Class: Physics II, Dates: Lab performed 2/17/2023

Lab 4: Introduction to Thermal Conductivity

by

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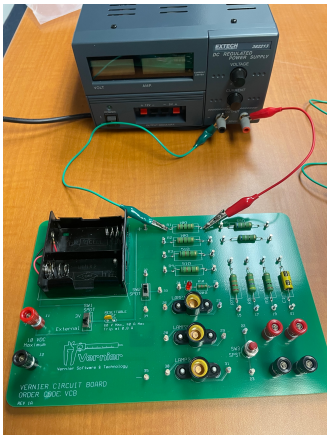
1. **Objective:** Current and voltage in series and parallel circuits.

2. **Introduction**:

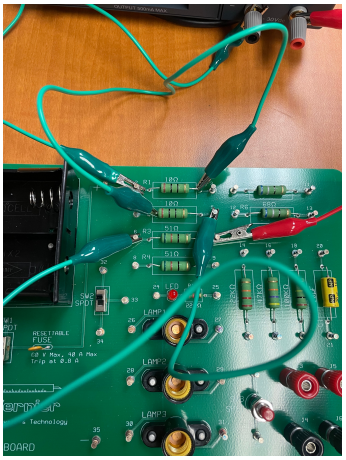
Ohm's law predicts that the voltage, current, and resistance of a circuit are related in that the total voltage of the circuit is equivalent to the product of the current and the resistance of the circuit. Ohm's Law can be written as V=I*R. When V is the voltage, I represents current, and R is resistance. The unit of current is the ampere (A); the unit of resistance is the ohm (Ω), which is equivalent to the one volt per ampere. Every electric device has inherent resistance to the flow of current.

3. **Apparatus and Materials:**
   - Ammeter
   - Voltmeter
   - Connecting wires

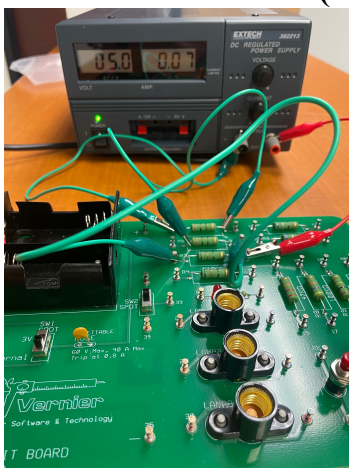


(fig. 1)

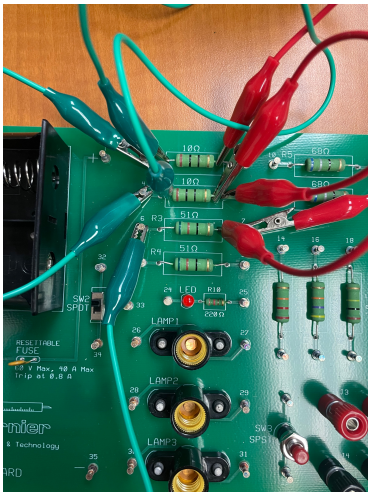
(fig. 2)



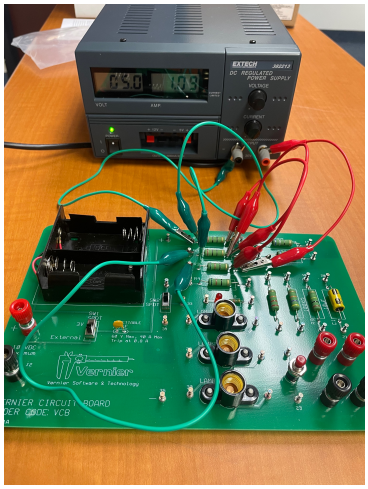
(fig. 3)



(fig. 4)



(fig. 5)



(fig. 6

4. Procedure and Results:

V=I*R
R=V/I
R=5V/0.5A
R=10Ω

I=0.5A
V=5V
R=?

Please refer to figure 1 and figure 2 for values and to corroborate results.

$R = R_1 + R_2 + R_3$ (Series)
R = 10Ω + 10Ω + 51Ω
R= 71Ω

$R_1 = 10\Omega$
$R_2 = 10\Omega$
$R_3 = 51\Omega$
R=?

Please refer to figure 3 and figure 4 for values and to corroborate results.

$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ (Paralell)

$\frac{1}{R} = \frac{R_2R_3 + R_1R_3 + R_1R_2}{R_1R_2R_3}$

$R = \frac{R_1R_2R_3}{R_2R_3 + R_1R_3 + R_1R_2}$

$R = \frac{5100}{1120} = 4.55\Omega$

$R_1 = 10\Omega$
$R_2 = 10\Omega$
$R_3 = 51\Omega$
R=?

Please refer to figure 5 and figure 6 for values and to corroborate results.

R=V/I=4.58Ω

This is what we obtain from the reading which is close to what we calculate.

6. Conclusions

In this experiment we were able to determine the total current flowing through a series circuit and parallel circuit, the voltage across each resistor and the current flowing through a series circuit and a parallel circuit. While in experimental procedure for both series connection and parallel connection for the resistor, the percent of error was very minimal that the values are so close to the original values. With that we can draw a conclusion that the experiment was carried out successfully.

7. Question:

If voltage in a circuit is increased under constant resistance, then what will happen to the current?

Current must increase because of Ohm's Law states that voltage and current are directly proportional.