EECT 121
LAB NOTEBOOK

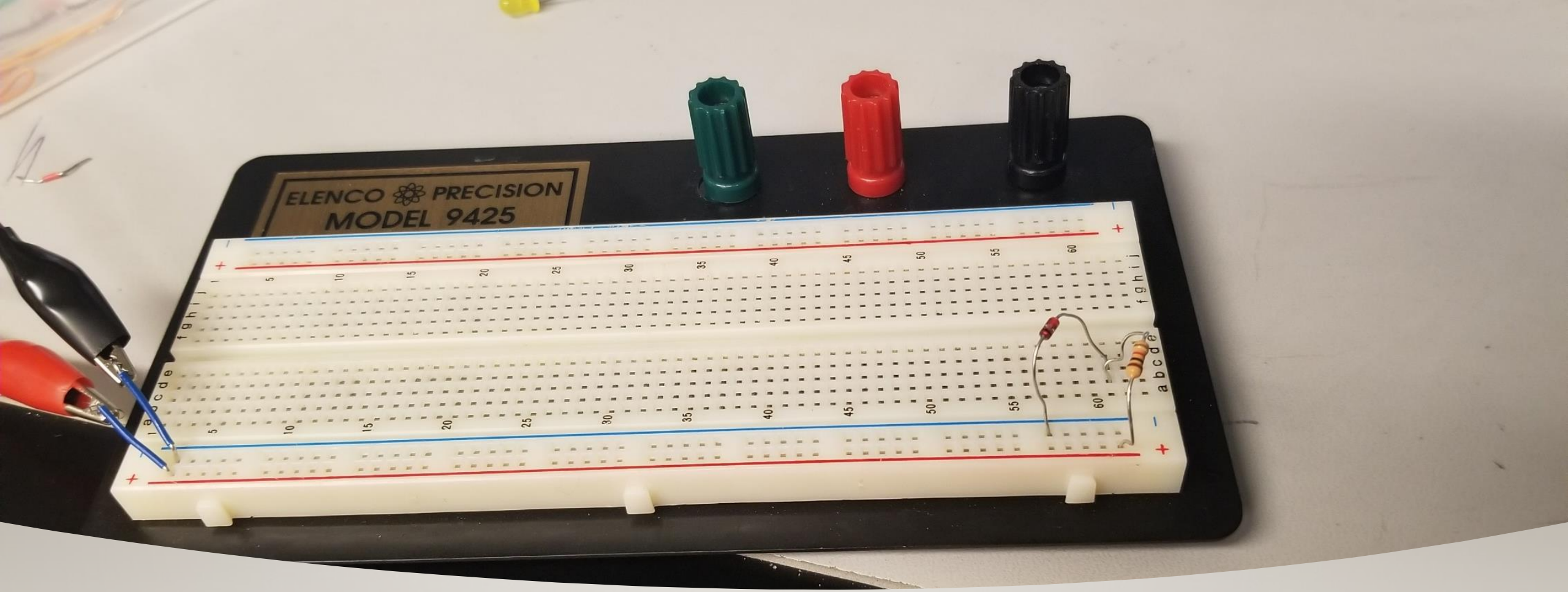
STUDENT: BRIAN YANG

INSTRUCTOR: PROFESSOR BELL

LAB PARTNER: CALEB BARGER

FALL 2019

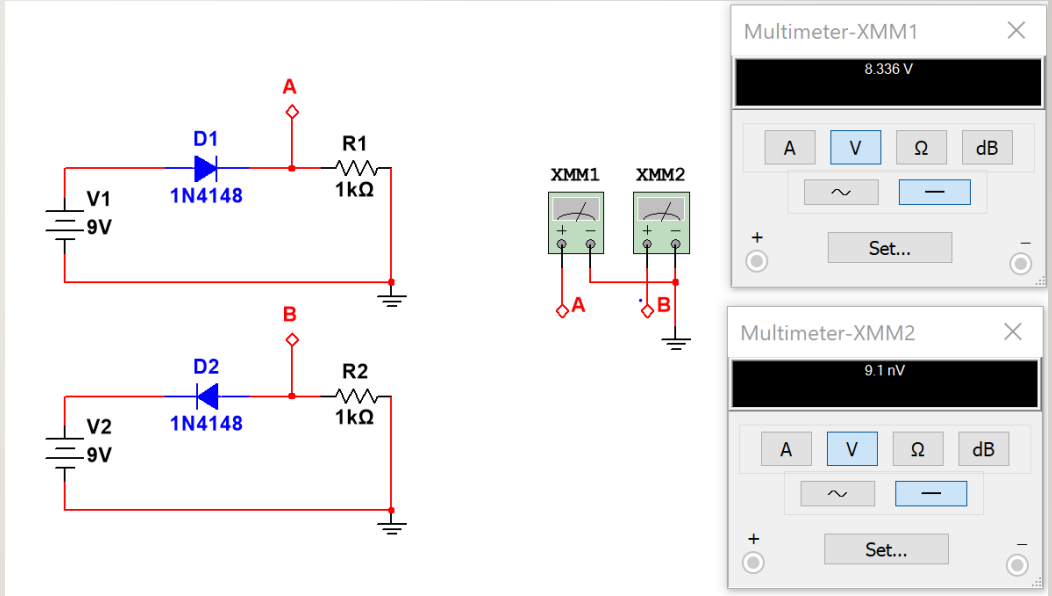
2 TABLE OF CONTENTS



LAB I

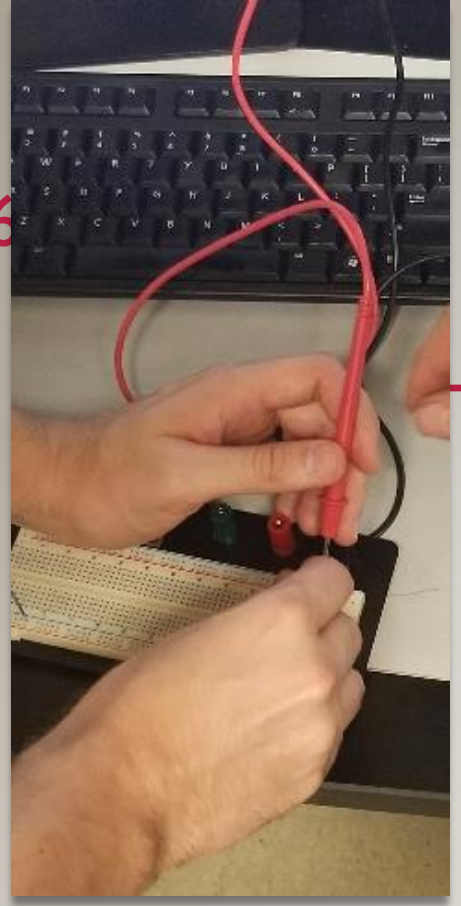
4 LAB 1

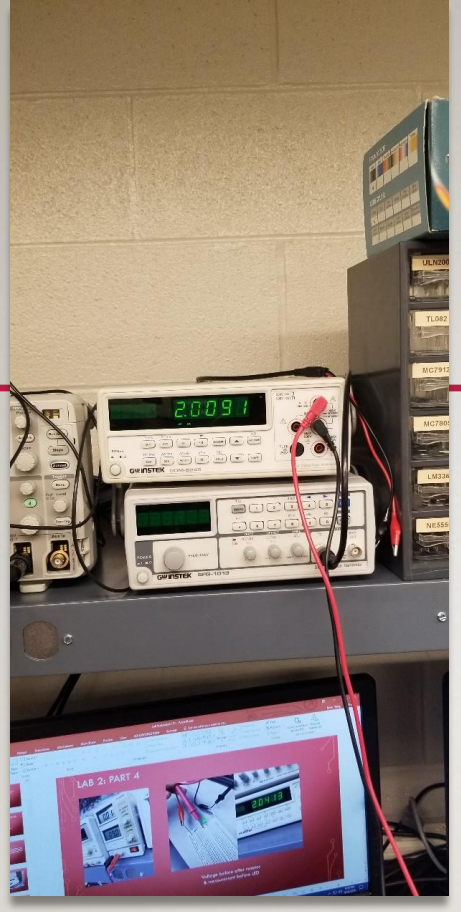
- The purpose of this lab is to: experiment and find out characteristics of switching diodes, and how they work in a circuit.

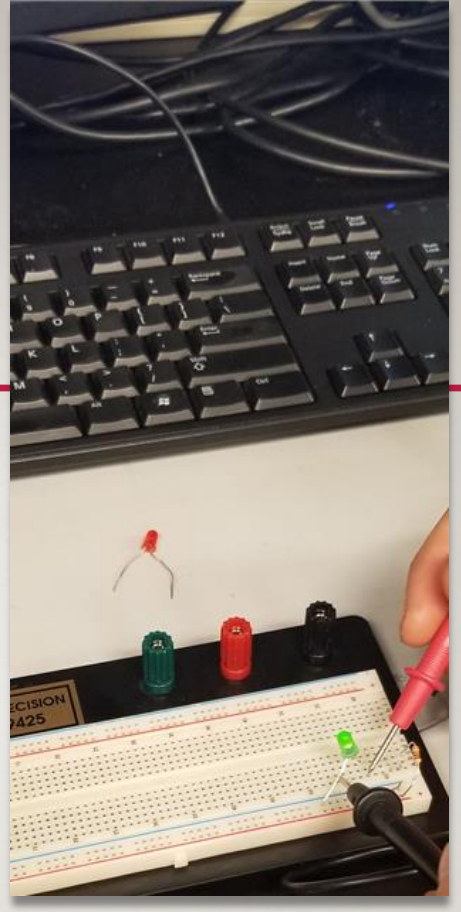


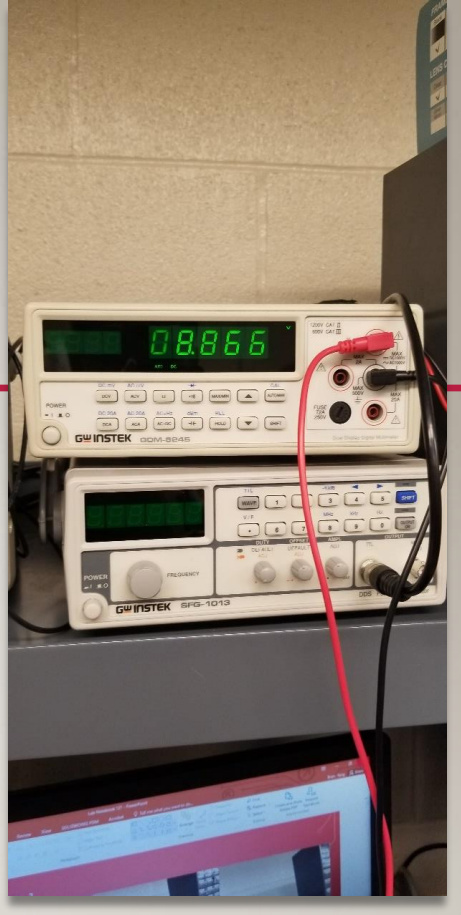
LAB 1 OBSERVATIONS

- We tested this diode and found that diodes are polarized. Forward Bias allows voltage to pass. Reverse Bias diminishes the voltage to almost 0.





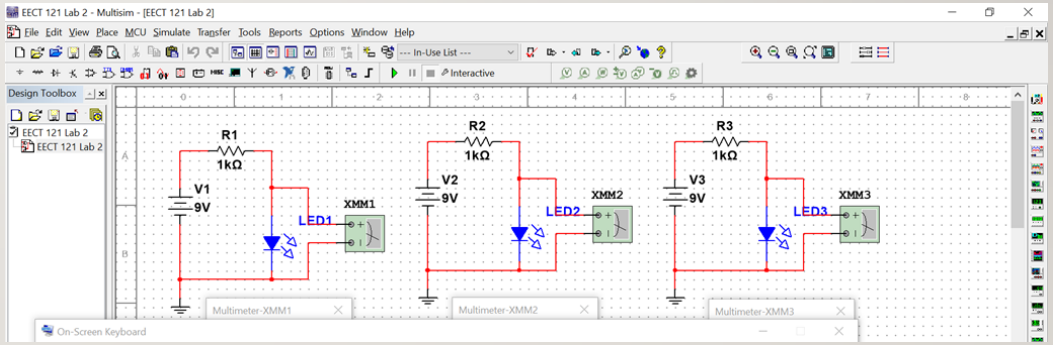




LAB 2

LAB 2: LIGHT EMITTING DIODES

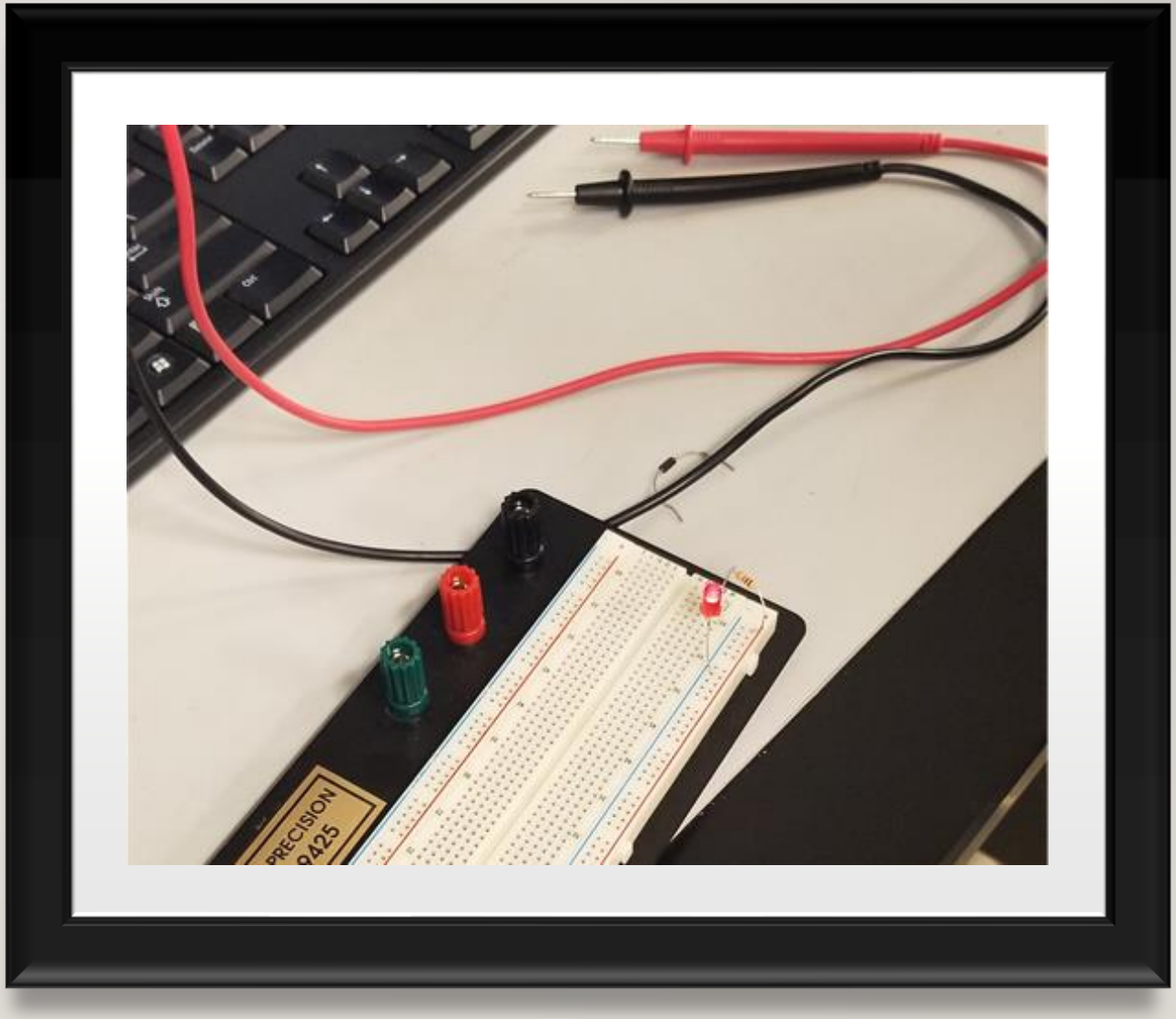
- The purpose of this lab is to: experiment and find out characteristics of Light Emitting diodes, and how they work in a circuit. Equipment & parts needed:
- -Breadboard
- -Digital Multimeter
- -DC Power Supply (9 Volt)
- -1K ohm Resistor (.9821 KOhms Actual Reading)
- -Light Emitting Diodes (Red, Yellow, Green)

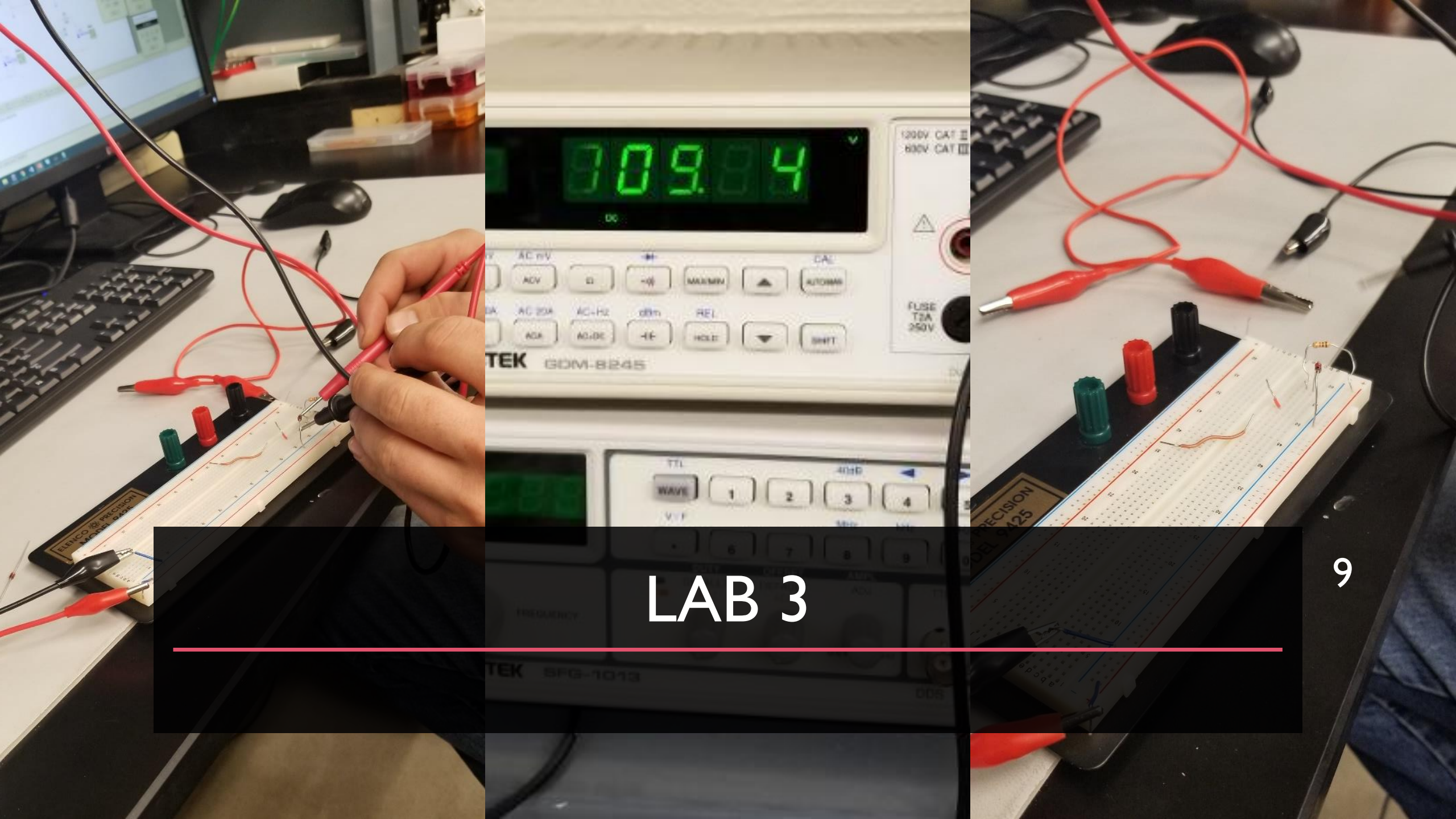


8 LAB 2

Observations:

- The Diodes have an amperage thresh hold that must be met to emit light.
- Changes in amperage inside the threshold change the amount of light emitted.
- Light was only emitted when the diodes were oriented according to bias





LAB 3

LAB 3: ZENER DIODES

- The purpose of this lab is to: experiment and find out characteristics of Light Emitting diodes, and how they work in a circuit.

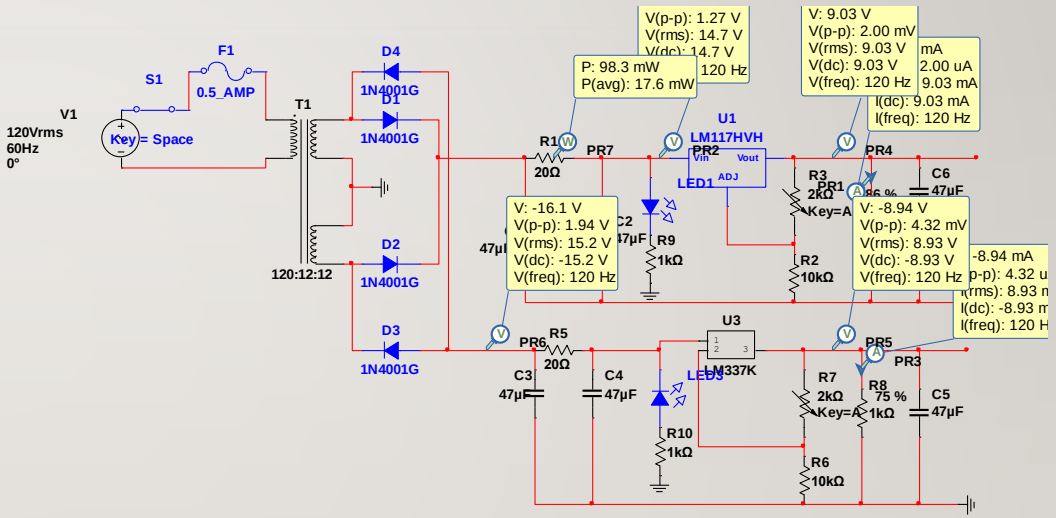
- Equipment & parts needed:
- -Breadboard
- -Digital Multimeter
- -DC Power Supply (9 Volt)
- -1K ohm Resistor
- -Zener Diodes (1N4733A and 1N4747A)

LAB 3

Observations:

- We tested 2 different Zener diodes and expected pretty close voltages, but found out that one of the two was almost half the voltage of the other.
- When bias was reversed some voltage was still allowed to pass.

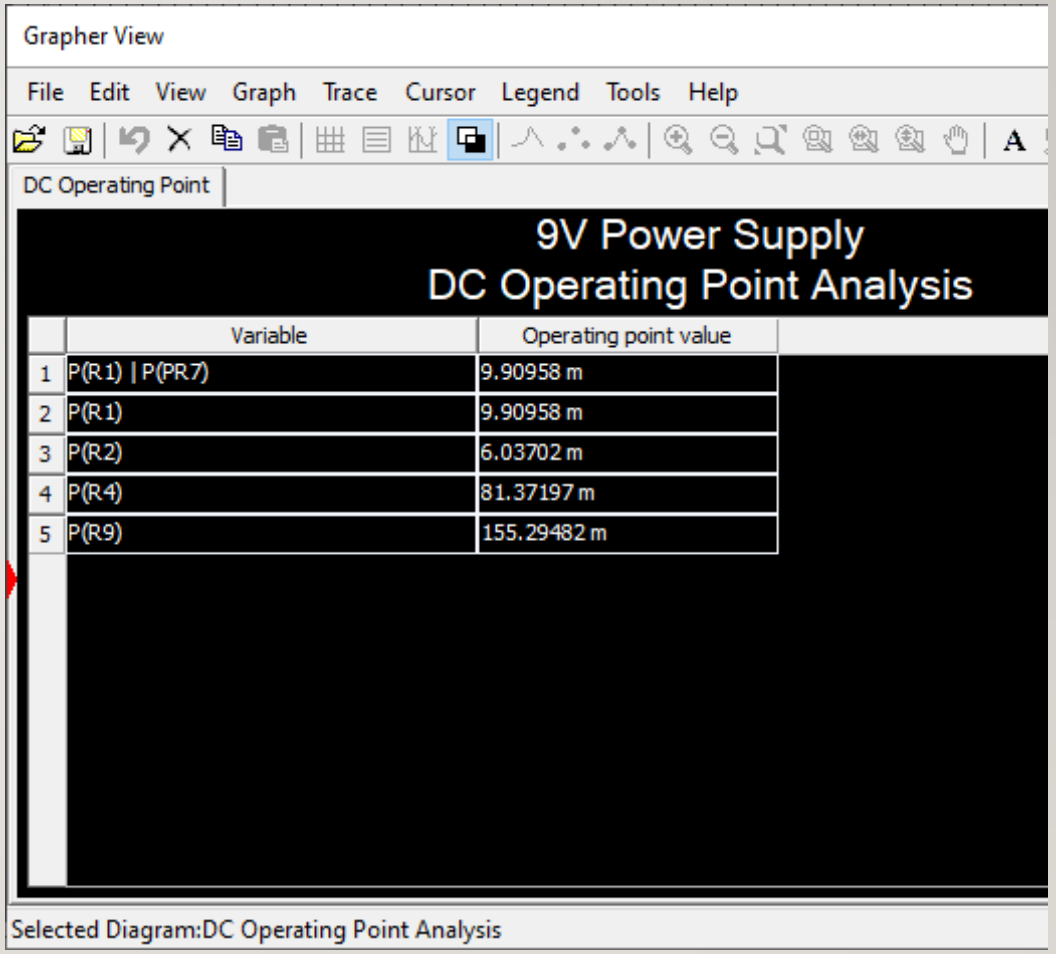
POWER SUPPLY



13 POWER SUPPLY LAB

- The object of this lab was to design and build a functioning power supply.
- Design a simulation of power supply
- Create a BOM to order parts
- Build supply

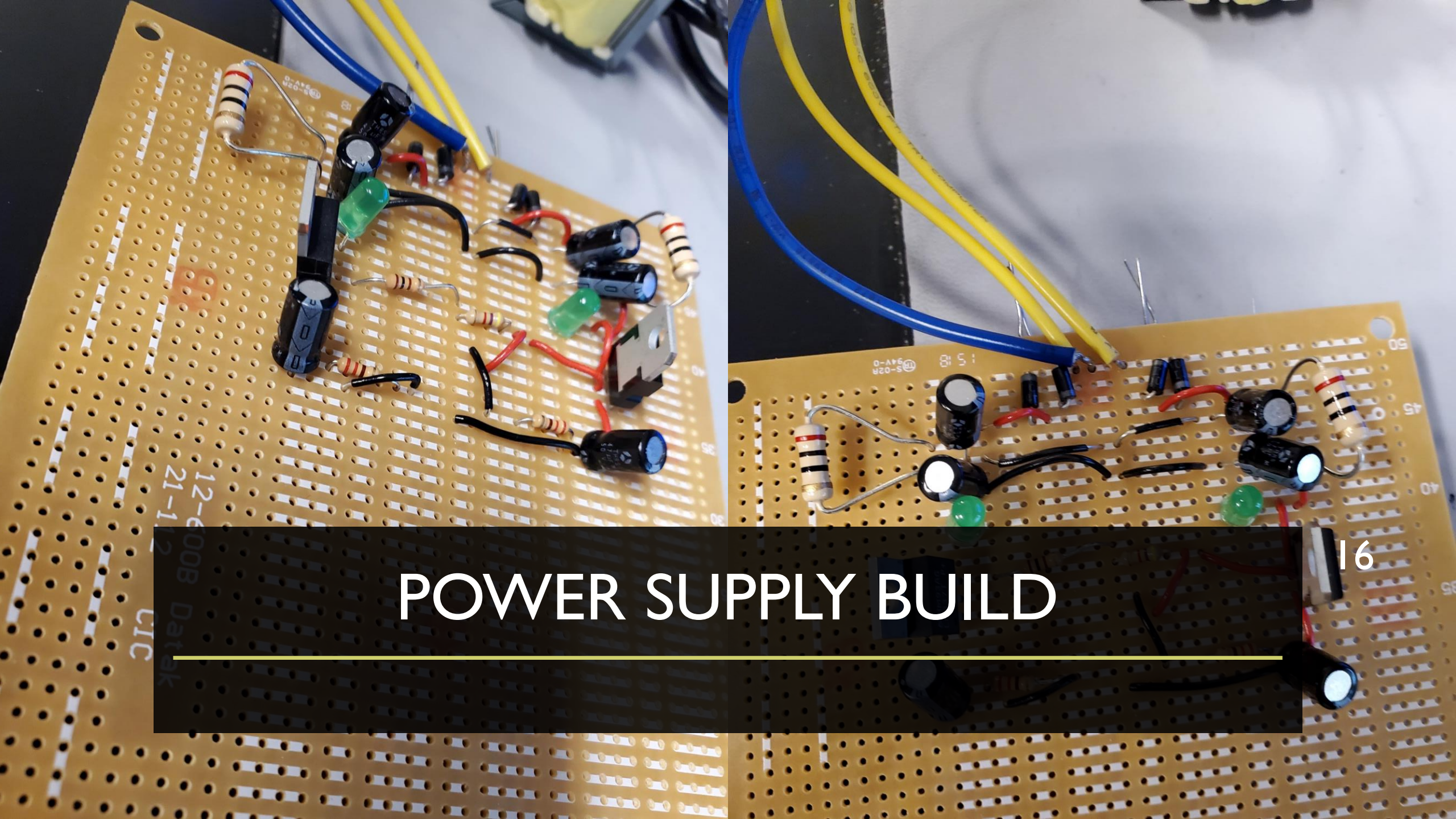
POWER SUPPLY READINGS



	Variable	Operating point value
1	P(R1) | P(PR7)	9.90958 m
2	P(R1)	9.90958 m
3	P(R2)	6.03702 m
4	P(R4)	81.37197 m
5	P(R9)	155.29482 m

15 POWER SUPPLY BOM

Item	Part Description	Part Number	Qty	Unit Price	Total Price
1	Electrolytic Axial Lead Capacitors - 47 uf 50V	14EA05047u	6	0.28	1.68
2	Silicon Rectifiers - Max Current 1A Max PIV 50	111N4001	4	0.1	0.4
3	RSR SPST Toggle Switch with lead wires 6 Amp 125V	17SWTOGWR	1	1.1	1.1
4	LEDs SMALL 3mm Green	08L32GD	2	0.14	0.28
5	Slow Blow Fuses Bussman 1/2 Amp	2000MDL1/2	1	0.7	0.7
6	Volt. Regulator Adjustable 1A	10317-T	1	0.35	0.35
7	Volt. Regulator Adjustable 1A	10337-T	1	0.75	0.75
8	Carbon film resistor 5% 1/2W 20 Ohms	13.552	2	0.07	0.14
9	Carbon Film Resistors 5% 1/2 W 1K Ohms	13.551K	4	0.07	0.28
10	Carbon Film Resistors 5% 1/4 W 10K Ohms	1300510K	2	0.06	0.12
11	Cermet Potentiometers Single Turn 3/8" Square - Side Adjust 2K Ohm	18CPV2K	2	0.6	1.2
12	In-Line Holder For 1-1- 4 x 1- 4 Fuses	2001LINL	1	0.55	0.55
13	Power Transformers 24 VCT .3A	16P124-.3	1	5.95	5.95
				Total	13.5



POWER SUPPLY BUILD

POWER SUPPLY OBSERVATIONS

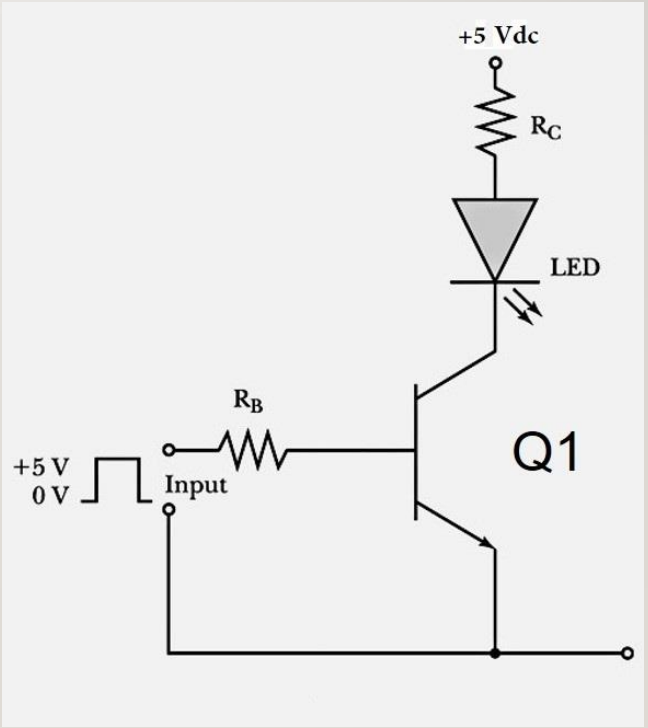
Observations:

- The design of the power supply was a refining process. Prof. Bell was kind enough to make general reviews of our work that prevented us from making serious mistakes.
- When assembling on the board we made the mistake of putting components to close together. This lead to unintentionally soldering some sections of the board to each other
- When we applied power no current was measured on the output leads. We check for heat and only the transformer was warm.
- Passed conductivity test but still not turning on.

LAB 5 – LED SWITCH

- Design Inputs - LED turns “on” & “off”
- IC should be a low as possible ~ 5mA but LED must be visible when turned “on”.
- Vin = 0 to 5V
- Freq = slow
- Vcc = 5VDC
- Q1 = 2N2222A

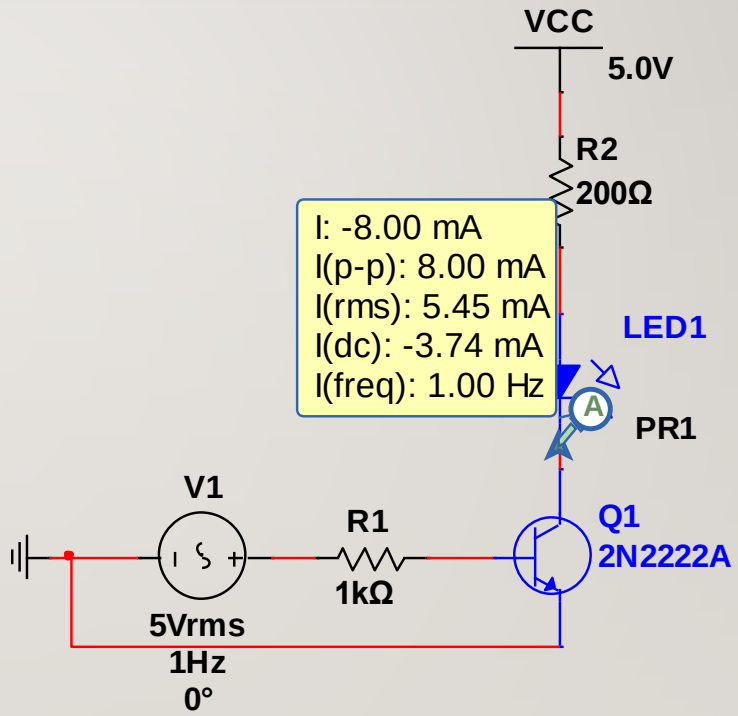
- RB = _1k ohm____
- RC = __200 ohm___
- LED = __blue____
- LED min current = __5mA_____
- LED VF = __3.1 VDC____
- VCE when LED “on” = _____
- VCE when LED “off” = _____



LAB 5:

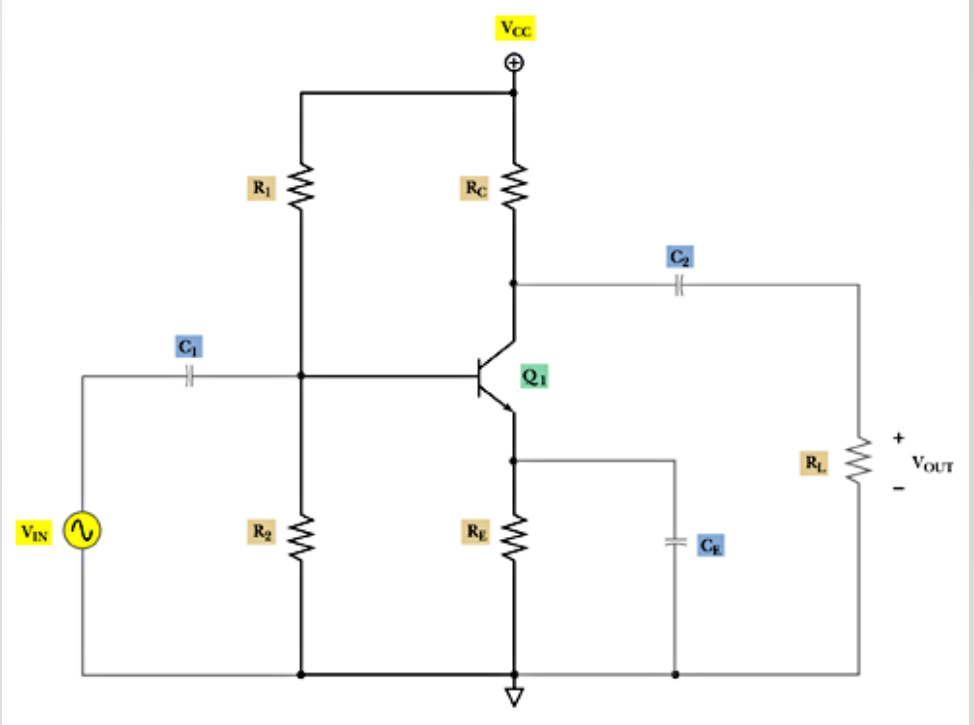
Observations:

- The Input voltage controls the proportion of the source that gets to the drain
- It is conceivably possible have a logic else where in the cirrcet control the LED's brightness



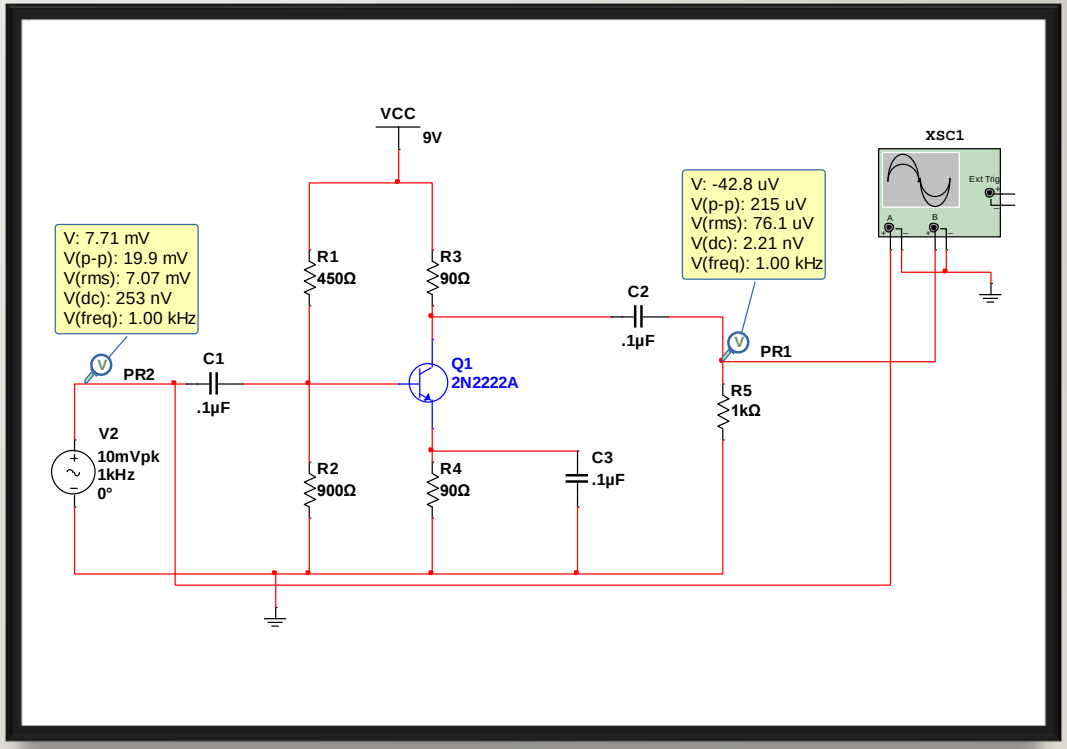
LAB 6 - COMMON-EMITTER (CE) AMPLIFIER

- Design Inputs
- Vin = 10mVpp
- Vout = 100 mVpp
- Freq = 1KHz
- Vcc = 9VDC
- RL = 1K

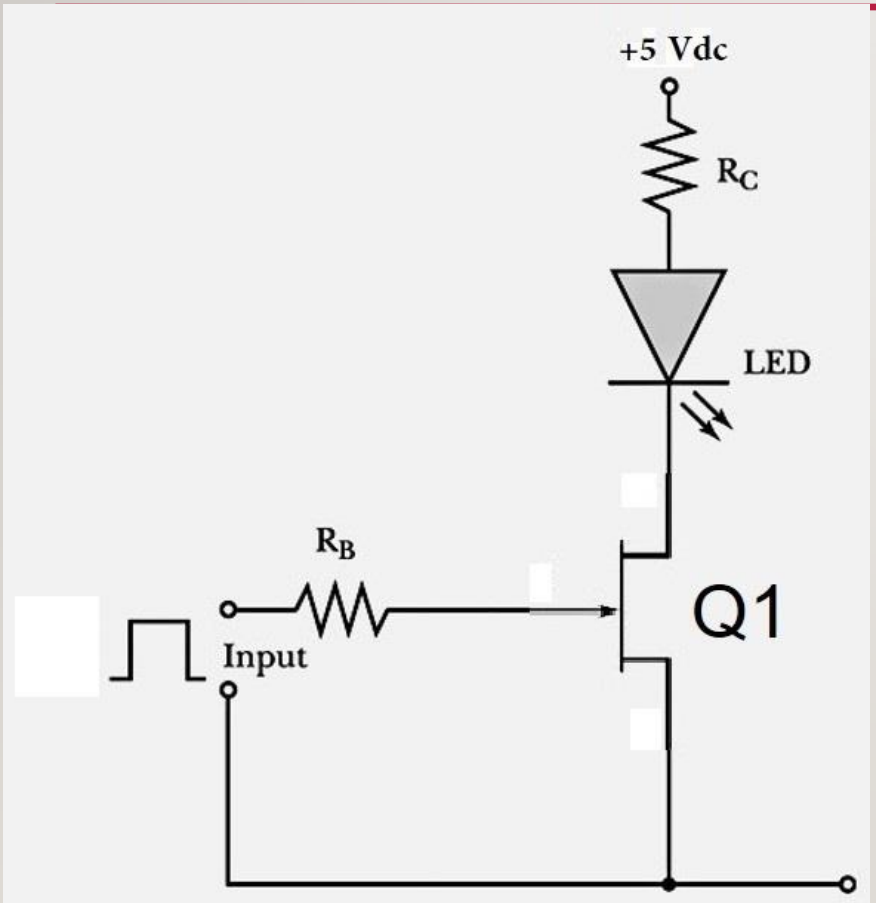


LAB 6

- Observations:
  - The output Voltage was higher than the input Voltage.
  - This could be used to overcome limitations on Voltage.



LAB 7 – LED JFET SWITCH

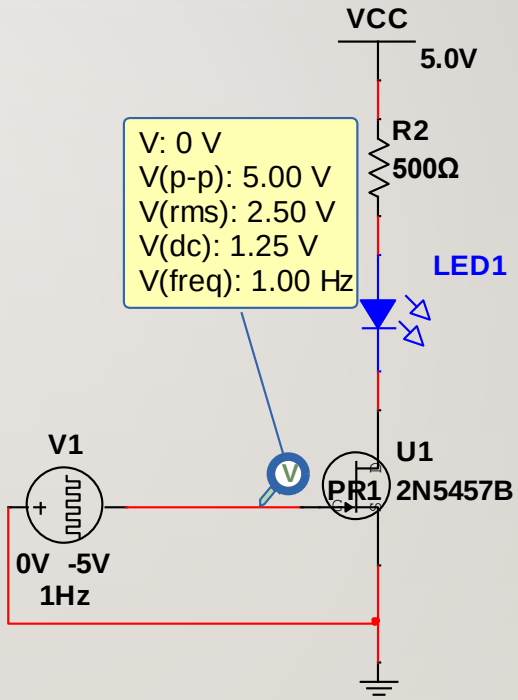


- Design Inputs - LED turns "on" & "off"
- ID should be a low as possible ~ 5mA but LED must be visible when turned "on".
- Vin = tbd
- Freq = slow
- Vcc = 5VDC
- Q1 = 2N5457

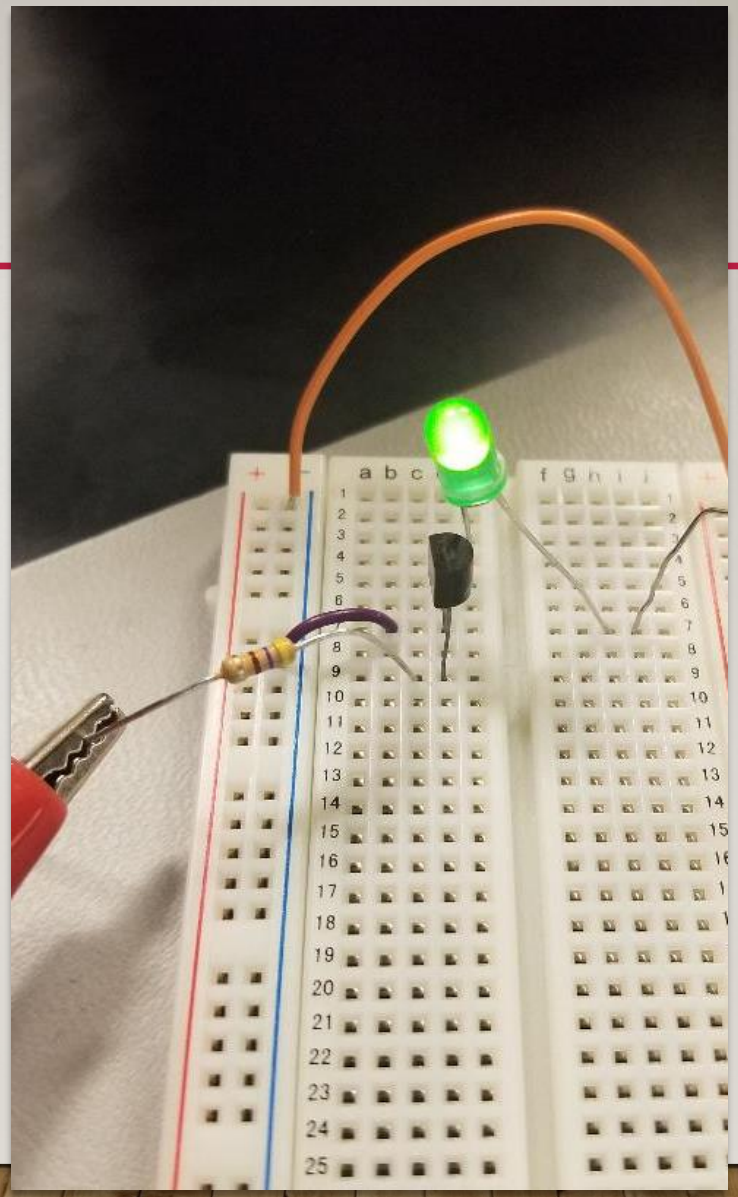
- RB = _____
- RC = _____
- LED = _____
- LED min current = _____
- LED VF = _____
- VCE when LED "on" = _____
- VCE when LED "off" = _____

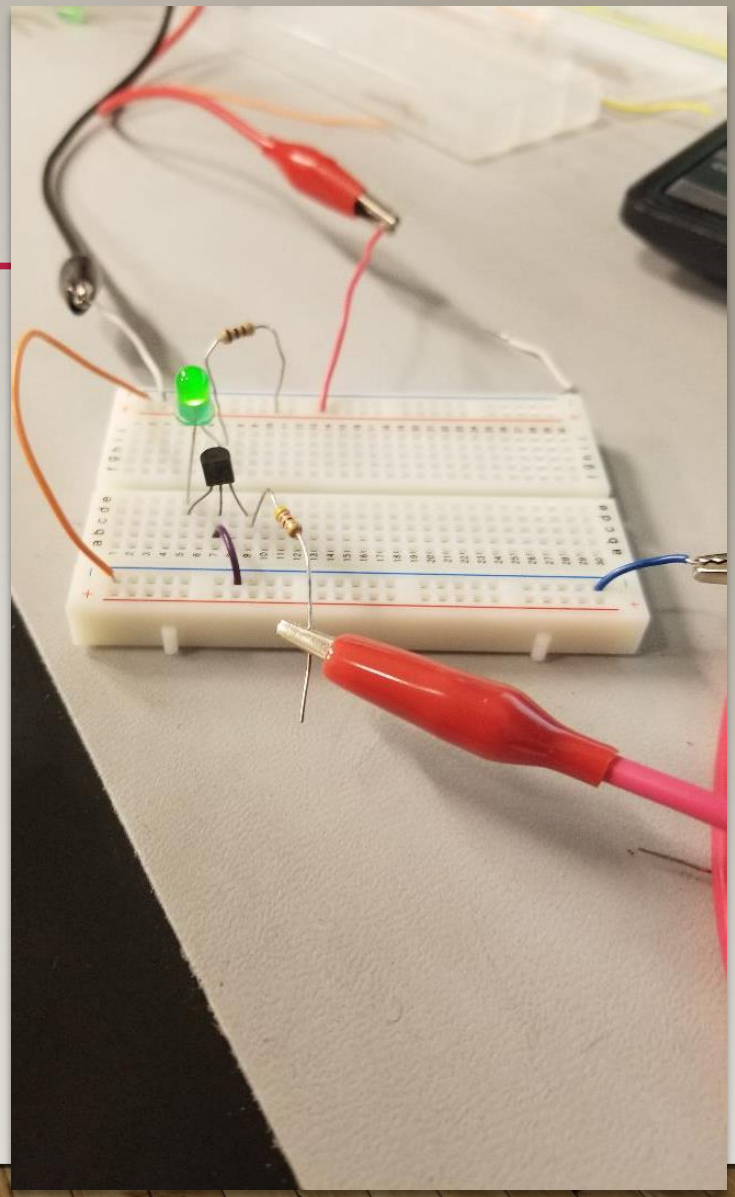
LAB 7 LED SWITCH

- Observations
  - This devices had similar effect to the one in lab 5. Its range of control had the reverse polarity of Lab 5.



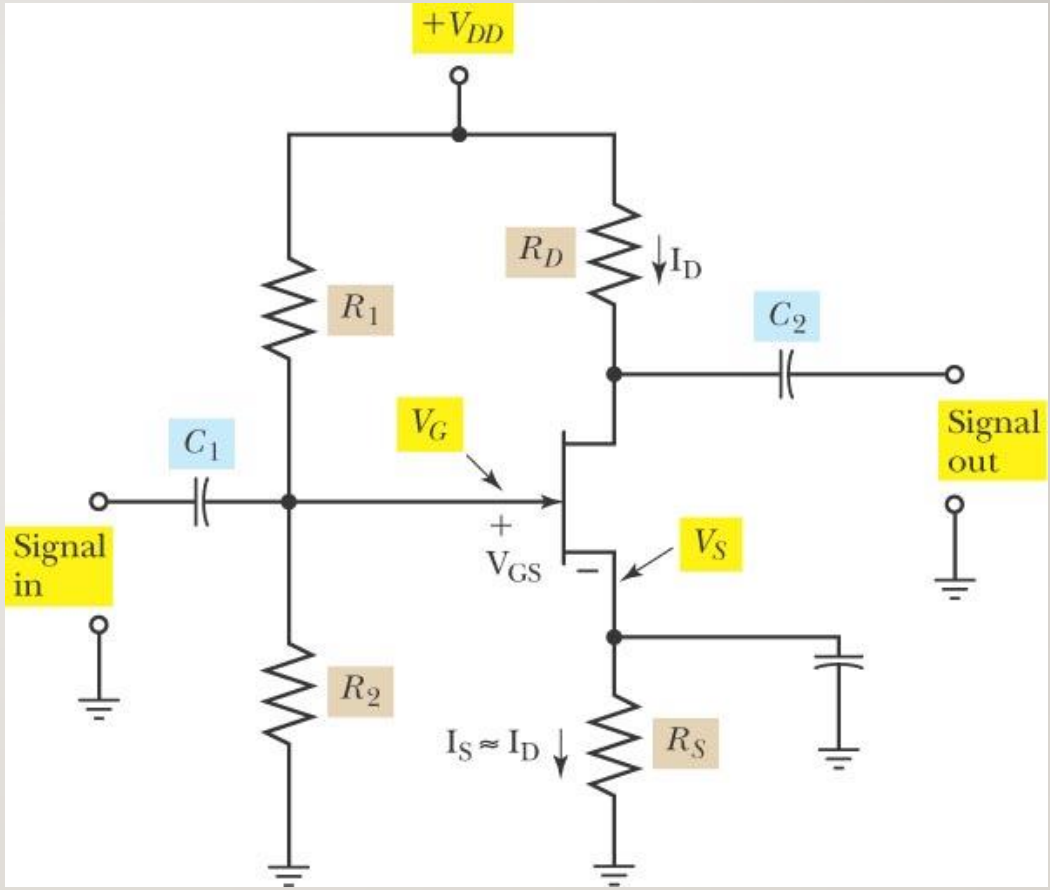
LAB 7



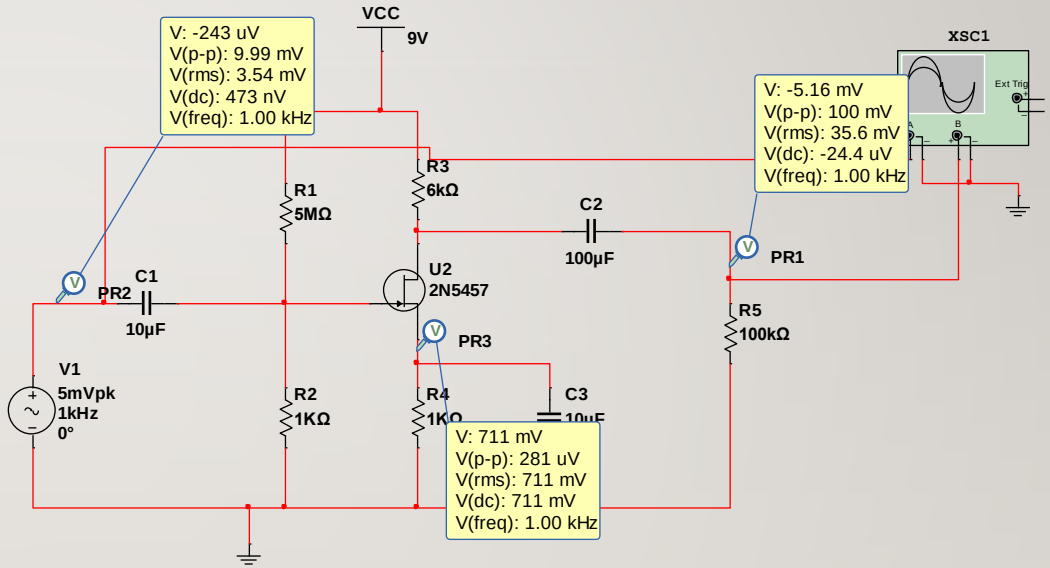


LAB 8 - COMMON-DRAIN AMPLIFIER

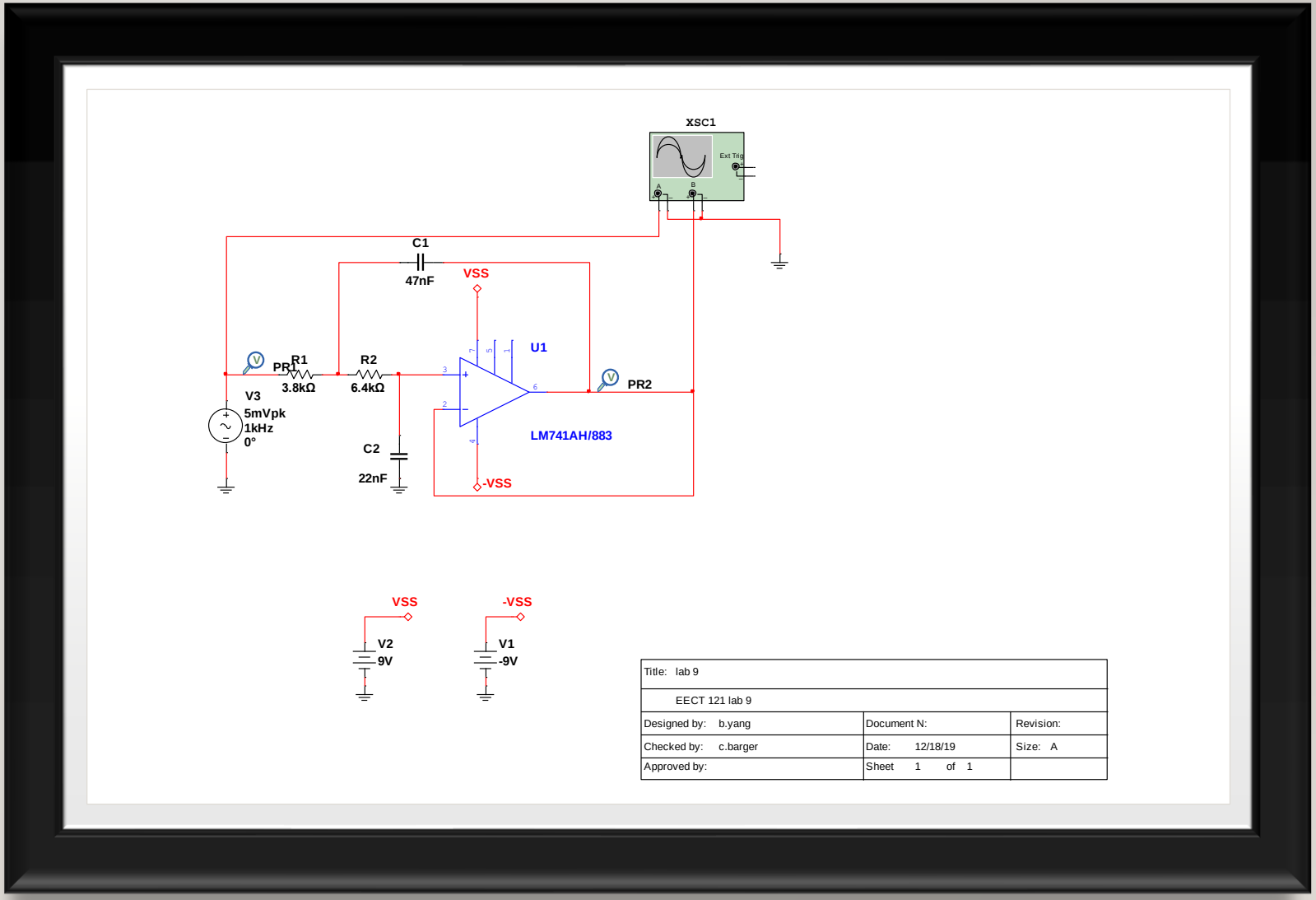
- Design Inputs
- Vin = 10mVpp
- Vout = 100 mVpp
- Freq = 1KHz
- Vcc = 9VDC
- RL = 100K



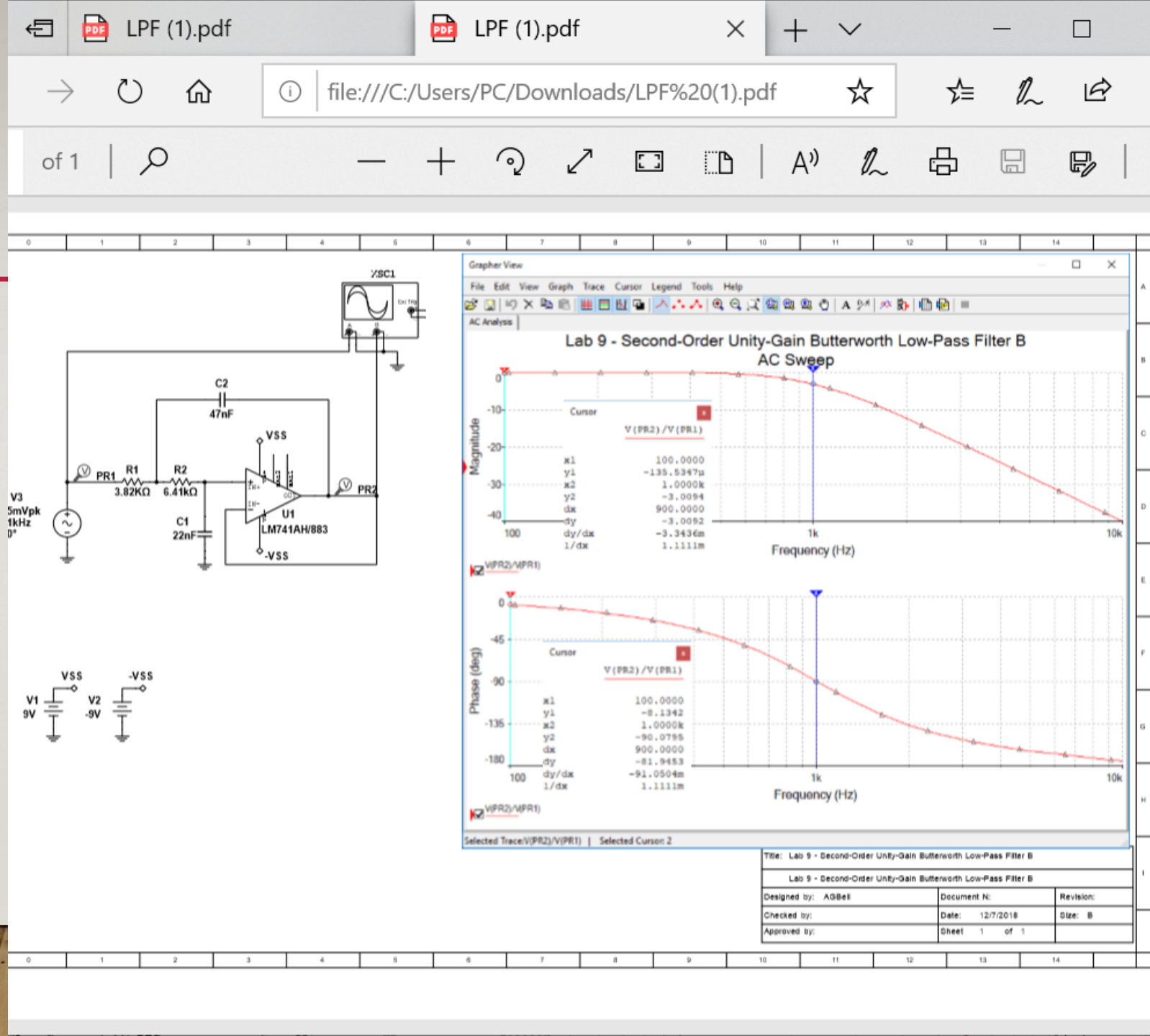
LAB 8 COMMON DRAIN AMPLIFIER



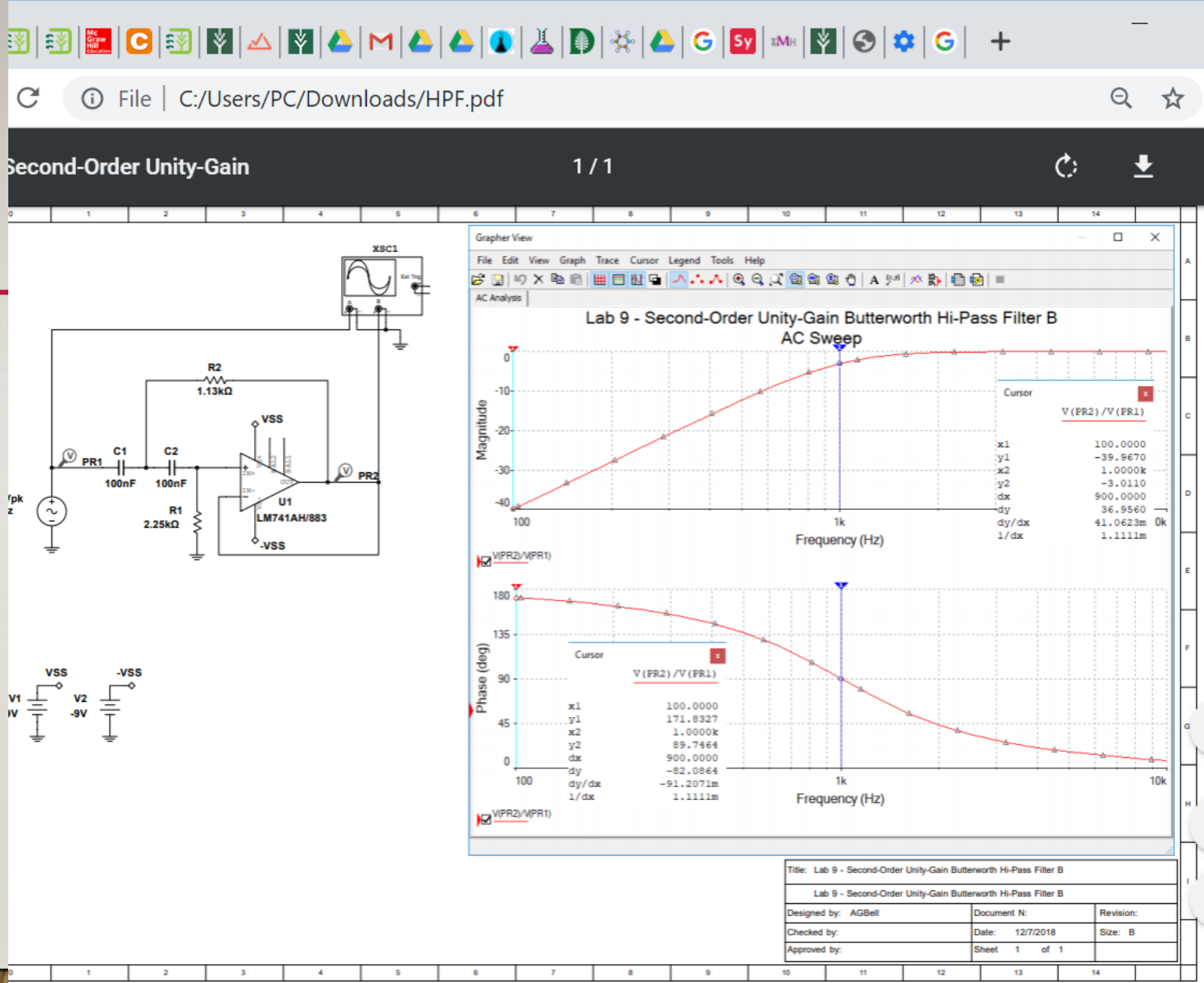
LABS 9-12: DESIGNING ACTIVE FILTERS



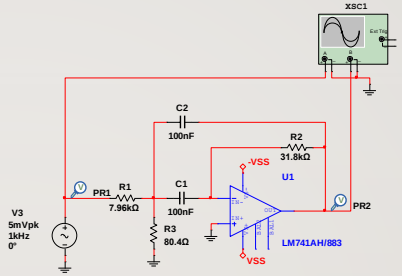
LAB 9: DESIGN A BUTTERWORTH LOW-PASS FILTER WITH A 3DB POINT @ 1KHZ

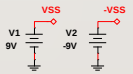


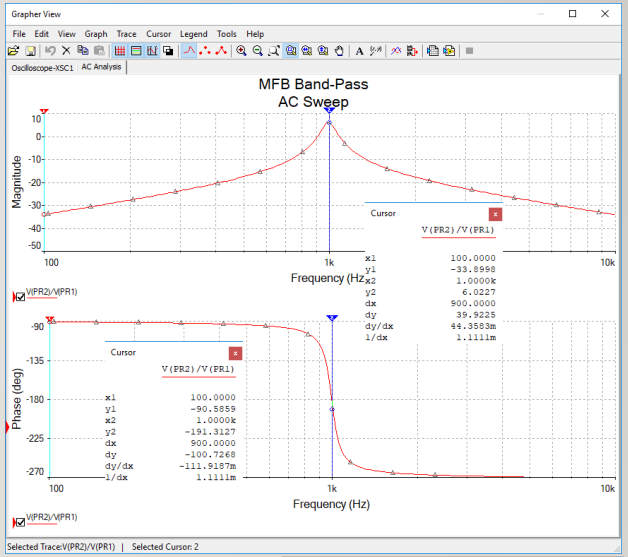
LAB 10: DESIGN, A BUTTERWORTH HIGH-PASS FILTER WITH A 3DB POINT @ 1KHZ.



LAB 11: DESIGN A BAND-PASS FILTER WITH A 3DB POINT @ 1KHZ.







Title: eect 121 lab 11		
eect 121 lab 11		
Designed by: AGBell	Document N:	Revision:
Checked by:	Date: 12/18/19	Size: B
Approved by:	Sheet 1 of 1	

LAB 12: DESIGN, A 1KHZ NOTCH FILTER.