EET/CPE 1140 - Homework # 3

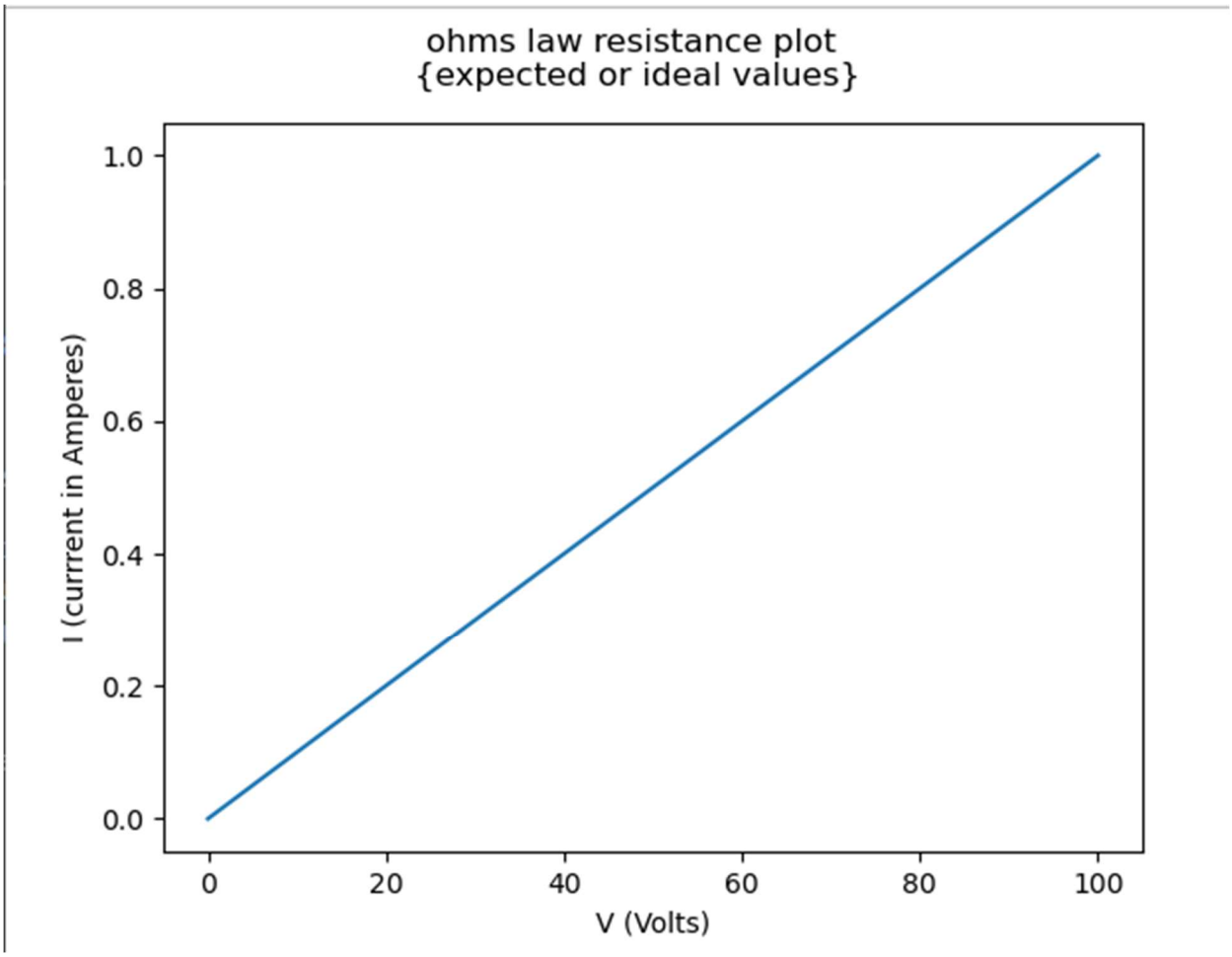
Chapter 3

5. A variable voltage source is connected to the circuit of **Figure 3–21**. Start at 0 V and increase the voltage in 10 V steps up to 100 V. Determine the current at each voltage point, and plot a graph of V versus I. Is the graph a straight line? What does the graph indicate?

Figure 3–21

Computed in a table in next page

Voltage[V] {Volts} (Control variable) Resistance [R] {Ohms} (constant) = 100Ω $\frac{V}{R}$ = I	Current[I] {Amperes} (Dependent variable or output variable)
$\frac{0}{100}$	0.000
$\frac{10}{100}$	0.100
$\frac{20}{100}$	0.200
$\frac{30}{100}$	0.300
$\frac{40}{100}$	0.400
$\frac{50}{100}$	0.500
$\frac{60}{100}$	0.600
$\frac{70}{100}$	0.700
$\frac{80}{100}$	0.800
$\frac{90}{100}$	0.900
$\frac{100}{100}$	1.000



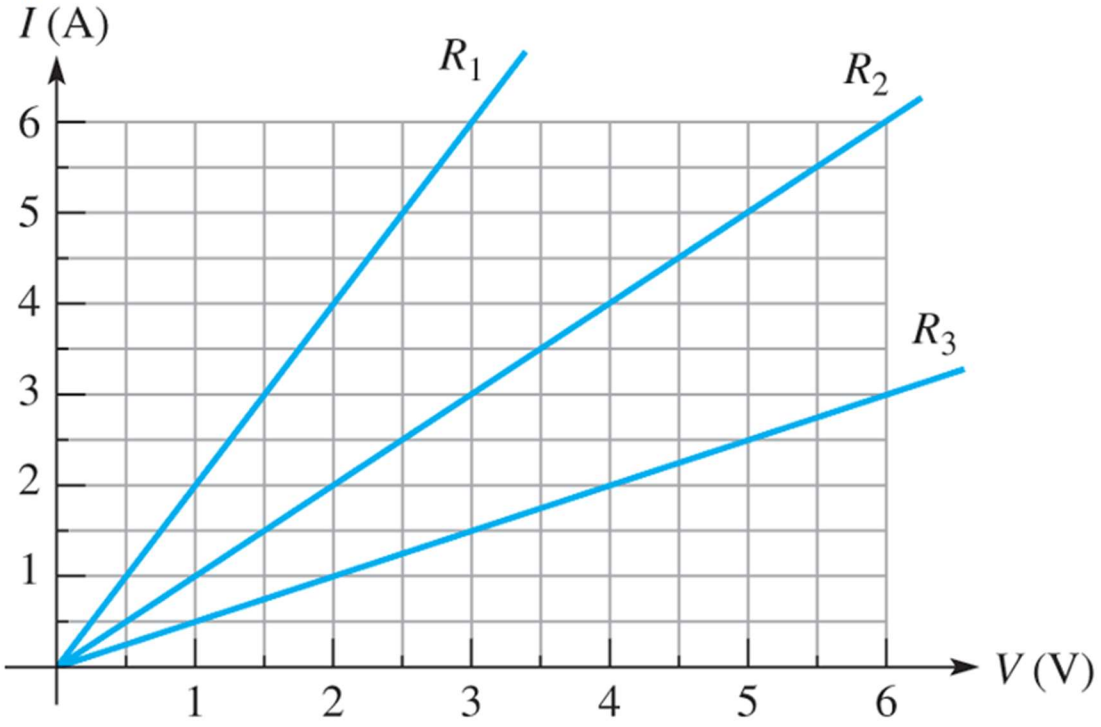
Plot made with matplot.lib in python included code.

```
import matplotlib.pyplot as ohms_law

#initalization of variables
current_output_data = [] # y output
resistance = 100.0 # resitance in ohms constant
voltage = [] # x control variable
temp = 0.0 #  computations output temporary variable

# voltage initalization 0-100 in increments of 10
# some excess in temp but not pushed to the list
for i in range (11):
   voltage.append(temp)
   temp += 10.0
# computes current value using ohms law V/R =I
for k in range(len(voltage)):
   current_output_data.append(voltage[k]/resistance)

# X label data first in a list

ohms_law.plot(voltage,current_output_data)

# labels section
```

```
ohms_law.suptitle("ohms law resistance plot \n{expected or ideal values}")

ohms_law.ylabel("I (currrent in Amperes)")

ohms_law.xlabel("V (Volts)")


#displays the graph

ohms_law.show()
```

7. **Figure 3–22** is a graph of current versus voltage for three resistance values. Determine R_1, R_2, and R_3.

Figure 3–22



$$\frac{v}{i} = R$$

R1	½ , 2/4	½ Ω
R2	1/1,2/2	1Ω
R3	2/1,4/2	2Ω

Might be wire resistances

19. Assume 200 mV is across a $330\ \mathbf{m\Omega}$ current sensing resistor. What is the current through the resistor?

$\frac{V}{R}$ = I

$\frac{200*10^{-3}}{330*10^{-3}} = \frac{20}{33}$ = 0.606Ω