ET 350L Name:
Lab C
Inductance, Impedance, Phase Shift

Assemble the circuit in Fig.1. Set the signal generator for a sine wave of 10k Hz and maximum amplitude but no D.C. offset.

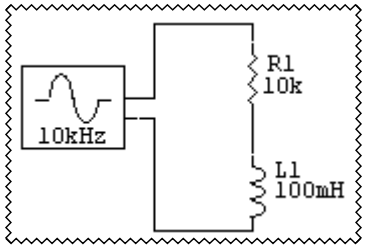

Fig. 1

1. Use the voltmeter to measure the output of the signal generator, this is the total voltage. V_T = _____

2. Measure the voltage across R1: V_{R1} = _____

3. Measure the voltage across L1: V_{L1} = _____

4. Does the sum of $V_{R1} + V_{L1}$ equal the total voltage V_T? Why or why not?

5. Calculate inductive reactance X_L. (Hint: $X_L = 2\pi fL$) X_L = _____

6. Calculate impedance using the vector diagram in Fig. 2; label the appropriate quantities.

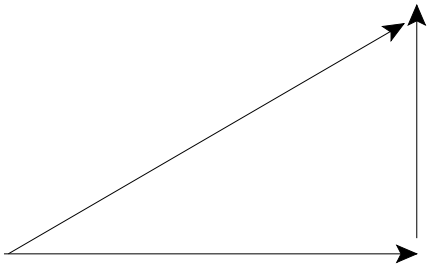
Fig. 2

7. Calculate the phase angle using the vector diagram in Fig. 2. (Hint: $\theta = \arctan \frac{X_L}{R}$)

8. Calculate total current (Hint: $I = \frac{V}{Z}$)

9. Measure total current: I_T = _____
Do the calculated and measured values match?

10. Connect the oscilloscope as in Fig 3. Draw the observed waveforms, label the axes and label the waveforms indicating which waveform is ahead. Where is the current with respect to the voltage across the inductor; is it ahead or behind, if so by how many degrees?

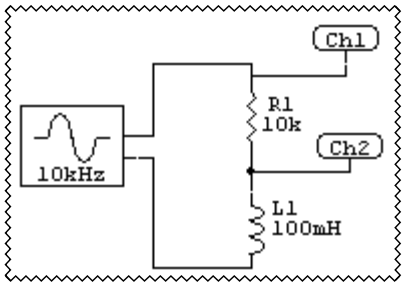

Fig. 3