

Figure 21-31

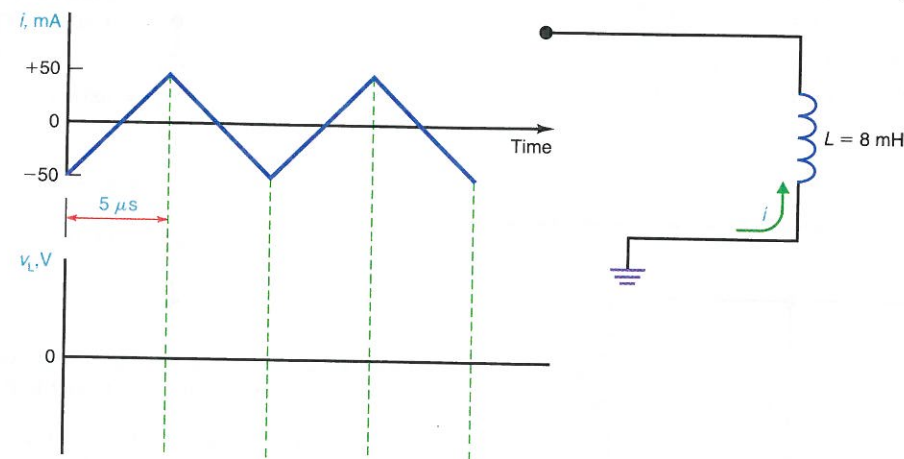
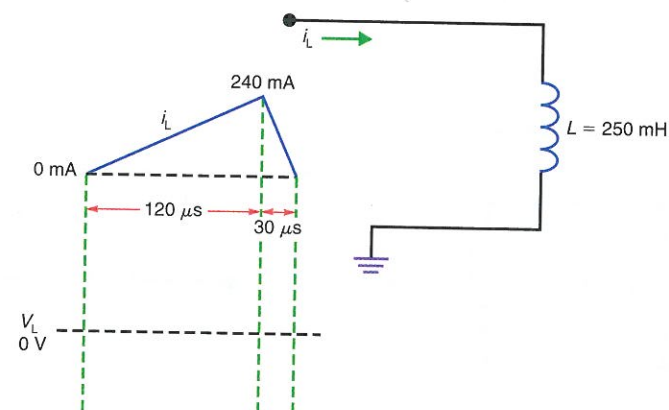


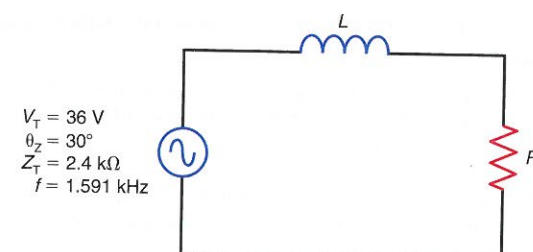
Figure 21-32



## Critical Thinking

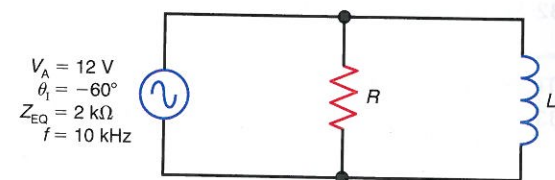
21-42 In Fig. 21-33, calculate  $X_L$ ,  $R$ ,  $I$ ,  $V_L$ , and  $V_R$ .

Figure 21-33 Circuit for Critical Thinking Prob. 21-42.



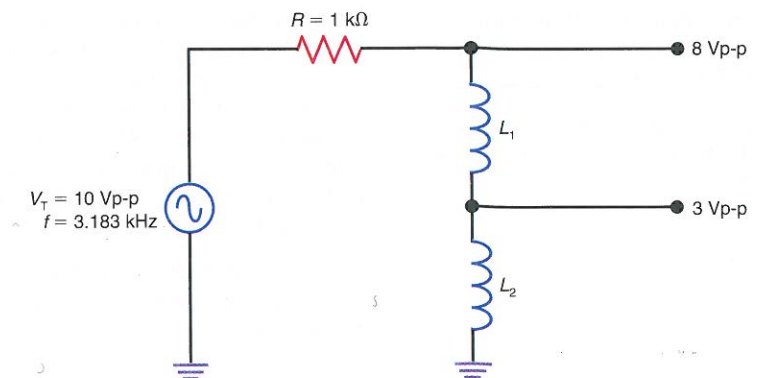
21-43 In Fig. 21-34, calculate  $I_T$ ,  $I_R$ ,  $I_L$ ,  $X_L$ ,  $R$ , and  $L$ .

Figure 21-34 Circuit for Critical Thinking Prob. 21-43.



21-44 In Fig. 21-35, calculate  $V_R$ ,  $V_{L1}$ ,  $V_{L2}$ ,  $I$ ,  $Z_T$ ,  $L_1$ ,  $L_2$ , and  $\theta_Z$ .

Figure 21-35 Circuit for Critical Thinking Prob. 21-44.



## Answers to Self-Reviews

- 21-1 a.  $0^\circ$   
b.  $90^\circ$   
c. lag  
21-2 a.  $0^\circ$   
b.  $90^\circ$   
21-3 a. 28.28  
b. 28.28 V  
c.  $45^\circ$

- 21-4 a. 2.828 A  
b.  $-45^\circ$   
21-5 a. 75  
b. 10  $\Omega$   
21-6 a. 800  $\Omega$   
b. 1600  $\Omega$   
21-7 a. 1000 A/s  
b. 9000 A/s

## Laboratory Application Assignment

In this lab application assignment you will examine both series and parallel  $RL$  circuits. In the series  $RL$  circuit you will measure the individual component voltages as well the circuit current and phase angle. In the parallel  $RL$  circuit you will measure the individual branch currents, the total current, and the circuit phase angle.

**Equipment:** Obtain the following items from your instructor.

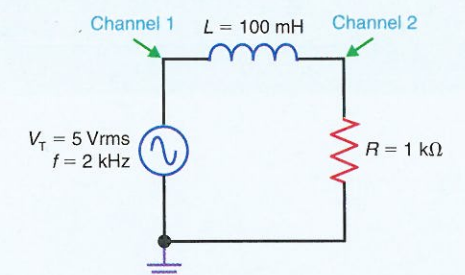
- Function generator
- Oscilloscope
- 10- $\Omega$  and 1-k $\Omega$  carbon-film resistors and a 100-mH inductor
- DMM

### Series $RL$ Circuit

Examine the series  $RL$  circuit in Fig. 21-36. Calculate and record the following circuit values:

$$X_L = \underline{\hspace{2cm}}, Z_T = \underline{\hspace{2cm}}, I = \underline{\hspace{2cm}}, V_L = \underline{\hspace{2cm}}, \\ V_R = \underline{\hspace{2cm}}, \theta_Z = \underline{\hspace{2cm}}$$

Figure 21-36



Construct the circuit in Fig. 21-36. Set the total voltage,  $V_T$ , to 5 Vrms and the frequency,  $f$ , to 2 kHz. Using a DMM, measure and record the following circuit values:

$$I = \underline{\hspace{2cm}}, V_L = \underline{\hspace{2cm}}, V_R = \underline{\hspace{2cm}}$$