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**Group 1**

**Experiment 4: Basic Electrical Measurements**

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**Introduction:** In this experiment we learned how to use multimeters, Simpson Meters, and DC Power supplies by measuring the resistances of several ordinary resistors as well as the varying resistances of a 10-turn potentiometer. These resistors had colored bands, which, by comparing with established color codes, let us determine their theoretical resistances, along with their acceptable tolerances. We also mathematically determined the theoretical resistances of these resistors in specific scenarios, then compared our measured findings with the ideal. In addition, this experiment saw us analyzing different configurations of circuits, and determining the current, resistance, and voltage passing through the circuits each time their arrangements were altered.

**Equations Used:**

**Data:** See attached Excel Sheets and Graphs.

**Conclusion:** Using the tools presented to us, we managed to determine the resistance, current, and power of a DC circuit. We found that the value of current and power corresponded with the theoretical calculations using the Ohm’s law. Additionally, we managed to find the theoretical and measured potential difference through varying resistances and found the standard deviation to be <0.5 in all cases. These measurements all support the concepts through physical data, albeit with some variance due to error. Constructing a circuit with perfectly uniform wires and resistances was not possible given our hand-crafted designs, and the imperfect selection of the potentiometer dial both led to some amount of error, close enough and consistent enough to agree with our calculations.