Experiment #1

Series Circuit and Parallel Circuits

EENG 275 - W01

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**Experiment Objectives**

* Practically validate the equations for computing equivalent resistance
* Check for Kirchhoff’s Voltage Law
* Check for Kirchhoff’s Current Law

**Equipment Used**

Components Used in the Experiment:

1. NYIT supplied Lab Kit
2. Digital Multi-Meter (DMM)
3. 220 Ω Resistor
4. 330 Ω Resistor
5. 470 Ω Resistor
6. 1 kΩ Resistor
7. 2.2 kΩ Resistor
8. 2.7 kΩ Resistor
9. 4.7 kΩ Resistor
10. DC Power Supply
11. Breadboard

**Results**

**1. Construct the circuit shown in Figure 1.1. Do not connect the source. Measure RT with the DMM.**

RT = 2013 Ω

**2. Connect the source as shown in Figure 1.1. Measure and tabulate V1, V2, V3, V4, VT and IT.**

*Measurements for circuit shown in Figure 1.1*

|  |  |
| --- | --- |
| V1 | 1.32V |
| V2 | 1.97V |
| V3 | 2.81V |
| V4 | 5.96V |
| VT | 12.07V |
| IT | 0.001A |

**3. Construct the circuit shown in Figure 1.2. Do not connect the source. Measure RT with the DMM**.

RT = 621 Ω

**4. Connect the source as shown in Figure 1.2. Measure and tabulate I1, I2, I3, and IT.**

*Measurements for circuit shown in Figure 1.2*

|  |  |
| --- | --- |
| I1 | 12.3mA |
| I2 | 4.53mA |
| I3 | 2.55mA |
| IT | 19.32mA |

**Questions**

**1. How is a voltmeter connected to measure an unknown voltage?**

- Connected the DCC each resistor in a closed circuit to calculate

**2. Calculate the percentage differences between the values obtained in the preparation and the actual measured values.**

*Percent Error for the measurements in the circuit shown in Figure 1.1*

|  |  |
| --- | --- |
| V1 | -1.52% |
| V2 | 1.52% |
| V3 | 0.35% |
| V4 | -1.00% |
| VT | 0.58% |
| IT | 500% |
| RT | 0.34% |

*Percent Error for the measurements in the circuit shown in Figure 1.2*

|  |  |
| --- | --- |
| I1 | -2.4% |
| I2 | 13.25% |
| I3 | -15% |
| IT | 1.68% |
| RT | 1.7% |

**3. Compare experimental and calculated values.**

- There was a difference between the calculated and experimental values by a margin of error

**4. Demonstrate the satisfaction of KVL and KCL.**

- The total currents and voltages added up with the respective currents and voltages of the resistors; thus, satisfying the KVL and KCL.

**5. When using a DMM to do a current measurement, the implicit assumption is that the meter resistance is 0. What will be the effect on the measurement if the resistance of the meter is not 0?**

- There will be a small difference in current measurement due to this difference in resistance.

**Conclusion**

* Given that we are unable to measure the current of the circuit when it’s a decimal to the thousandth, I was unable to get a read for total current in circuit 1.
* To be able to accurately measure current across a circuit component it is necessary to make it open path.
* The resistance from the DMM can influence the difference in measuring current, thus leading to a difference in the measurement of the actual and measured values.