University of California, Los Angeles

School of Engineering and Applied Science

Department of Electrical and Computer Engineering

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ECE11L Lab

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Lab

1. Ohm's Law and Measuring Voltage and Current

<Insert One Sample Image of Test-Setup>

From Impedance Measurement:

Theoretical Resistance (Ω)	Measured Resistance (Ω)
680 Ω	
1 kΩ	
2.2 kΩ	

From Voltage and Current Measurement:

Resistance (Ω)	Voltage (V)	Current (mA)
680 Ω		
1 kΩ		
2.2 kΩ		

Discussion

- How did the values of resistance vary from their given values based on color code? Were they within the given variance?

<Answer in 1-2 lines.>

- How does Ohm's Law hold for your experimental results?

<Answer in 1-2 lines.>

- AD2 cannot measure the current directly. Based on your observation, how does AD2 impedance analyzer produce the values for the current and resistors?

<Answer in 1-2 lines.>

2. Equivalent Resistance

<Insert One Sample Image of Test-Setup>

Theoretical Resistance (Ω)	Measured Resistance (Ω)
680 Ω	
1.2 kΩ	
5.6 kΩ	

- What is the equivalent resistance from nodes A and B?

  From Theoretical Calculation:

  From Impedance Analyzer:

  - Do they agree? Why not?

<Answer in 1-2 lines.>

- Calculate the skin resistance and mark the answer clearly

Discussion

- Voltages of about 50V can cause an electric shock (assuming contact with dry hands, as in this experiment). Based on your experimental results, how much current would be going through your body with such a voltage?

<Answer in 1-2 Lines.>

3. Voltage and Current Dividers

- Voltage Divider Readings.

<Insert One Sample Image of Test-Setup>

	Theoretical Voltage (V)	**Measured Voltage (V)**
Across R1 = 100 Ω		
Across R2 = 470 Ω		

- Current Divider Readings.

<Insert One Sample Image of Test-Setup>

	Measured Voltage Across Resistor (V)	**Branch Current (mA)**
R1 = 100 Ω		
R2 = 470 Ω		
R3 = 1.2 kΩ		

Sensor-Circuit

<Insert One Sample Image of Test-Setup>

- What is the value of R_1 chosen for implementing the sensor circuit?

R_1 =

Voltage output in Normal Lighting (V)	**Voltage output in Darkness (V)**

Discussion

- How did the voltage and current divider compare with theoretical expectations?

<Answer in 1-2 lines.>

- How does the resistance of the photoresistor change as you alter the level of light?

<Answer in 1-2 lines.>

4. Kirchhoff's Laws Analysis of Circuits

<Insert One Sample Image of Test-Setup>

	Theoretical		**Measured**	
	Voltage Across Resistor (V)	**Branch Current (mA)**	**Voltage Across Resistor (V)**	**Branch Current (mA)**
R1 = 1 kΩ				
R2 = 680 Ω				
R3 = 3.3 kΩ				
R4 = 2.2 kΩ				
R5 = 470 Ω				

Discussion

- Does your experimental results obey Kirchhoff's Laws?

<Answer in 1-2 lines.>