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Laboratory 2:
Kirchhoff's Current and Voltage Laws

Part 1: Kirchhoff's Current Law

Resistor Number	Resistance	Current
R1	4600Ω	0.920mA
R2	2000Ω	-0.383mA
R3	2200Ω	-0.348mA
R4	4100Ω	-0.187mA
Total	----------	0.002mA

Comment on the net total current observed.

ANSWER: The algebraic sum of the currents flowing into A and out of A is 0

Part 2: Kirchhoff's Current Law – Multiple Nodes

Resistor Number	Resistance	Current
A-R1	4600Ω	0.900mA
A-R2	2000Ω	-0.400 mA
A-R3	2200Ω	-0.365 mA
A-R4	4100Ω	-0.140 mA
Total	----------	-0.900 mA
B-R4	4100Ω	0.140 mA
B-R5	3600Ω	-0.066 mA
B-R6	3400Ω	-0.080 mA
Total	----------	-0.006 mA

What is the value of the current flowing resistor R4 for nodes A and B according to Kirchoff's Current Law. Explain your answer.

ANSWER: The value of the current flowing resistor R4 for node A is -0.140mA, the value of the current flowing resistor R4 for node B is 0.140mA. The two currents are of the same magnitude and in different directions

Comment on the validity and usefulness of Kirchoff's Current Law as we extend it to multiple nodes.

ANSWER: Experimental data show that kirchhoff's law still holds in multi-point circuits,

the current flowing into a point is equal to the current flowing out of that point at each point

Part 3: Kirchhoff's Voltage Law – Single Loop

Component Number	Resistance	Voltage
R1	4100Ω	1.9V
R2	4600Ω	2.2V
R3	2200Ω	1.1V
BATTERY	----------	-5.10V
Total	----------	0.1V

Comment on the net total voltage observed.
ANSWER: The net total voltage should be equal to 0.
But as there are errors in the operation and calculation of the experiment, the figure we get is 0.1

Part 4: Kirchhoff's Current Law – Multiple Nodes

Resistor Number	Resistance	Voltage
A-R1	2200Ω	1.2V
A-R2	4600Ω	2.4V
A-R3	3400Ω	1.5V
BATTERY	----------	-5V
Total	----------	0.1V
B-R3	3400Ω	-1.4V
B-R4	4100Ω	0.8V
B-R5	3600Ω	0.6V
Total	----------	0V

What is the value of the voltage across resistor R3 for the two loops (A4, B4) according to the methodology required for Kirchoff's Voltage Law. Explain your answer.

ANSWER: The voltage on resistance R3 in the loop (A4) is 1.5V , and the voltage on resistance R3 in the loop (B4) is -1.4V. As there are errors in the operation and calculation of the experiment, the figures we got are different.

Comment on the validity and usefulness of Kirchoff's Voltage Law as we extend it to multiple loops.

ANSWER: As we extend Kirchhoff's voltage law to multiple loops, it can help us understand the loop structure more intuitively and make calculation more convenient and intuitive.