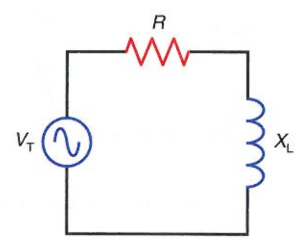
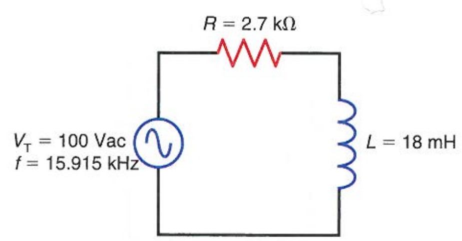
21–16 In Fig. 21–20, solve for Z_T, I, V_L, V_R, and θ_Z for the following circuit values:
a. $X_L = 30\ \Omega$, $R = 40\ \Omega$, and $V_T = 50$ V.
b. $X_L = 50\ \Omega$, $R = 50\ \Omega$, and $V_T = 141.4$ V.
c. $X_L = 10\ \Omega$, $R = 100\ \Omega$, and $V_T = 10$ V.
d. $X_L = 100\ \Omega$, $R = 10\ \Omega$, and $V_T = 10$ V.

Figure 21–20



21–17 In Fig. 21–21, solve for X_L, Z_T, I, V_R, V_L, and θ_Z.

Figure 21–21



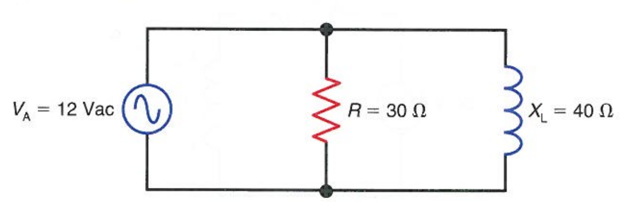
21–18 In Fig. 21–21, what happens to each of the following quantities if the frequency of the applied voltage increases?
a. X_L.
b. Z_T.
c. I.
d. V_R.
e. V_L.
f. θ_Z.

21–19 Repeat Prob. 21–18 if the frequency of the applied voltage decreases.

SECTION 21–4 X_L AND R IN PARALLEL

21–20 In Fig. 21–22, how much voltage is across
a. the 30-Ω resistor, R?
b. the 40-Ω inductive reactance, X_L?

Figure 21–22



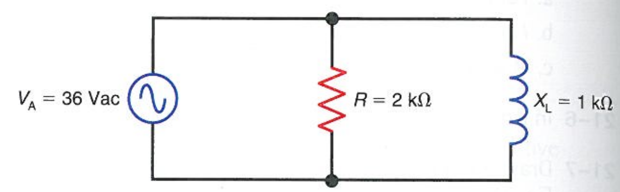
21–21 In Fig. 21–22, what is the phase relationship between
a. V_A and I_R?
b. V_A and I_L?
c. I_L and I_R?

21–22 In Fig. 21–22, solve for I_R, I_L, I_T, Z_{EQ}, and θ_I.

21–23 Draw the phasor current triangle for the circuit in Fig. 21–22. (Use I_R as the reference phasor.)

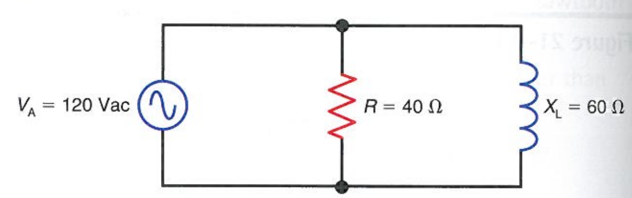
21–24 In Fig. 21–23, solve for I_R, I_L, I_T, Z_{EQ}, and θ_I.

Figure 21–23



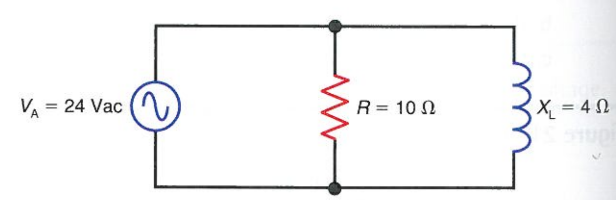
21–25 In Fig. 21–24, solve for I_R, I_L, I_T, Z_{EQ}, and θ_I.

Figure 21–24



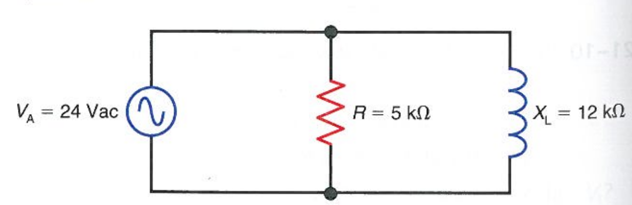
21–26 In Fig. 21–25, solve for I_R, I_L, I_T, Z_{EQ}, and θ_I.

Figure 21–25



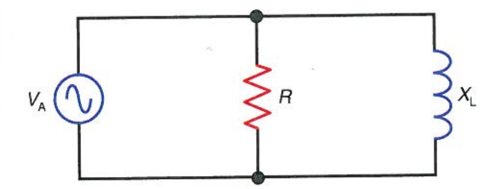
21–27 In Fig. 21–26, solve for I_R, I_L, I_T, Z_{EQ}, and θ_I.

Figure 21–26



21–28 In Fig. 21–27, solve for I_R, I_L, I_T, Z_{EQ}, and θ_I for the following circuit values?
a. $R = 50\ \Omega$, $X_L = 50\ \Omega$, and $V_A = 50$ V.
b. $R = 10\ \Omega$, $X_L = 100\ \Omega$, and $V_A = 20$ V.
c. $R = 100\ \Omega$, $X_L = 10\ \Omega$, and $V_A = 20$ V.

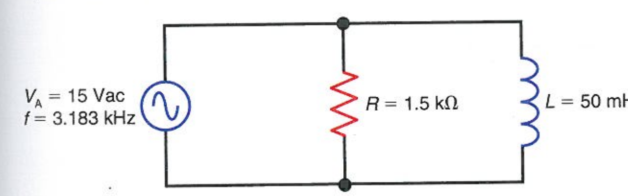
Figure 21–27



21–29 In Fig. 21–27, how much is Z_{EQ} if $R = 320\ \Omega$ and $X_L = 240\ \Omega$?

21–30 In Fig. 21–28, solve for X_L, I_R, I_L, I_T, Z_{EQ}, and θ_I.

Figure 21–28



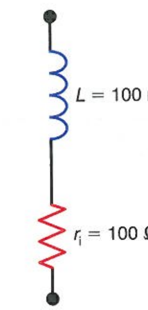
21–31 In Fig. 21–28, what happens to each of the following quantities if the frequency of the applied voltage increases?
a. I_R.
b. I_L.
c. I_T.
d. Z_{EQ}.
e. θ_I.

21–32 Repeat Prob. 21–31 if the frequency of the applied voltage decreases.

SECTION 21–5 Q OF A COIL

21–33 For the inductor shown in Fig. 21–29, calculate the Q for the following frequencies:
a. $f = 500$ Hz.
b. $f = 1$ kHz.
c. $f = 1.592$ kHz.
d. $f = 10$ kHz.

Figure 21–29



21–34 Why can't the Q of a coil increase without limit as the value of X_L increases for higher frequencies?

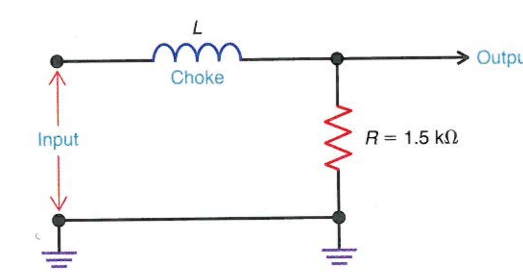
21–35 Calculate the ac effective resistance, R_e, of a 350-μH inductor whose Q equals 35 at 1.5 MHz.

21–36 Recalculate the value of R_e in Prob. 21–35 if the value of Q decreases to 25 at 5 MHz.

SECTION 21–6 AF AND RF CHOKES

21–37 In Fig. 21–30, calculate the required value of the choke inductance, L, at the following frequencies:
a. $f = 500$ Hz.
b. $f = 2.5$ kHz.
c. $f = 200$ kHz.
d. $f = 1$ MHz.

Figure 21–30



21–38 If $L = 50$ mH in Fig. 21–30, then what is the lowest frequency at which L will serve as a choke?

21–39 In Fig. 21–30 assume that the input voltage equals 10 V peak-to-peak for all frequencies. If $L = 150$ mH, then calculate V_{out} for the following frequencies:
a. 159.2 Hz.
b. 1.592 kHz.
c. 15.92 kHz.

SECTION 21–7 THE GENERAL CASE OF INDUCTIVE VOLTAGE

21–40 In Fig. 21–31, draw the waveform of induced voltage, V_L, across the 8-mH inductor for the triangular current waveform shown.

21–41 In Fig. 21–32, draw the waveform of induced voltage, V_L, across the 250-mH inductor for the sawtooth current waveform shown.