BIRZEIT UNIVERSITY
Physics Department
Physics 112

Experiment1
Linear and Nonlinear Elements

Student's name:
Student's No.:

Partner's name:
Partners No.:

Section:

Instructor:

Date:

Abstract:

Theory:

Data:

Carbon resistor	
V(Volts)	I(mA)

Light bulb			
Low current		High current	
V(Volts)	I(mA)	V(Volts)	I(mA)

Si Diode	
V(Volts)	I(mA)

1) On a linear graph paper, using your data draw the I-V characteristic curves for the carbon resistor, the diode and the light bulb.

2) From the IVC curve of the carbon resistor find the resistance.

3) Draw tangent lines at two different points on the IVC of the Si-diode and find the resistance at those points.

4) Draw tangent lines at two different points on the IVC of the light bulb and find the resistance at those points.

<u>Results and conclusion:</u>

Preliminary Laboratory Questions1

1. Find the value of the electric resistance of a carbon resistor from the four colors ordered on it as: orange, violet, red and gold.

2. If the resistance of the tungsten wire in the light bulb is 2 Ω at 20 $^{\circ}$C what would be its resistance when it glows at a temperature of 1520 $^{\circ}$C, if the thermal coefficient of resistance of tungsten is 4.5 x 10^{-3} $^{\circ}C^{-1}$.

3. Explain how you can measure the temperature of glow of the tungsten filament in the light bulb (see question 2).

4. Find the current in a silicon diode with a reverse saturation current of 12 pA when it is biased:

a) Forward at 0.4 V,

b) Forward at 0.7 V,

c) Reverse at 0.2 V,

d) Reverse at 2 V.

5. Explain how a current flows in a semiconducting diode in the two states of biasing.