Oscilloscopes

Name:_____ Date: _____

Instructor: _____

Teammates

1.- _____ 2.- _____

3.- _____ 4.- _____

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.

This worksheet makes greater use of the Lab Manual than many others. Read your manual carefully and feel free to ask your instructor if you need help. Make sure to label the scale on each graph. Straight-edges are available to help you make good sketches.

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

1.2 Frequency of a Tuning Fork

1. Record the frequency printed on the tuning fork.

2. Measure and record the frequency of the tuning fork.

1.3 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, then sketch the waveforms with appropriately labeled axes. Mark 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, then sketch the waveforms with appropriately labeled axes. Mark 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 Frequency of a Tuning Fork

1. Calculate the percentage error between the measured frequency and the frequency listed on the tuning fork.

2.3 Time Delays

1. In the RR-Circuit, can you measure any difference between the peaks in Channel 1 and Channel 2? If so, what is that difference?

2. 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?

3. 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 1 period/division.)

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

4 Quiz

Set up the oscilloscope using the parameters assigned to you by your instructor, then sketch what comes out on the screen in detail.

Assigned Parameters:

Amplitude (V):

Frequency (Hz):

Waveform:

Channel: