

EE 105 Labs

Lab Worksheet 1: Electronic Test Equipment

Name(s):

Lab Section:

Submit this worksheet to Gradescope before your lab section the week it is due.

4.1 DC Measurements

4.1.1 Power supply error:

Voltage Setting	DMM Measurement	% Error
1 V		
5 V		
10 V		

4.1.2 Resistive divider error:

Hand Calculation	Measured	% Error

Besides measurement error and error in the voltage source, what can also contribute to the total error?

4.1.3 Why are you not supposed to connect the DMM to the terminals of a voltage source while the DMM is in current mode?

4.1.4 Current:

Hand Calculation	Measured	% Error

4.2 AC Measurements

4.2.1 Function generator sine signal:

	Panel Setting	Expected	Measured	% Error
V_{pp}	1			
Frequency (kHz)	1			

4.2.2 Highest frequency sinusoid that the generator can produce with a 1 V_{pp} setting: _____

Highest frequency sinusoid produced by the signal generator: _____

At this frequency, measured an amplitude of _____ V_{pp} , with an error of _____%

4.2.3 Smallest V_{pp} sinusoid that the generator can produce at 1 kHz:

	Panel Setting	Expected	Measured	% Error
No averaging				
Average of 64	(Same as above)	(Same as above)		

With the averaging feature turned off, does the oscilloscope **over-measure** or **under-measure** the V_{pp} value? (Please circle one.) Why?

4.2.4 Resistor in the air, measured V_{pp} : _____

Estimated parasitic capacitance: _____ (Show your work!)

4.2.5 Resistor connected to the breadboard:

	mV_{pp}	Parasitic Capacitance (pF)
Resistor connected to a terminal strip		
Resistor connected to a supply strip		
Resistor connected to a supply strip, ground connected to a ground strip		

For which case is the parasitic capacitance the largest? Why?

4.2.6 Transfer function $|V_{\text{out}}/V_{\text{s}}|$ at 1 kHz:

Hand Calculation	Measured	% Error

4.2.7 Frequency at which the transfer function phase is -45° : _____

Measurement procedure:

4.2.8 RC time constant:

Hand Calculation	Square Wave		Sine Wave	
	Measured	% Error	Measured	% Error

Which measurement is expected to be more accurate?

4.3 Parameter Analyzer Basics

4.3.1 Attach the plot of the $100\ \Omega$ resistor I-V characteristic. What is the measured resistance according to your plot?

4.3.2 Attach the plot of the diode I-V characteristic.

4.3.3 Diode voltage V_{out} :

Calculated from I-V Curves	Measured	% Error