Problems of the Week 9

Always show your work to receive credit (NO WORK=NO CREDIT)

1. A physics 4B student wants to measure the inductance, L, and resistance, R, of a real inductor. Using a multimeter, a 1000Hz AC signal generator, an oscilloscope, and 1.00μf capacitor, the student makes several measurements and observations. First a multi-meter measurement of its resistance indicates that R=35Ω. The student then connects the capacitor in series with the power supply and the inductor. The voltage across the capacitor and the inductor is 19.7 Volts. The voltage across the capacitor alone is 31.8 Volts. Finally, the oscilloscope shows that the voltage across the resistor lags the power supply voltage. The students then uses the results of the measurements and observations to determine the inductance L. What value should the student get?

   A. 10.7mH
   B. 40.0mH
   C. 63.2mH
   D. 94.6mH

2. Consider two inductors connected in series shown below. If the mutual of the two coils is 1.0mH, what is the equivalent inductance of the circuit?

A. 4.5mH
B. 8.0mH
C. 12.0mH
C. 19.0mH
D. 24.5mH