Lab 1 – Results: Intro to DC Circuits

*ECE209: Fundamentals of Electrical Engineering*

|  |  |  |
| --- | --- | --- |
| Name | Student ID | CCID |
|  |  |  |
|  |  |  |

# 2.1 Equipment Familiarization

## 2.1.5.1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Measure Resistance** | | | | | |
|  | **R1** | **R2** | **R3** | **R4** | **R5** | **R6** |
|  | 10Ω | 100Ω | 470Ω | 1.0kΩ | 4.7kΩ | 10MΩ |
| Color 1 |  |  |  |  |  |  |
| Color 2 |  |  |  |  |  |  |
| Color 3 |  |  |  |  |  |  |
| Color 4 |  |  |  |  |  |  |
| Color 5 |  | NA | NA | NA | NA | NA |
| Tolerance |  |  |  |  |  |  |
| R (Ω) |  |  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Measure Series Resistors** | | |
| **RS1** | **RS2** | **RS3** |
| 100Ω + 470Ω | 1.0kΩ + 4.7kΩ | 10MΩ + 10MΩ |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Measure Parallel Resistors** | | |
| **RP1** | **RP2** | **RP3** |
| 100Ω // 470Ω | 1.0kΩ // 4.7kΩ | 10MΩ // 10MΩ |
|  |  |  |

# 2.2 Ohm’s Law and Power

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **470 Ω - Resistor** | | | | | | | |
| **Voltage** | *(V)* | **5.0** | **3.5** | **1.0** | **0** | **-2.5** | **-5.0** |
| **Voltage** | *(V)* |  |  |  |  |  |  |
| **Current** | *(mA)* |  |  |  |  |  |  |
| **Resistance** | *(Ω)* |  |  |  |  |  |  |
| **Power** | *(mW)* |  |  |  |  |  |  |
| **1.0 kΩ - Resistor** | | | | | | | |
| **Voltage** | *(V)* | **5.0** | **3.5** | **1.0** | **0** | **-2.5** | **-5.0** |
| **Voltage** | *(V)* |  |  |  |  |  |  |
| **Current** | *(mA)* |  |  |  |  |  |  |
| **Resistance** | *(Ω)* |  |  |  |  |  |  |
| **Power** | *(mW)* |  |  |  |  |  |  |
| **4.7 kΩ - Resistor** | | | | | | | |
| **Voltage** | *(V)* | **5.0** | **3.5** | **1.0** | **0** | **-2.5** | **-5.0** |
| **Voltage** | *(V)* |  |  |  |  |  |  |
| **Current** | *(mA)* |  |  |  |  |  |  |
| **Resistance** | *(Ω)* |  |  |  |  |  |  |
| **Power** | *(mW)* |  |  |  |  |  |  |

# 2.3 Voltage Divider

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **R1** | *(Ω)* | **470** | | | |
| **R2** | *(Ω)* | **100** | **470** | **1.0 k** | **4.7 k** |
| **VS** | *(V)* |  |  |  |  |
| **IS** | *(mA)* |  |  |  |  |
| **V1** | *(V)* |  |  |  |  |
| **V2** | *(V)* |  |  |  |  |
| **PR1** | *(mW)* |  |  |  |  |
| **PR2** | *(mW)* |  |  |  |  |
| **PTotal** | *(mW)* |  |  |  |  |

# 2.4 Current Divider

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **R1** | *(Ω)* | **470** | | | |
| **R2** | *(Ω)* | **100** | **470** | **1.0 k** | **4.7 k** |
| **VS** | *(V)* |  |  |  |  |
| **IS** | *(mA)* |  |  |  |  |
| **I1** | *(mA)* |  |  |  |  |
| **I2** | *(mA)* |  |  |  |  |
| **PR1** | *(mW)* |  |  |  |  |
| **PR2** | *(mW)* |  |  |  |  |
| **PTotal** | *(mW)* |  |  |  |  |

# 2.5 Potentiometer Divider

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **V1 Set-point** | *(V)* | **0** | **1.0** | **2.5** | **4.0** | **5.0** |
| **V1** | *(V)* |  |  |  |  |  |
| **V2** | *(V)* |  |  |  |  |  |
| **IS** | *(mA)* |  |  |  |  |  |
| **VTotal** | *(V)* |  |  |  |  |  |

# 2.6.1 Voltmeter Loading

|  |  |  |
| --- | --- | --- |
| **V2** | *(V)* |  |
| **V1** | *(V)* |  |
| **VS** | *(V)* |  |
| **V2 + V1** | *(V)* |  |

# 2.6.2 Ammeter Loading

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **VS** | *(V)* | **0.5** | **1.5** | **2.5** |
| **IS** | *(mA)* |  |  |  |
| **V(AMMETER)** | *(V)* |  |  |  |
| **RDMM** | *(Ω)* |  |  |  |

# Resistor I-V Characteristic Plot

The following pages have been left for you to include the plots that you are required to create as part of your post-lab.

To create your plots you can use whichever software you would like (Excel, Matlab, etc), export your plot as an image and import it into your Lab 1 - Results sheet in the appropriate place.

Your plots should include:

* A Plot title
* Label your axes and show what unit of measure is used.
* Include a marking for your data-points.
* Include a line between your data-points in the same series.
* Include a legend.
* Make sure your scales are appropriate and visible.

< Insert your plot here >

For your Ohm's Law and Power results:

Plot the current vs. voltage with each resistor value as a separate series.

# Resistor P-V Characteristic Plot

< Insert your plot here >

For your Ohm's Law and Power results:

Plot the power vs. voltage, with each resistor value as a separate series.

# Voltage Divider (R1 = 470Ω) – Voltage Plot

< Insert your plot here >

For your Voltage Divider results:

Plot a series for each voltage: source voltage, R1 voltage and R2 voltage versus the resistance value of R2.

# Voltage Divider (R1 = 470Ω) – **Power** Plot

< Insert your plot here >

For your Voltage Divider results:

Plot a series for each power: the source power, the R1 power dissipated and the R2 power dissipated versus the resistance value of R2.

# **Current** Divider (R1 = 470Ω) – **Current** Plot

< Insert your plot here >

For your Current Divider results:

Plot a series for each current: source current, R1 current and R2 current versus the resistance value of R2.

# **Current** Divider (R1 = 470Ω) – **Power** Plot

< Insert your plot here >

For your Current Divider results:

Plot a series for each power: the source power, the R1 power dissipated and the R2 power dissipated versus the resistance value of R2.