Lab 5

17. Resistor Circuits

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Physics II

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1. OBJECTIVE

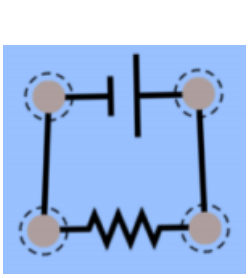
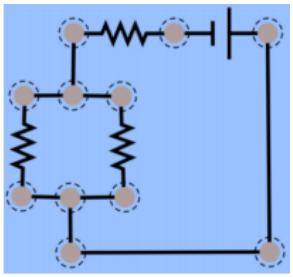
   This lab will introduce and show us the relationship between voltage, current and resistance in simple DC circuits. We will construct different configurations of resistors to determine their behavior and the voltage they'll produce.

2. THEORY

   We are expected to build a circuit and determine how different resistances will affect the overall voltage, current and resistance. With each resistor having different resistance we should expect to see a variety in the results.

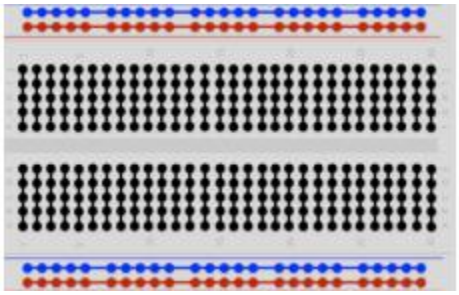
3. PROCEDURE

   1) Set up DC Power supplies
   2) Power Supply should read 5V
   3) Construct the circuits listed below:

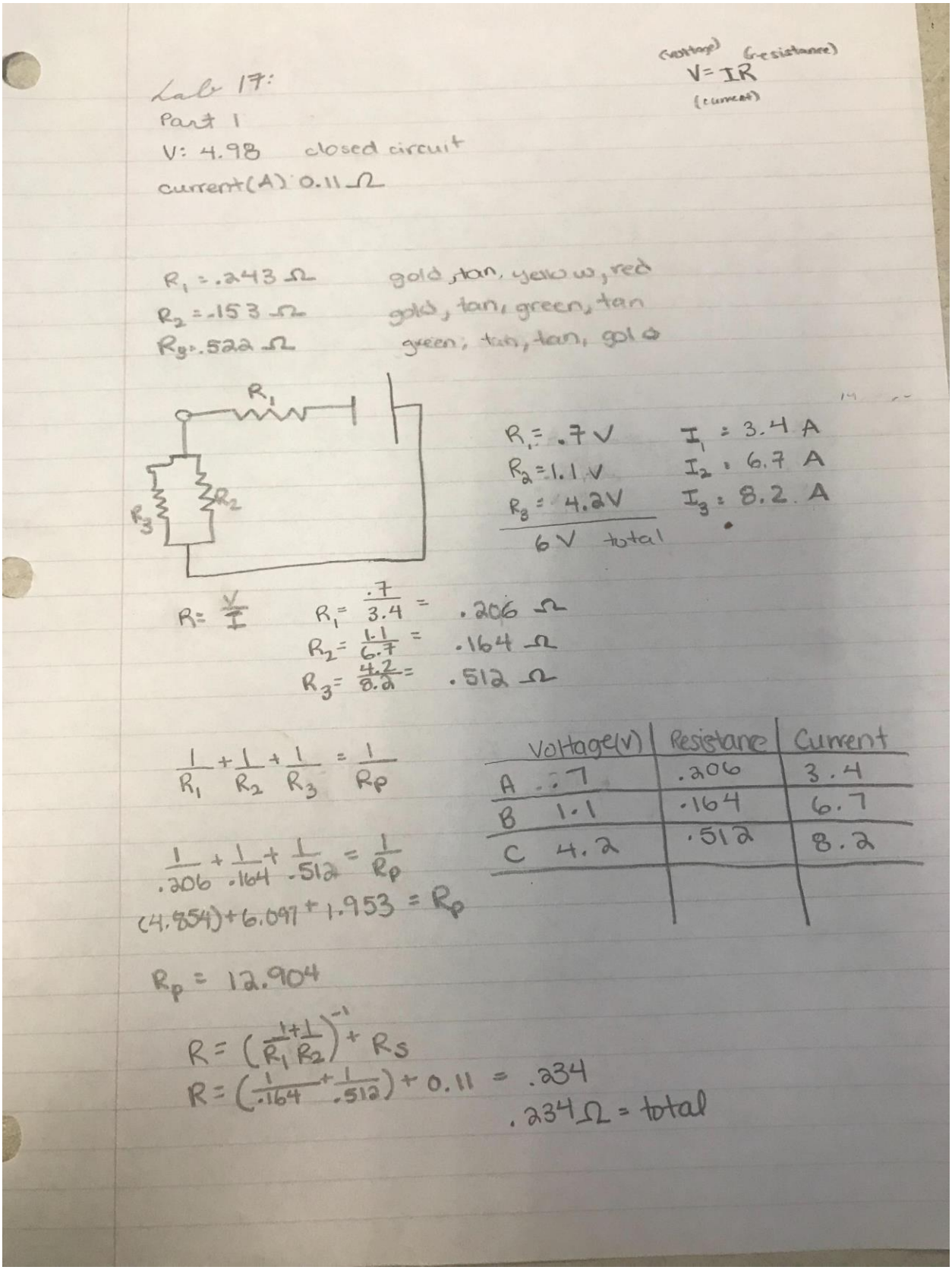
   4) Measure the voltage across the resistor and the current through the resistor.

4. DATA

 (original breadboard)

Voltage of Battery: 4.98 V (closed circuit)
Current Measured (A): 0.11 ohms
Resistor 1: .243 ohms (gold, tan, yellow, red)
Resistor 2: .153 ohms (tan, green, tan)
Resistor 3: .522 ohms (tan, tan, gold)
V=IR

5. CALCULATIONS/RESULTS



Lab 17:

Part 1

V: 4.98 closed circuit

current(A): 0.11 Ω

(voltage) (resistance)

$V = IR$

(current)

$R_1 = .243\ \Omega$ gold, tan, yellow, red

$R_2 = .153\ \Omega$ gold, tan, green, tan

$R_3 = .522\ \Omega$ green, tan, tan, gold

$R_1 = .7\ V$ $I_1 = 3.4\ A$

$R_2 = 1.1\ V$ $I_2 = 6.7\ A$

$R_3 = 4.2\ V$ $I_3 = 8.2\ A$

6 V total

$R = \frac{V}{I}$

$R_1 = \frac{.7}{3.4} = .206\ \Omega$

$R_2 = \frac{1.1}{6.7} = .164\ \Omega$

$R_3 = \frac{4.2}{8.2} = .512\ \Omega$

$\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{R_p}$

	Voltage(V)	Resistance	Current
A	.7	.206	3.4
B	1.1	.164	6.7
C	4.2	.512	8.2

$\frac{1}{.206} + \frac{1}{.164} + \frac{1}{.512} = \frac{1}{R_p}$

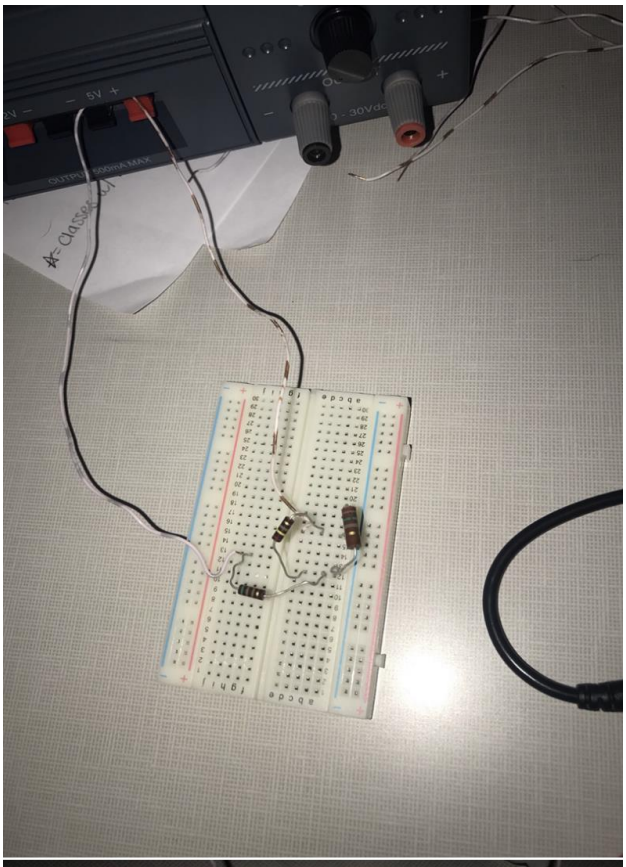
$(4.854) + 6.097 + 1.953 = R_p$

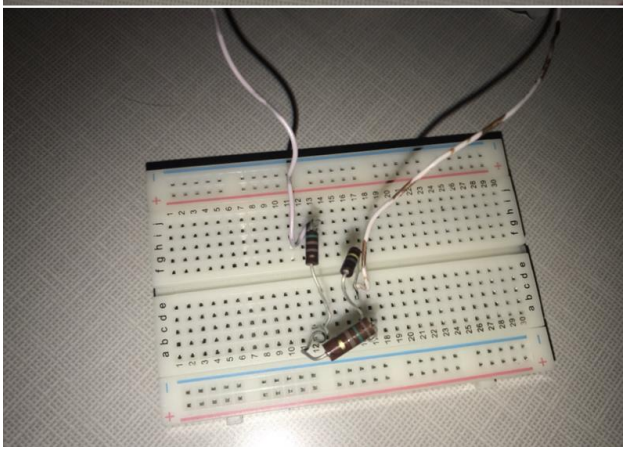
$R_p = 12.904$

$R = \left(\frac{1}{R_1} + \frac{1}{R_2}\right)^{-1} + R_S$

$R = \left(\frac{1}{.164} + \frac{1}{.512}\right) + 0.11 = .234$

$.234\ \Omega$ = total





6. ANALYSIS
   Overall this lab extended my skills in taking measurements and gave me a visual representation of a circuit.

7. COMMENTS
   I enjoyed this lab due to being able to see what truly happens within a circuit and how it affects our daily lifestyles.