## Oscilloscopes

Name:		Date:
Instructor:		
	Teammates	
1	2	
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Instructions: Follow the steps on this worksheet, using your lab manual as a guide, unless directed to do otherwise by your lab instructor. Show at least one sample calculation for each step. Box final mathematical results. Do not forget the units.

### 1 Data

### 1.1 Calibration and Setup

1. Sketch the calibration signal. Measure and record its period and peak-to-peak (p-p) amplitude.

2. Sketch the graph of the sinusoidal wave with 1kHz frequency and 10 V p-p amplitude. Measure and record the time for one, five, and ten periods of this wave pattern in a table. Also, record the TIME/DIV and VOLTS/DIV settings used for each measurement.

#### 1.2 Time Delays

- 1. Using a resistor for component 1, set up the circuit described in your lab manual.
- 2. Sketch the waveforms with appropriately labeled axes.

3. Replace Component 1 with a capacitor, bring the peaks from both channels to the same level on the grid, and then sketch the waveforms with appropriately labeled axes. Measure any separation between the peaks from Channel 1 and Channel 2 and record the value of this time interval.

4. Replace Component 1 with an inductor, bring the peaks from both channels to the same level on the grid, and then sketch the waveforms with appropriately labeled axes. Measure any separation between the peaks from Channel 1 and Channel 2 and record the value of this time interval.

## 2 Analysis

### 2.1 Calibration and Setup

1. Calculate the frequency based on each time measurement and compare it to the theoretical value.

2. What TIME/DIV setting gives the most precise value for the frequency and why?

#### 2.2 Time Delays

- 3. In the RR-Circuit, can you measure any difference between the peaks in Channel 1 and Channel 2? If so, what is that difference?
- 4. In the RC-Circuit, what channel shows a peak first? Based on this, is the signal from the circuit ahead of or behind the input from the signal generator?
- 5. In the LR-Circuit, what channel shows a peak first? Based on this, is the signal from the circuit ahead of or behind the input from the signal generator?

# 3 Questions

1. Estimate the highest frequency you can measure using this oscilloscope. (Hint: assume you can get no more than one period/division.)

2. Estimate the lowest frequency you can measure using this oscilloscope. (Hint: allow the screen's width to equal one period.)