DC Circuits

As you work through the steps in the lab procedure, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.

Procedure A: Reading the color code of unknown resistors

Complete the data table below.

Data Table 1

Resistor	Band #1		Band #2		Band #3		Resistance (Ω)
	color	value	color	value	color	value	
1							
2							

CHECKPOINT 1: Ask your TA to check your reading of the color code.

Procedure B: Experimentally determining the resistance of resistor 1

CHECKPOINT 2: Ask your TA to check your circuit and multimeter settings.

Complete the data table below for R_1.

Data Table 2

Trial #	ΔV (V)	current (A)
1		
2		
3		
4		
5		

What is the experimental value of R_1 (from your plot of voltage versus current)?

What is the percent error between the experimental and accepted values of R_1?

Is your measured resistance value in close agreement with the accepted value from Data Table 1? (Consider your percent error exactly as you have entered it.)

CHECKPOINT 3: Ask your TA to check your chart, calculations, and Excel graph before proceeding.

Procedure C: Experimentally determining the resistance of resistor 2

Complete the data table below for R_2.

Data Table 3

Trial #	ΔV (V)	current (A)
1		
2		
3		
4		
5		

What is the experimental value of R_2 (from your plot of voltage versus current)?

What is the percent error between the experimental and accepted values of R_2?

Does your measured resistance value agree with the expected value within the measured tolerance? (Consider your percent error exactly as you have entered it.)

CHECKPOINT 4: Ask your TA to check your chart, calculations, and Excel graph before proceeding.

Procedure D: Series Arrangement

CHECKPOINT 5: Ask your TA to check your circuit before proceeding.

Complete the data table below for the series arrangement. Take ΔV_{meas} to be the voltage across the combination of resistors.

Data Table 4

Trial #	**ΔV_{meas} (V)**	**current (A)**	**ΔV_1 across R_1 (V)**	**ΔV_2 across R_2 (V)**	**ΔV_{calc} across $(R_1 + R_2)$(V)**	**% difference**
1						
2						
3						
4						
5						

What is the experimental value of the equivalent resistance for the series combination (from your plot of voltage versus current)?

What is the calculated value of the equivalent resistance for the series combination using the values from Data Table 1?

What is the percent error between the experimental value and calculated value of R_s?

Is your measured resistance value in close agreement with the calculated value? (Consider your percent error exactly as you have entered it.)

Compare ΔV_{calc} with ΔV_{meas}. Do the voltage drops across the individual resistances add up to the total voltage drop across the combination for each of the five readings? (Consider your percent differences in Data Table 4 exactly as you have entered them.)

CHECKPOINT 6: Ask your TA to check your chart, calculations, and Excel graph before proceeding.

Procedure E: Parallel Arrangement

CHECKPOINT 7: Ask your TA to check your circuit before proceeding.

CHECKPOINT 8: Enter your data for Trial 1 in Data Table 5 below. Ask your TA to check your chart, calculations, and Excel graph before proceeding to the rest of Data Table 5.

Complete the data table below for the parallel arrangement. Take I_{meas} to be the current from the power supply.

Data Table 5

Trial #	ΔV_{meas} (V)	I_{meas} (A)	I_1 for R_1 (A)	I_2 for R_2 (A)	I_{calc} for $(R_1 + R_2)$ (A)	% difference
1						
2						
3						
4						
5						

What is the experimental value of the equivalent resistance for the parallel combination (from your plot of voltage versus current)?

What is the calculated value of the equivalent resistance for the parallel combination using the values from Data Table 1?

What is the percent error between the experimental value and calculated value of R_{p}?

Is your measured resistance value in close agreement with the calculated value? (Consider your percent error exactly as you have entered it.)

Compare I_{calc} with I_{meas}. Do the currents flowing through the individual resistances add up to the total current flowing in the circuit for each of the five readings? (Consider your percent differences in Data Table 5 exactly as you have entered them.)