

# Experiment 4: RC and RLC Circuits

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## Pre-Lab Report

### A. Phase Shift Measurements

- Calculate the phase shift between the input voltage and output voltage of the circuit in figure 1

Calculated Phase Shift

- Briefly describe two methods for measuring phase shift in the lab

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### B. Lead and Lag Networks

Calculate the output voltage of the lag and lead networks in figure 3 and 4 if a  $1 V_{pk-pk}$  sinusoidal signal is applied to the input. Below are the frequencies

Lead Network		
Frequency	Input Voltage	Output Voltage
100Hz	1 $V_{PK-PK}$	
1KHz	1 $V_{PK-PK}$	
10KHz	1 $V_{PK-PK}$	

Lag Network		
Frequency	Input Voltage	Output Voltage
100Hz	1 $V_{PK-PK}$	
1KHz	1 $V_{PK-PK}$	
10KHz	1 $V_{PK-PK}$	

### C. Series RLC circuits

- Calculate the resonant frequency for the following RLC circuits (figure 5)

Resistance	Inductor	Capacitor	Resonant Frequency
10 $\Omega$	220 $\mu H$	1 $\mu F$	
100 $\Omega$	220 $\mu H$	1 $\mu F$	
10 $\Omega$	470 $\mu H$	1 $\mu F$	
10 $\Omega$	470 $\mu H$	0.1 $\mu F$	

- What is the Phase angle between the input voltage and output voltage at resonance

Phase Angle