

Figure 21-37

Examine the parallel RL circuit in Fig. 21-37a. Calculate and record the following circuit values:

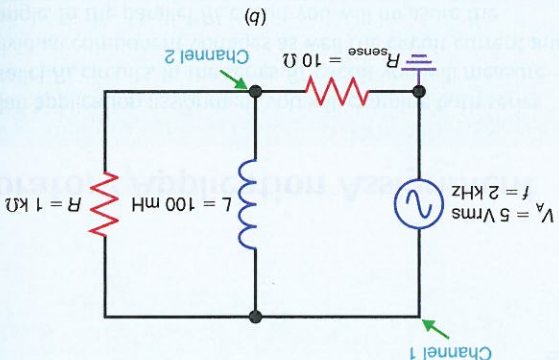
$Z_T = \underline{\hspace{2cm}}$, $\theta = \underline{\hspace{2cm}}$, $I_T = \underline{\hspace{2cm}}$, $I_R = \underline{\hspace{2cm}}$, $I_L = \underline{\hspace{2cm}}$

Ask your instructor for assistance in using the oscilloscope to measure the phase angle, θ , in Fig. 21-36. Note the connections designated for channels 1 and 2 in the figure.

Parallel RL Circuit

Using the measured values of V_T and V_R , calculate the total voltage, V_T , as $V_T = \sqrt{V_R^2 + V_L^2}$. Does this value equal the applied voltage, V_T , of 5 V? Using the measured values of voltage and current, calculate X_L as V_L/I and Z_T as V_T/I . $X_L = \underline{\hspace{2cm}}$, $Z_T = \underline{\hspace{2cm}}$. Using Formula (21-3), determine the phase angle, θ . $\theta = \underline{\hspace{2cm}}$. How do these values compare to those originally calculated in Fig. 21-36.

In the space provided below, draw the phasor voltage triangle, including the phase angle, θ , for the circuit of Fig. 21-36. Use measured values for V_R , V_L , and V_T .



Ask your instructor for assistance in using the oscilloscope to measure the phase angle, θ , in Fig. 21-37b. Note the connections designated for channels 1 and 2 in the figure. [The voltage drop across the sensing resistor (R_{sense}) has the same phase as the total current, I_T .]

Construct the circuit in Fig. 21-37a. Set the applied voltage, V_A , to 5 Vrms and the frequency, f , to 2 kHz. Using a DMM, measure and record the following circuit values:

$I_T = \underline{\hspace{2cm}}$, $I_R = \underline{\hspace{2cm}}$, $I_L = \underline{\hspace{2cm}}$

Using the measured values of I_T and I_R , calculate the total current, I_T , as $I_T = \sqrt{I_R^2 + I_L^2}$. Does this value agree with the measured value of total current? Using the measured values of I_T and I_R , calculate the phase angle, θ , using Formula (21-6). $\theta = \underline{\hspace{2cm}}$. Also, calculate X_L as V_L/I_L and Z_T as V_T/I_T . How do these values compare to those originally calculated in Fig. 21-37a?

In the space provided below, draw the phasor current triangle, including the phase angle, θ , for the circuit of Fig. 21-37a. Use measured values for I_T , I_R , and I_L .