Introduction to the Oscilloscope and RC Circuits

As you work through the steps in the lab procedure, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.

Oscilloscope and Power Supply

Upload your sketch of the waveform made using the screen template and the Paint program. (Submit a file with a maximum size of 1 MB. *You will upload this file in the WebAssign question.*)

Method 1

What is the frequency of the waveform and the voltage of the waveform?

Upload your sketch of the waveform made using the screen template and the Paint program. (Submit a file with a maximum size of 1 MB. *You will upload this file in the WebAssign question.*)

Cursor Method

Using the cursor method, what is the voltage reading?

How does it compare with your voltage reading from Method 1? Which would you say would be a more accurate reading? Explain.

Using the cursor method, what is the frequency reading?

How does it compare with the value from Method 1? Which would you say would be a more accurate reading? Explain.

Examine Different Frequencies

Discuss what happens to the waveform on the scope screen when the generator is set to 10k.

Upload your sketch of the waveform for that frequency. Be sure to label the sketch. (Submit a file with a maximum size of 1 MB. *You will upload this file in the WebAssign question.*)

Discuss what happens to the waveform and the readings on side sections of the oscilloscope screen when the FREQUENCY control and the AMPL control are varied.

Upload your sketch of the waveform for an output frequency of 100 kHz. (Submit a file with a maximum size of 1 MB. *You will upload this file in the WebAssign question.*)

For the square wave output at a frequency of 2 kHz, compare the frequency output of the generator to the frequency measured with the oscilloscope.

Determine the voltage of the waveform.

Upload the sketch of the waveform. (Submit a file with a maximum size of 1 MB. *You will upload this file in the WebAssign question.*)

Measuring the Transient Behavior of a Simple RC Circuit

Record the time, voltage, and the ln(Voltage) readings in Table 1.

Table 1

Time (s)	**Voltage (V)**	**ln(Voltage)**

Find the slope and intercept of your data from Table 1. (Do not enter units for these answers.)

How are these two quantities related to the $q_{\max}$ and RC of this circuit as described in $q(t) = q_{\max}e^{-t/RC}$?

Disconnect the resistor R from the circuit and measure its resistance. (Note that the internal resistance of the function generator is 50 ohms.)

Calculate the experimental value of the capacitor C in the circuit. Call it (experimental) C_1. Do not forget the units.

Record the component value of the capacitor written on the side of the capacitor.

What is the percent error between the experimental value and the component value of the capacitor?

Which value do you consider to be more accurate? Why?