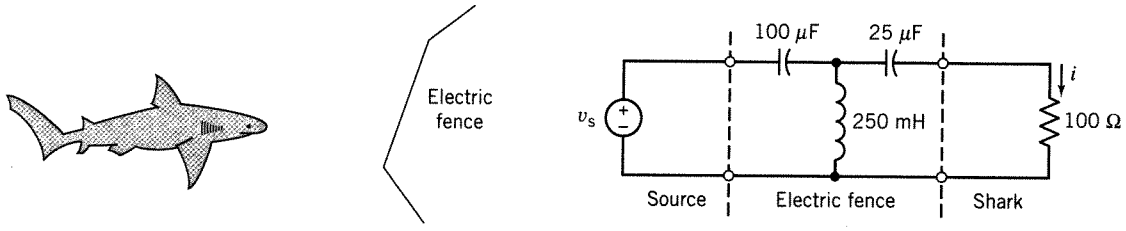

FIGURE P 10.10-11
Electric fence for repelling sharks.

Section 10.11 Superposition, Thévenin and Norton Equivalents, and Source Transformations

P 10.11-1 For the circuit of Figure P 10.11-1, find $i(t)$ when $v_1 = 12 \cos(4000t + 45°)$ V and $v_2 = 5 \cos 3000t$ V.

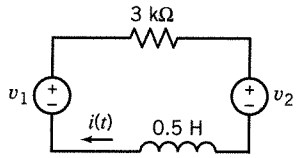

FIGURE P 10.11-1

P 10.11-2 Determine $i(t)$ of the circuit of Figure P 10.11-2.
Hint: Replace the voltage source by a series combination of a dc voltage and a sinusoidal voltage source.
Answer: $i(t) = 0.166 \cos(4t - 135°) + 0.5$ mA

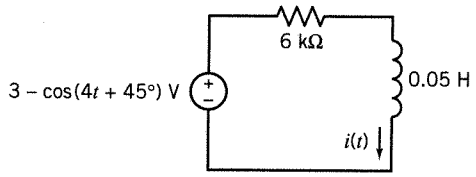

FIGURE P 10.11-2

P 10.11-3 Determine $i(t)$ for the circuit of Figure P 10.11-3.
Answer: $i(t) = 1.9 \cos(4t + 26.6°) + 0.8 \cos(3t + 166°)$ A

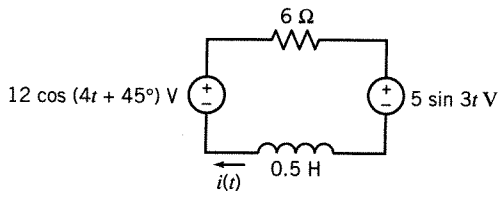

FIGURE P 10.11-3

P 10.11-4 Determine the Thévenin equivalent circuit for the circuit shown in Figure P 10.11-4 when $v_s = 5 \cos(4000t - 30°)$.
Answer: $\mathbf{V}_t = 5.7\angle -21.9°$ V
$\mathbf{Z}_t = 23\angle -81.9°\ \Omega$

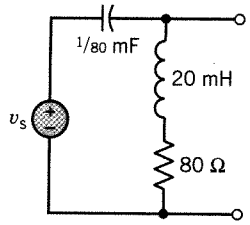

FIGURE P 10.11-4

P 10.11-5 Find the Thévenin equivalent circuit for the circuit shown in Figure P 10.11-5 using the mesh current method.
Answer: $\mathbf{V}_t = 3.71\angle -16°$ V
$\mathbf{Z}_t = 247\angle -16°\ \Omega$

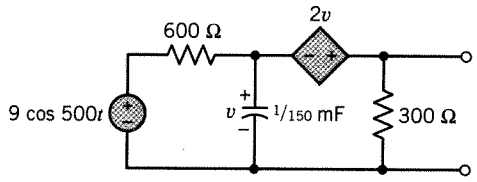

FIGURE P 10.11-5

P 10.11-6 A pocket-sized mini-disk CD player system has an amplifier circuit shown in Figure P 10.11-6 with a signal $v_s = 10 \cos(\omega t + 53.1°)$ at $\omega = 10{,}000$ rad/s. Determine the Thévenin equivalent at the output terminals a–b.

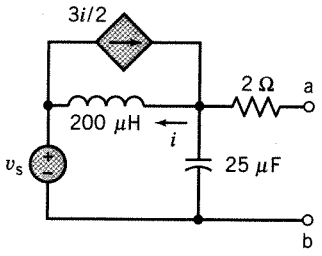

FIGURE P 10.11-6

P 10.11-7 An AM radio receiver uses the parallel *RLC* circuit shown in Figure P 10.11-7. Determine the frequency, f_0, at which the admittance $\mathbf{Y}$ is a pure conductance. The AM radio will receive the signal broadcast at the frequency f_0. What is the "number" of this station on the AM radio dial?
Answer: $f_0 = 800$ Hz, which corresponds to 80 on the AM radio dial.