

## Forced Response of a Series RLC Circuit

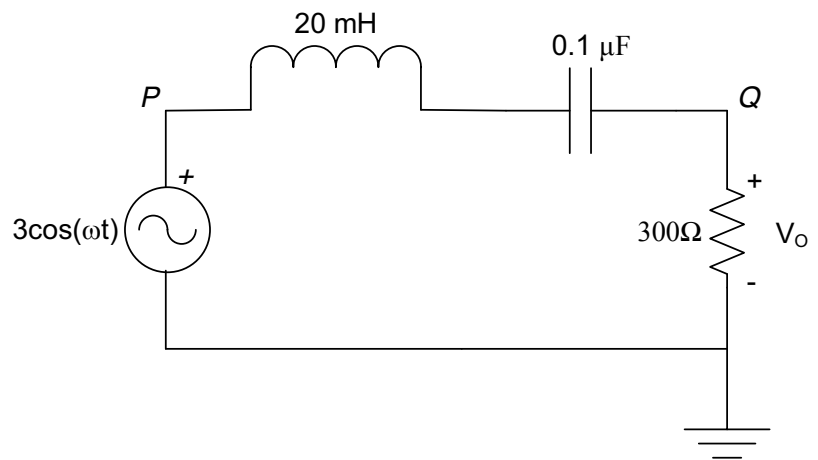
Name \_\_\_\_\_

Grade \_\_\_\_\_/10

**Introduction**

This lab exercise investigates a series RLC circuit driven by a sinusoidal source. When driven with an AC voltage, the circuit exhibits the characteristics of a band-pass filter. This exercise explores the frequency response (magnitude and phase) of the series RLC circuit.

1. Use phasors to derive an expression for the voltage ratio ( $V_Q/V_P$ ) as a function of frequency, where  $V_P$  is the sinusoidal voltage source and  $V_Q$  is the voltage across the resistor.



2. Using your expression from part 1, divide it into two parts, magnitude and phase. Both of these expressions will be functions of  $\omega$ .
3. Using Excel or another program, make two separate plots: one of magnitude vs. frequency, and one of phase vs. frequency. Plot frequencies in the range of 1kHz – 7kHz in increments of 100Hz.