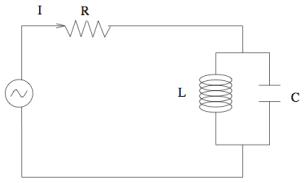
Physics 008 **Problem Set #6** **Fall 2009**

My Lectures from : Purcell Chapter 7.9;Chapter 8.1-8.5
Web Notes : Lecture Notes #4a,4b,4c

Purcell Problems:

7.13 RL circuit
7.17 RL circuit
8.2 RC circuit
8.3 RLC circuit
8.4 RLC circuit
8.10 Real impedance
8.12 Out of phase
8.13 Voltage difference is zero
8.14 Equivalent circuits

1. Consider the circuit shown.



(a) What is the complex impedance of the circuit elements?
(b) The AC voltage is given as $V_0\cos(\omega t)$. What is the current I (the actual current, not the complex current) flowing through the circuit? Find the phase angle.
(c) Explain the high and low frequency behavior of the phase shift of the current in terms of the currents through each of the circuit elements.

2. Consider the circuit shown below, where C_1 is initially charged to 75 volts. Suppose that C_1 is 10000 μF, C_2 is 3000 μF and L is 15 H. Explain how to open and close the switches so as to discharge C_1 and charge C_2. Starting at t = 0, you should give explicitly times for opening and closing each switch. What is the final voltage across C_2?