Transistor Lab Report

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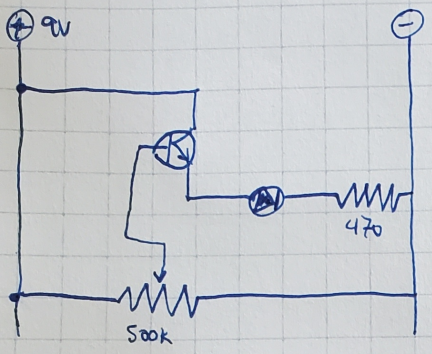
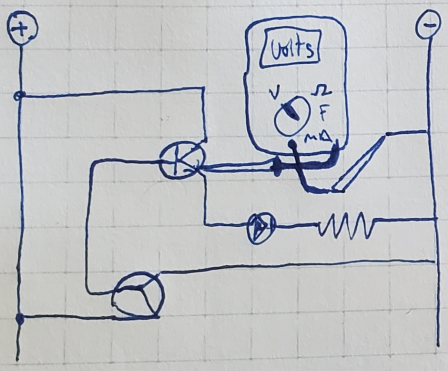
Physics 2023-2024

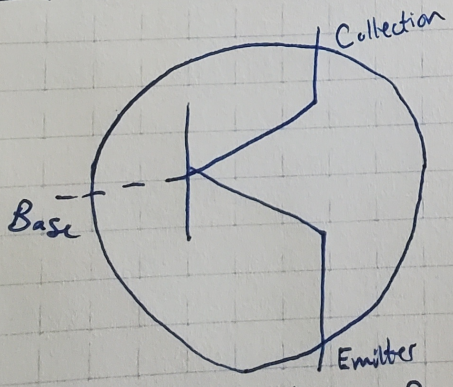
#1 - Schematic A circuit #3



#2 - Schematic B circuit #2



#3 - Transistor Function



- Power is sent through C
- The pathway to E is blocked at junction B
- Power sent to B will open the pathway.
- Therefore varying input B will vary output E

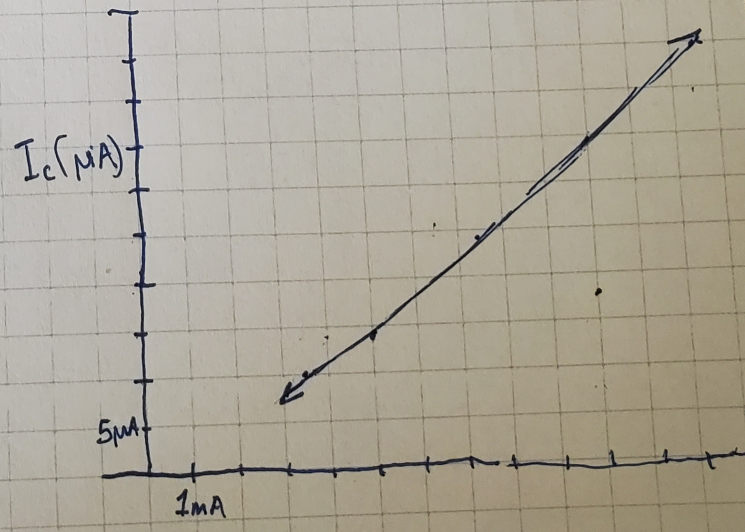
#4 - Lab Procedure

- We had a short lecture on transistors
- We then built two circuits (see #1 & #2)
- Finally, data was analyzed for gain (see #6)

#5 - Gain Procedure

- Each transistor has a generic factory set gain
- Gain for that transistor was ~300
- Gain is measured as I_C / I_B
  (or in other words, the Main input over the transistor input)
- I_C is measured in milliamps (mA)
- I_B is measured in microamps (μA)

#6 - Graph of measured Gain Values



Gain = I_C / I_B

	I_B	I_C
1	10μA	3.5mA
2	14μA	5mA
3	24μA	7.5mA
4	34μA	10mA
5	45μA	12.5mA

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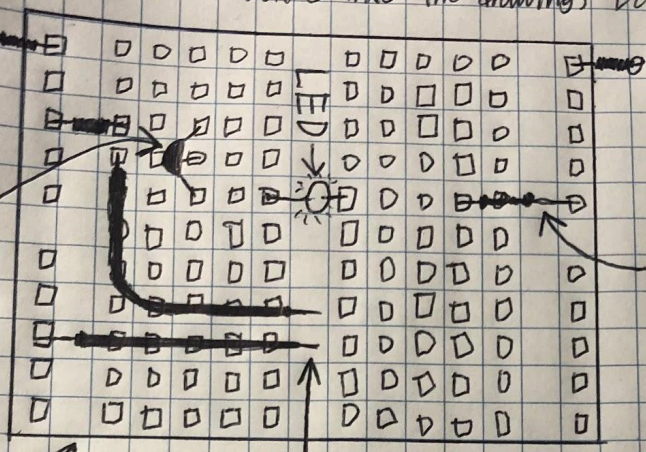
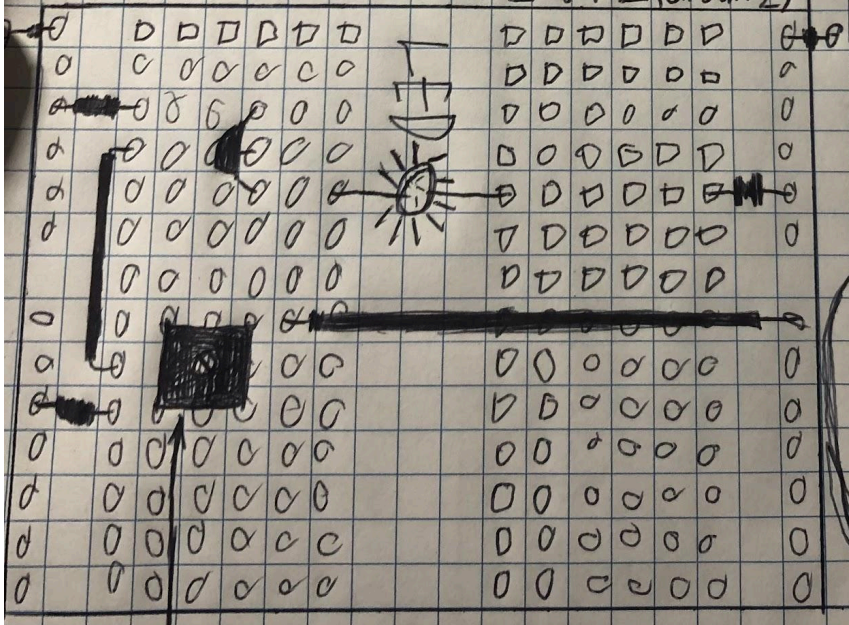
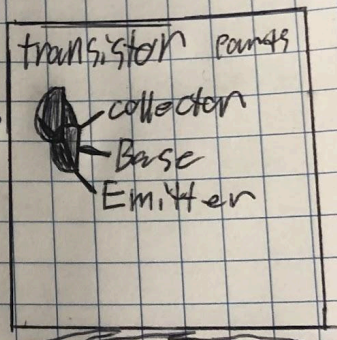
I.) The lab consisted of two different circuits which we built which looked like the drawings below



circuit 1 of 2

graph 2 of 2 (circuit 2)





all pieces are the same but a trimmer potentiometer was added so we can better control the transistor more precisely

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II). How a transistor works is that the top leg is the collector while the middle is the base and the bottom is the emitter. What it does is when the base is slightly more positive than the emitter the transistor allows positive current to flow from the collector out through the emitter. In this way the small current entering the emitter (actually the base not emitter) can control a much greater current entering the collector.

III). In this lab we built a pair of circuits, first one where we used our finger as the potentiometer, the next we installed a trimmer potentiometer which we could control much better. After that we found the gain by using an amp meter and rearranging the wires a bit. After that we graphed the gain and finished the lab. At one point I almost blew up the circuit by putting the trimmer potentiometer backwards but quickly changed that and finished the lab.

IIII). We measured the "gain" of our transistor by attatching an amp meter to our second circuit we constructed. After we got our numbers we used our calculaters to find the finell "gain" of our transistor/circuit.

1 $\frac{3.5 \times 10^{-3}}{10 \times 10^{-6}} = 350$

2 $\frac{5 \times 10^{-3}}{14 \times 10^{-6}} = 357$

3 $\frac{7.5 \times 10^{-3}}{24 \times 10^{-6}} = 312$

4 $\frac{10 \times 10^{-3}}{34 \times 10^{-6}} = 294$

5 $\frac{12.5 \times 10^{-3}}{45 \times 10^{-6}} = 277$

V). graph of my gain