

# Lab 1 - Results: Intro to DC Circuits

ECE202: *Electrical Circuits I*

| Name | Student ID | CCID | Lab Section |
|------|------------|------|-------------|
|      |            |      |             |
|      |            |      |             |
|      |            |      |             |

Pre-lab Sign-off: \_\_\_\_\_ Results Sign-off: \_\_\_\_\_

## Equipment Familiarization

### Student PC Board - Resistors

| RESISTORS A - (4-band Resistors) |      |  |      |  |     |  |      |
|----------------------------------|------|--|------|--|-----|--|------|
| Resistor                         | 1.8k |  | 4.7k |  | 62k |  | 4.7M |
| Color 1                          |      |  |      |  |     |  |      |
| Color 2                          |      |  |      |  |     |  |      |
| Color 3                          |      |  |      |  |     |  |      |
| Color 4                          |      |  |      |  |     |  |      |
| Tolerance                        |      |  |      |  |     |  |      |
| High/low R Value ( $\Omega$ )    |      |  |      |  |     |  |      |
| Resistance ( $\Omega$ )          |      |  |      |  |     |  |      |
| % Error                          |      |  |      |  |     |  |      |

| RESISTORS B - (5-band Resistors) |       |  |       |  |       |  |      |
|----------------------------------|-------|--|-------|--|-------|--|------|
| Resistor                         | 1.00k |  | 20.0k |  | 40.2k |  | 200k |
| Color 1                          |       |  |       |  |       |  |      |
| Color 2                          |       |  |       |  |       |  |      |
| Color 3                          |       |  |       |  |       |  |      |
| Color 4                          |       |  |       |  |       |  |      |
| Color 5                          |       |  |       |  |       |  |      |
| Tolerance                        |       |  |       |  |       |  |      |
| High/low R Value ( $\Omega$ )    |       |  |       |  |       |  |      |
| Resistance ( $\Omega$ )          |       |  |       |  |       |  |      |
| % Error                          |       |  |       |  |       |  |      |

| Series Resistors          |             |               |              |                      |
|---------------------------|-------------|---------------|--------------|----------------------|
| Resistors                 | 1.8k + 4.7k | 4.99k + 40.2k | 20.0k + 200k | 5.6k + 10.0k + 20.0k |
| Calculated R ( $\Omega$ ) |             |               |              |                      |
| Resistance ( $\Omega$ )   |             |               |              |                      |

| Parallel Resistors        |              |                |               |                        |
|---------------------------|--------------|----------------|---------------|------------------------|
| Resistors                 | 1.8k // 4.7k | 4.99k // 40.2k | 20.0k // 200k | 5.6k // 10.0k // 20.0k |
| Calculated R ( $\Omega$ ) |              |                |               |                        |
| Resistance ( $\Omega$ )   |              |                |               |                        |

## DC Power Supply and Digital Multimeter

| Power Supply as a Voltage Source |    |     |     |
|----------------------------------|----|-----|-----|
| Needle                           | 5V | 10V | 20V |
| Voltage (V)                      |    |     |     |
| % Error                          |    |     |     |

| Power Supply as a Current Source |       |       |       |
|----------------------------------|-------|-------|-------|
| Needle                           | 100mA | 200mA | 300mA |
| Current (mA)                     |       |       |       |
| % Error                          |       |       |       |

| Power Supply as a Series Voltage Source |      |    |     |
|-----------------------------------------|------|----|-----|
| Needle                                  | 2.5V | 5V | 10V |
| Voltage (V)                             |      |    |     |

| Power Supply as a Parallel Current Source |       |       |       |
|-------------------------------------------|-------|-------|-------|
| Needle                                    | 100mA | 200mA | 400mA |
| Current (mA)                              |       |       |       |

## Decade Box

| Setting                 | 1k | 5k | 12k | 38k |
|-------------------------|----|----|-----|-----|
| Resistance ( $\Omega$ ) |    |    |     |     |

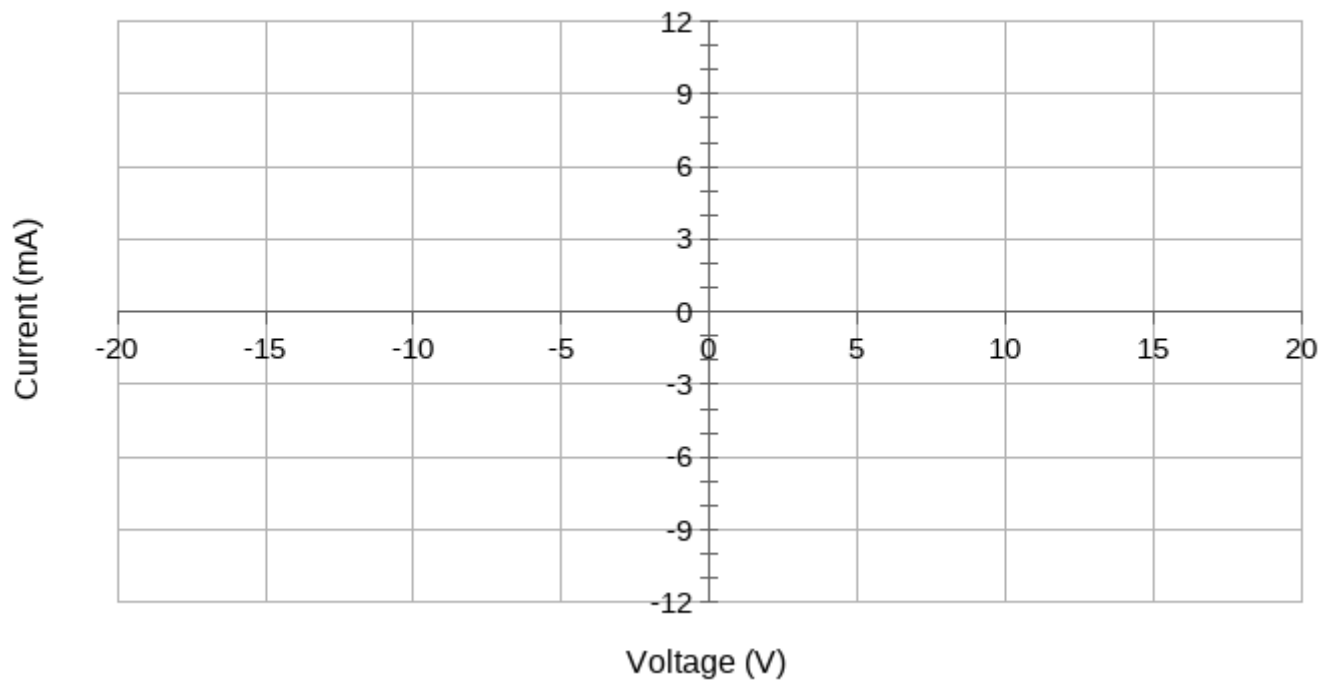
## Ohm's Law and Power Dissipation

| 1.8k                    |     |     |    |     |      |      |
|-------------------------|-----|-----|----|-----|------|------|
| Needle                  | 20V | 10V | 5V | -5V | -10V | -20V |
| Current (mA)            |     |     |    |     |      |      |
| Resistance ( $\Omega$ ) |     |     |    |     |      |      |
| Power (mW)              |     |     |    |     |      |      |

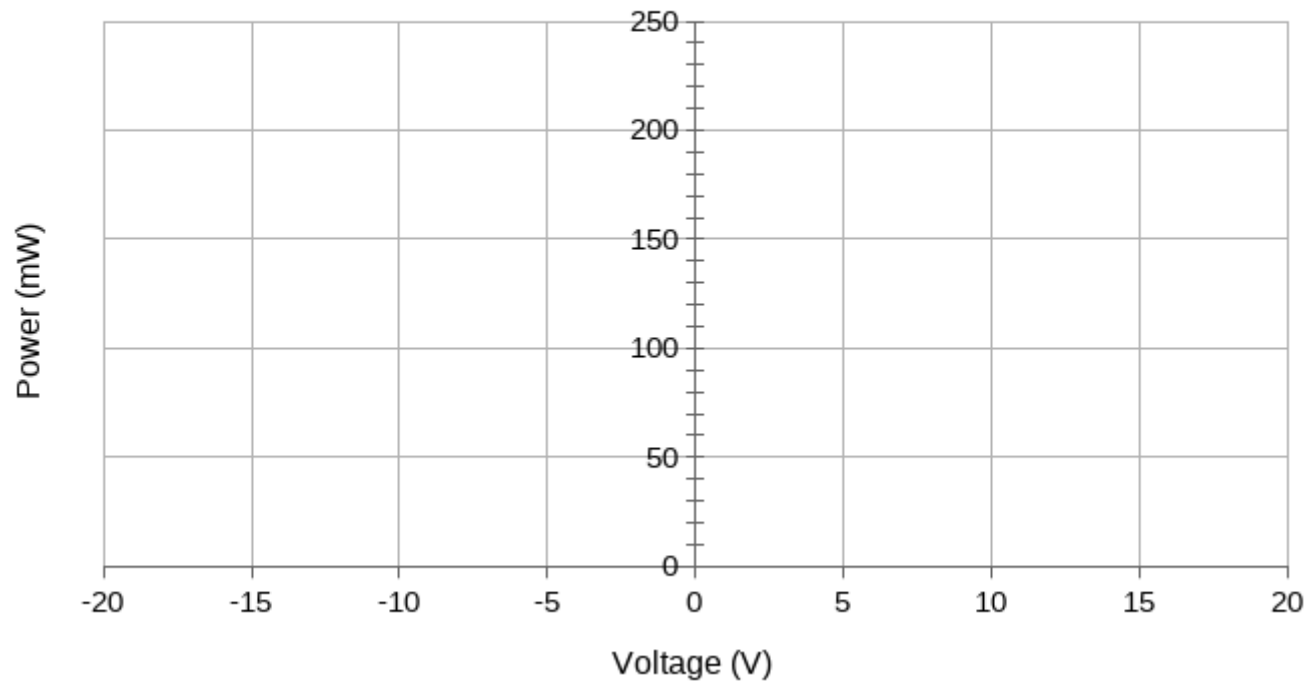
| 4.7k                    |     |     |    |     |      |      |
|-------------------------|-----|-----|----|-----|------|------|
| Needle                  | 20V | 10V | 5V | -5V | -10V | -20V |
| Current (mA)            |     |     |    |     |      |      |
| Resistance ( $\Omega$ ) |     |     |    |     |      |      |
| Power (mW)              |     |     |    |     |      |      |

| 20.0k                   |     |     |    |     |      |      |
|-------------------------|-----|-----|----|-----|------|------|
| Needle                  | 20V | 10V | 5V | -5V | -10V | -20V |
| Current (mA)            |     |     |    |     |      |      |
| Resistance ( $\Omega$ ) |     |     |    |     |      |      |
| Power (mW)              |     |     |    |     |      |      |

## Resistor I-V Curves



## Resistor P-V Curves



## Current Divider

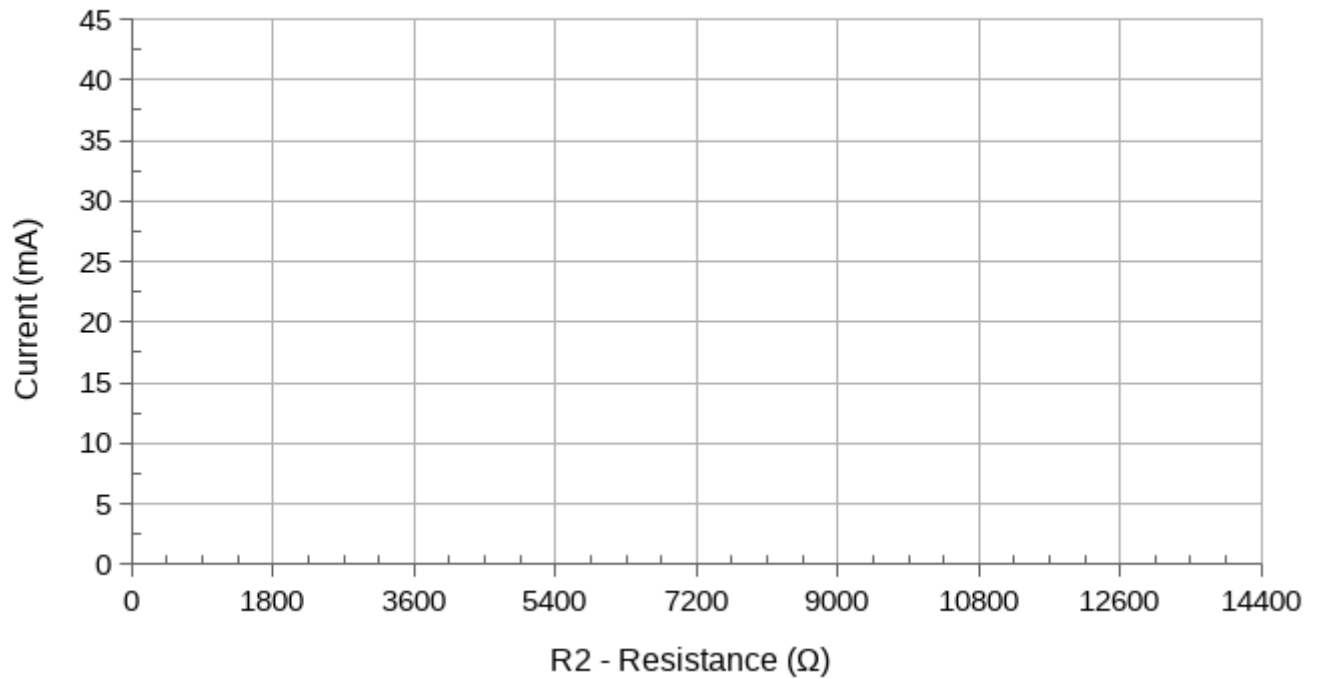
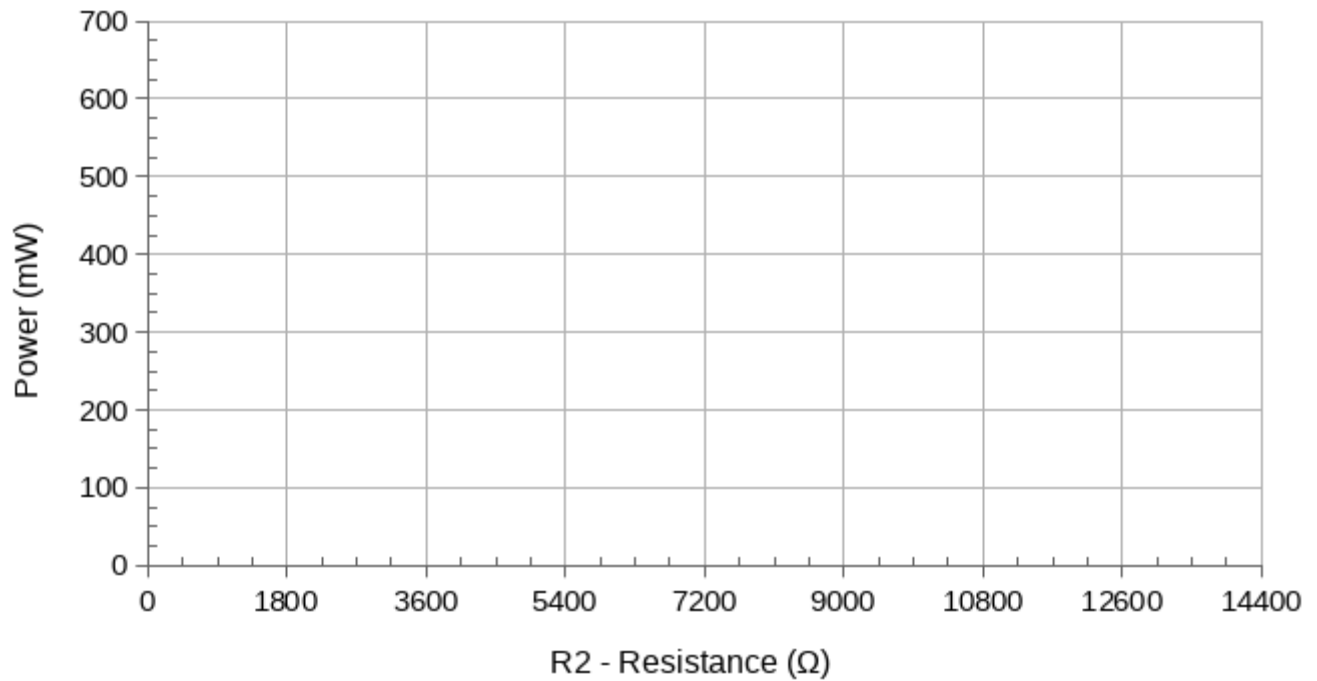
| $R_1$                          | 1.8k ( $V_s = 15\text{ V}$ ) |     |      |      |      |       |
|--------------------------------|------------------------------|-----|------|------|------|-------|
| $R_2$                          | 450                          | 900 | 1.8k | 3.6k | 7.2k | 14.4k |
| $R_1/R_2 (\Omega)$             |                              |     |      |      |      |       |
| $I_s (\text{mA})$              |                              |     |      |      |      |       |
| $I_{R1} (\text{mA})$           |                              |     |      |      |      |       |
| $I_{R2} (\text{mA})$           |                              |     |      |      |      |       |
| $V_s (\text{V})$               |                              |     |      |      |      |       |
| $I_s (\text{mA})$              |                              |     |      |      |      |       |
| $I_{R1} (\text{mA})$           |                              |     |      |      |      |       |
| $I_{R2} (\text{mA})$           |                              |     |      |      |      |       |
| $P_{R1} (\text{mW})$           |                              |     |      |      |      |       |
| $P_{R2} (\text{mW})$           |                              |     |      |      |      |       |
| $P_{\text{TOTAL}} (\text{mW})$ |                              |     |      |      |      |       |

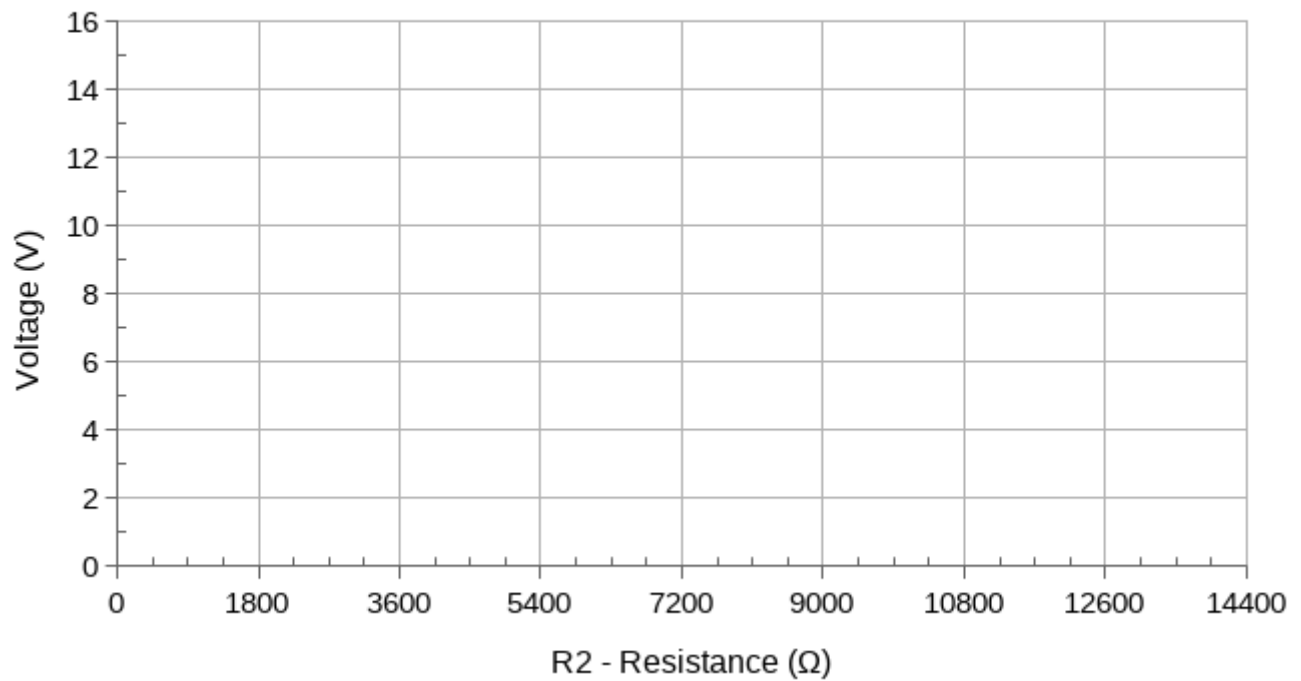
## Voltage Divider

| $R_1$                          | 1.8k ( $V_s = 15\text{ V}$ ) |     |      |      |      |       |
|--------------------------------|------------------------------|-----|------|------|------|-------|
| $R_2$                          | 450                          | 900 | 1.8k | 3.6k | 7.2k | 14.4k |
| $R_1+R_2 (\Omega)$             |                              |     |      |      |      |       |
| $I_s (\text{mA})$              |                              |     |      |      |      |       |
| $V_{R1} (\text{V})$            |                              |     |      |      |      |       |
| $V_{R2} (\text{V})$            |                              |     |      |      |      |       |
| $V_s (\text{V})$               |                              |     |      |      |      |       |
| $I_s (\text{mA})$              |                              |     |      |      |      |       |
| $V_{R1} (\text{V})$            |                              |     |      |      |      |       |
| $V_{R2} (\text{V})$            |                              |     |      |      |      |       |
| $P_{R1} (\text{mW})$           |                              |     |      |      |      |       |
| $P_{R2} (\text{mW})$           |                              |     |      |      |      |       |
| $P_{\text{TOTAL}} (\text{mW})$ |                              |     |      |      |      |       |

## The Loading Effect

|                | $V_s$ | $V_1$ | $V_2$ |
|----------------|-------|-------|-------|
| Calculated (V) |       |       |       |
| Voltage (V)    |       |       |       |
| % Error        |       |       |       |

Current Divider ( $R_1 = 1.8k$ ) - CurrentCurrent Divider ( $R_1 = 1.8k$ ) - Power

Voltage Divider ( $R_1 = 1.8k$ ) - VoltageVoltage Divider ( $R_1 = 1.8k$ ) - Power