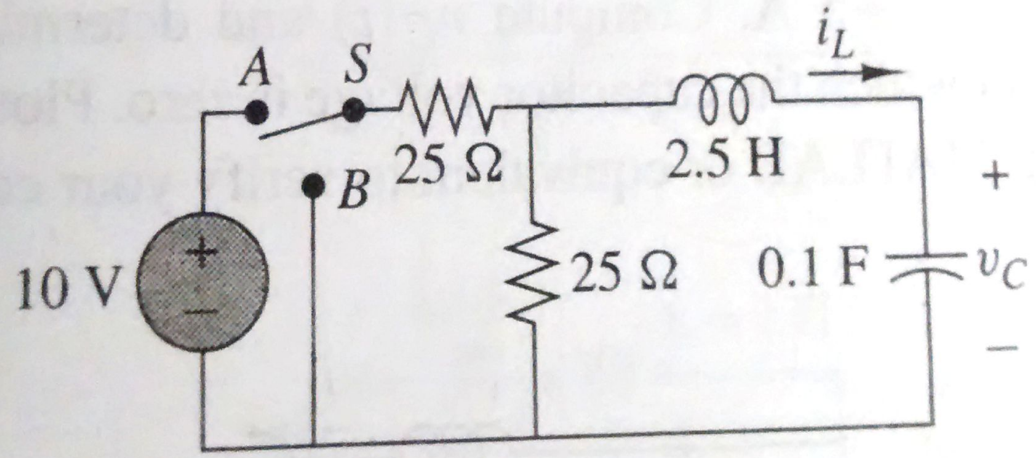

Figure P9.18