Unit 11: Electric Circuits
LAB: Resistor Circuits and Resistor-Capacitor Circuits

Objectives:
- Analyze the similarities and differences between series, parallel, and compound circuits.

Equipment:
- Variable power supply, voltmeter, ammeter, resistors, resistor band decoder, low voltage capacitor

Safety:
- Do not turn the voltage on the power supply above 10 V.
- Follow your teacher's instructions for measuring with the ammeter and voltmeter.

Procedure: Using at least four resistors, create circuits and take measurements to analyze the similarities and differences between series, parallel, and compound circuits.

Part 1 – Series Circuits: Create series circuits with 2, then 3, then 4 resistors. Keep the voltage constant. Measure current through each resistor and voltage across each resistor. Also measure total current and terminal voltage. Analyze your results for patterns.

	Resistance (Ω)	Predicted Current (A)	Actual Current (A)	Predicted Voltage (V)	Actual Voltage (V)
Totals					

	Resistance (Ω)	Predicted Current (A)	Actual Current (A)	Predicted Voltage (V)	Actual Voltage (V)
Totals					

	Resistance (Ω)	Predicted Current (A)	Actual Current (A)	Predicted Voltage (V)	Actual Voltage (V)
Totals					

Analysis: Find at least four patterns.

Part 1 – Parallel Circuits: Create parallel circuits with 2, then 3, then 4 resistors. Keep the voltage constant. Measure current through each resistor and voltage across each resistor. Also measure total current and terminal voltage. Analyze your results for patterns.

	Resistance (Ω)	Predicted Current (A)	Actual Current (A)	Predicted Voltage (V)	Actual Voltage (V)
Totals					

	Resistance (Ω)	Predicted Current (A)	Actual Current (A)	Predicted Voltage (V)	Actual Voltage (V)
Totals					

	Resistance (Ω)	Predicted Current (A)	Actual Current (A)	Predicted Voltage (V)	Actual Voltage (V)
Totals					

Analysis: Find at least four patterns.

Part 3 – Compound Circuit: Create a compound circuit using three resistors. Sketch your circuit using schematic symbols. Measure current through each resistor and voltage across each resistor. Also measure total current and terminal voltage. Analyze your results for patterns.

	Resistance (Ω)	Predicted Current (A)	Actual Current (A)	Predicted Voltage (V)	Actual Voltage (V)
Totals					

Sketch:

Analysis: How does the behavior of this circuit differ from the other two circuits?

Part 4 – R-C Circuit: In one branch of a parallel component of your compound circuit, insert a small capacitor. Indicate on your sketch in part 3 where you inserted the capacitor. Redo all of your measurements and find the potential difference across the capacitor.

	Resistance (Ω)	Predicted Current (A)	Actual Current (A)	Predicted Voltage (V)	Actual Voltage (V)
Totals					

Voltage across the capacitor: _____

Analysis: How does adding the capacitor affect your circuit?