EE 105 Spring 2026

Lab Worksheet 1: Electronic Test Equipment, RC response, diode IV

Name(s): _____ Lab Section: _____

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

1 DC Measurements

1.1 Power supply accuracy

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

1.2 Resistive divider error

Hand Calculation	Measured	% Error

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

1.2.1 Avoiding Explosions

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

1.2.2 Current

	Hand Calculation	Measured	% Error
$I_{20k\Omega}$			

2 AC Measurements

2.1 Function generator sine signal

	Panel Setting	50Ω	High-Z
V_{pp}	1		
Frequency (kHz)	1		

2.2 Highest frequency sinusoid

Frequency where amplitude begins to drop: _____
Highest frequency sinusoid produced by the generator: _____
At this frequency, measured amplitude: _____ Vpp, error: _____%

2.3 Smallest sinusoid at 1 kHz

	Panel Setting	Measured	% Error
No averaging			
Average of 64			

With the averaging feature off, does the oscilloscope **over/under-measure** the Vpp (circle one)? Why?

2.4 Breadboard capacitance

Resistor in air, measured Vpp: _____
Is the measured voltage still 1 Vpp? Why?

Estimated parasitic capacitance (show work or reference prelab):

Configuration	V_{pp} (mV)	Parasitic Capacitance (pF)
Resistor connected to terminal strip		
Resistor connected to supply strip		
Resistor connected to supply strip, ground connected to ground strip		

Which case has the largest capacitance? Why?

3 RC Response

3.1 Magnitude response

At 1kHz, 1Vpp:

	Hand Calculation	Measured	% Error
$\lvert V_{\text{out}}/V_s \rvert$			

Estimated time constant (show work or reference prelab):

3.2 Frequency response

At 1kHz, 1Vpp:

	Hand Calculation	Measured	% Error
$Phase$			

Estimated time constant (show work or reference prelab):

3.3 Step response

Estimated time constant (show work or reference prelab):

3.4 Cutoff frequency

	Frequency	Magnitude	Phase
$0.1f_p$			
f_p			
$10f_p$			

3.5 High pass

Why does the voltage go above and below the input?

Estimated time constant (show work or reference prelab):

Oscilloscope output:

After switching to a sine wave:

	Frequency	Magnitude	Phase
$0.1f_p$			
f_p			
$10f_p$			

4 Parameter Analyzer Basics

4.1 Resistor IV curve

Attach the plot of the 100 Ω resistor I–V curve.
Measured resistance: _____

4.2 Diode IV curve

Attach the plot of the diode I–V characteristic.

4.3 Diode load-line analysis

	Calculated	Measured	% Error
V_{out}			