

Combinations of Resistors 01

Purpose:

We will practice calculating the resistance, voltage and current of different combinations of resistors and compare your answers to measurement.

Procedure:

1. Select three resistors with resistance of roughly the same magnitude (but not the same value). Measure their resistance and record your measured values in the first column Table 1. We will call the resistors R_1 , R_2 , R_3 .
2. Use the three resistors to connect the circuit in Figure 1 (ignore the values of the resistance and voltage in the figure). Set the voltage of your power supply to roughly $10V$ (instead of the $18V$ in the figure) and record in Table 1 as the total voltage. Measure the total resistance and record the value also.
3. Use a voltmeter to measure the voltage across each resistor.
4. Use an ammeter to measure the current through each resistor.
5. Copy the circuit diagram onto your worksheet and label the resistors R_1 , R_2 , R_3 in the diagram (so that your instructor knows which resistor is which).
6. Now use the total voltage as well as the resistance of each resistor to theoretically calculate and complete Table 2. Show your steps. Your prediction should be close to the measured values in Table 1, otherwise, check your calculations.

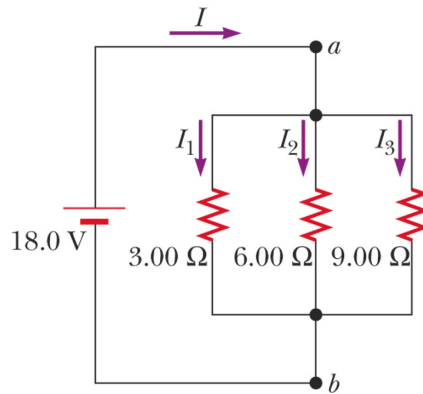


Figure 1 (Table 1 and Table 2)

Table 1: Measured values for the circuit in Figure 1

	Resistance	Voltage	Current
1			
2			
3			
Total			

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Table 2: Theoretical values for the circuit in Figure 1

	Resistance	Voltage	Current
1	N/A		
2	N/A		
3	N/A		
Total		N/A	

7. Repeat the above steps for all the circuits below one by one. You are free to choose any values you like for the resistors (as long as they are not all identical). If the power supply is not shown in the diagram, assume it is connected across all the resistors. You may set the voltage of the power supply to roughly $10V$, or you may choose other values you like. Please make sure you draw the circuit diagrams in your work and label all your resistors in your diagrams as R_1 , R_2 , R_3 ..., otherwise your instructor would not be able to check your calculations.

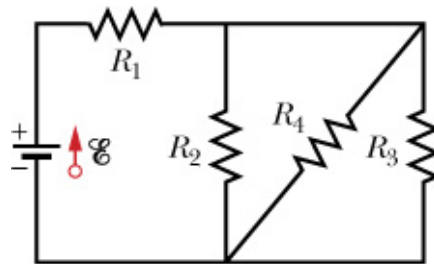


Figure 2 (Table 3 and Table 4)

Table 3: Measured value for the circuit in Figure 2

	Resistance	Voltage	Current
1			
2			
3			
4			
Total			

Table 4: Theoretical values for the circuit in Figure 2

	Resistance	Voltage	Current
1	N/A		
2	N/A		
3	N/A		
4	N/A		
Total		N/A	

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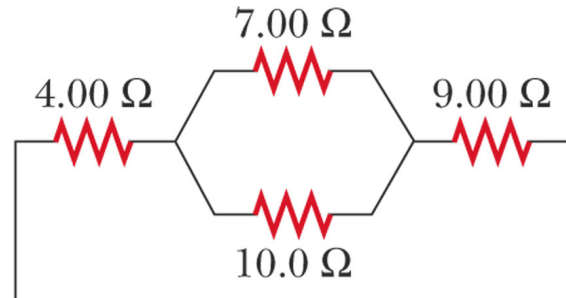


Figure 3 (Table 5 and Table 6)

Table 5: Measured values for the circuit in Figure 3

	Resistance	Voltage	Current
1			
2			
3			
4			
Total			

Table 6: Theoretical values for the circuit in Figure 3

	Resistance	Voltage	Current
1	N/A		
2	N/A		
3	N/A		
4	N/A		
Total		N/A	