**ASEN 3300, Fall 2023: Lab 1 Report Submission**

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| **Names:** | Jared Steffen |
|  | Brady Sivey |
|  | Joshua Geeting |
| **Section:** | 012 |

**4. Experiment (25pts)**

1. **Inventory** **(4 pts)**
   1. Record your response to 4.1.a in the table below:

(Enter one part, or set of parts, in each box; e.g. “1 kΩ resistors (5)”)

|  |  |  |  |
| --- | --- | --- | --- |
| Jumper wire kit | USB-A to USB-Micro cable | 100 Kilo-ohm Resistor (3) | NMH0515SC-DCDC Converter |
| Breadboard | BNC Cables (3) | 1 Mega-ohm Resistor (3) | 2N7000TA-MOSFET (2) |
| BNC to banana plug/T connector | BNC to Alligator Pigtail | 10 Mega-ohm Resistor (3) | LM358 Op. Amp (4) |
| Arduino due | Alligator clips (2) | 1 Micro-farad Capacitor (2) | LM317 Power Regulator (2) |
| Accelerometer kit | 332 Ohm Resistor (4) | 0.1 Micro-farad Capacitor (2) |  |
| 12”/18” banana plug | 1 Kilo-ohm Resistor (11) | 10 Pico-farad Capacitor (2) |  |
| 8” banana  plug | 3.3 Kilo-ohm Resistor (5) | 1 Micro-farad Polarized Capacitor (2) |  |
| Anti-static wrist strap | 5.1 Kilo-ohm Resistor (3) | 1N4001 Diode (2) |  |
| 24” banana plug (2) | 10 Kilo-ohm Resistor (4) | 1N5232B Zener Diode (2) |  |
| 36” banana plug | 33 Kilo-ohm (3) | LED (2) |  |

* 1. Record your response to 4.1.b below

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1. **Resistor Measurements (11 pt)**
2. Record your response to 4.2.a below:

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| --- |
| *Insert sketch / images of 1 kΩ and 1 MΩ resistors here, depicting color coding* |

1. Record your response to 4.2.b below:

|  |  |
| --- | --- |
| Resistor (Manufacture Stated Value) | Measured Value |
| R1 (1 kΩ) |  |
| R2 (1 kΩ) |  |
| R3 (1 MΩ) |  |
| R4 (1 MΩ) |  |

1. Record your responses to 4.2.c below:

|  |  |
| --- | --- |
| First measurement: |  |
| Second measurement: |  |

1. Record your responses to 4.2.d below:

|  |  |
| --- | --- |
| Two 1kΩ resistors in series: |  |
| Two 1MΩ resistors in series: |  |

1. Record your responses to 4.2.e below:

|  |  |
| --- | --- |
| Two 1kΩ resistors in parallel: |  |
| Two 1MΩ resistors in parallel: |  |

1. **Voltage and Current Measurements (10 pt)**
2. Record your response to 4.3.b below:

|  |  |
| --- | --- |
| Power supply voltage measured with DMM: |  |

1. Record your responses to 4.3.c below:

|  |  |
| --- | --- |
| Voltage across first resistor: |  |
| Voltage across second resistor: |  |

1. Record your response to 4.3.d below:

|  |  |
| --- | --- |
| Current through circuit: |  |

1. Record your responses to 4.3.e below:

|  |  |
| --- | --- |
| Voltage across first resistor: |  |
| Voltage across second resistor: |  |
| Current through circuit: |  |

**5. Analysis (25 pts)**

1. **Comparison of Resistor Measurements**
   1. Record your responses to 5.1.a in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Resistor:** | **Manufacturer value:**  **(resistor value +/- tolerance as marked on resistor)** | **DMM Measurement (Ohmmeter):** | **Calculated**  **(From V and I):** |
| 1 kΩ |  |  |  |
| 1 kΩ |  |  |  |
| 1 MΩ |  |  |  |
| 1 MΩ |  |  |  |

|  |
| --- |
| *Comments on / comparison of values in table* |

* 1. Record your response to 5.1.b below. **Don't forget to mention the effect of the DMM input resistance in your discussion.**

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1. **People Comparison**
2. Record your response to 5.2.a below:

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|  |

1. **1 MΩ and 1kΩ**
2. Record your response to 5.3.a below:

|  |
| --- |
| *Insert image with circuit, voltmeter(s), and ammeters here* |

1. Record your responses to 5.3.b below:

|  |  |
| --- | --- |
| Voltage across 1 kΩ resistor: |  |
| Voltage across 1 MΩ resistor: |  |

1. Record your responses to 5.3.c below:

|  |  |
| --- | --- |
| Current through 1 kΩ resistor: |  |
| Current through 1 MΩ resistor: |  |

1. Record your responses to 5.3.d below:

|  |
| --- |
| *Insert comments on changes / similarities and rationale here for both resistor branches after the 1 MΩ is swapped to 10 MΩ.* |

1. **Power Ratings / Dissipation**
   1. Record your responses to 5.4.a below:

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|  |

1. **Ammeter Design**
   1. Record your response to 5.5.a below:

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|  |

* 1. Record your response to 5.5.b below:

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|  |

* 1. Record your responses to 5.5.c below:

|  |
| --- |
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