

EXPERIMENT 2

SERIES AND PARALLEL CIRCUITS

OBJECTIVE

Comprehending series and parallel circuits.

EQUIPMENT NEEDED

- Digital Multimeter (DMM)
- DC Power Supply
- Resistors

PRELIMINARY WORK

P1 Calculate R_T , V_1 , V_2 , V_3 and i_T for *Figure 2.1*.

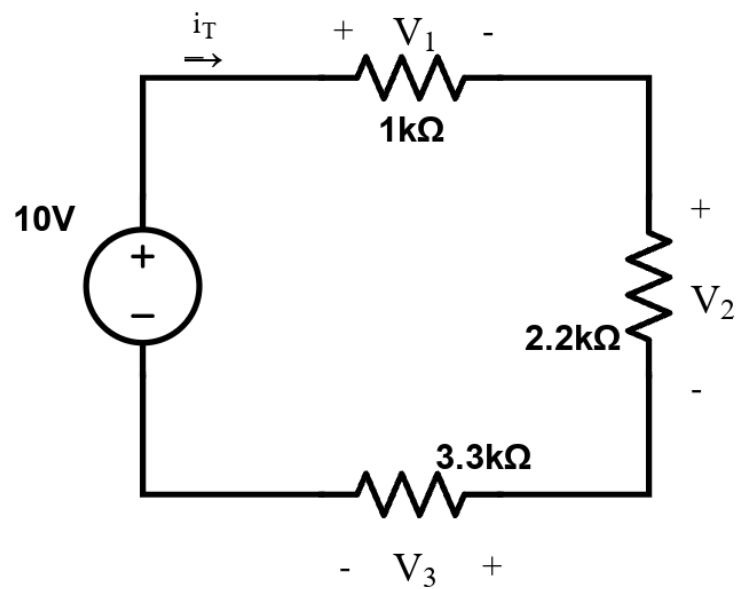


Figure 2.1

Table 2.1

	R_T	V_1	V_2	V_3	i_T
Calculated					

P2 Calculate R_T , V_1 , V_2 , V_3 , i_1 , i_2 and i_3 for *Figure 2.2*.

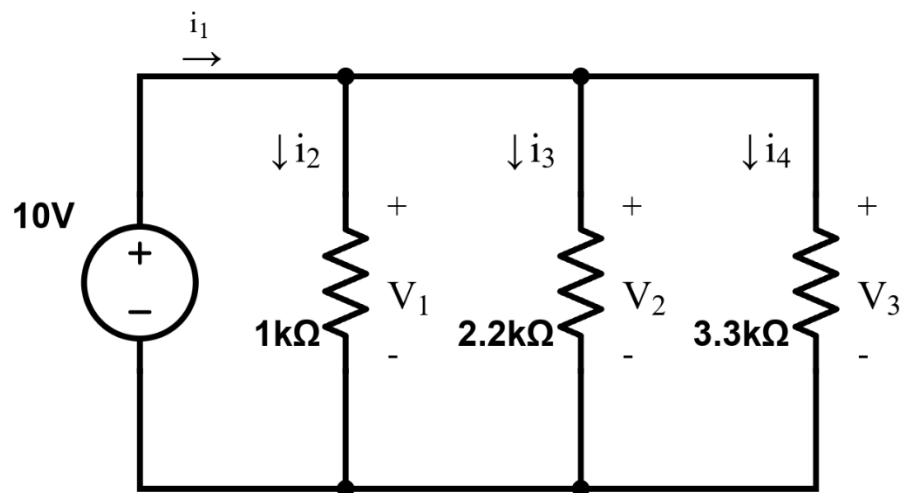


Figure 2.2

Table 2.2

	R_T	V_1	V_2	V_3	i_1	i_2	i_3	i_4
Calculated								

P3 For the circuit of *Figure 2.3* calculate the resistance between nodes:

- A and B
- A and C
- C and D

Hint: Part c cannot immediately be reduced using series and parallel combinations.

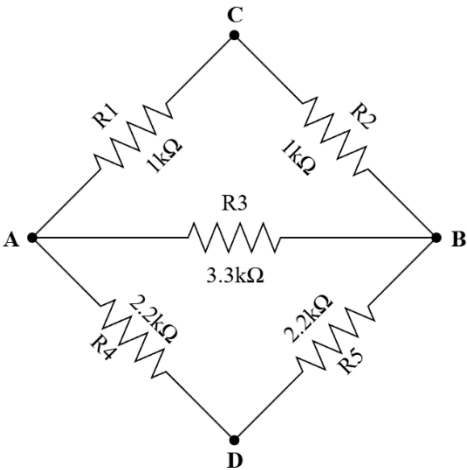


Figure 2.3

	R_{A-B}	R_{A-C}	R_{C-D}
Calculated			

EXPERIMENTAL WORK

E1 Setup the circuit given in Figure 2.1. Verify the theoretical values found in preliminary work.

Table 2.3

	R_T	V_{Source}	V_1	V_2	V_3	i_T
Theoretical						
Measured						
Percent Error						

E2 Setup the circuit given in Figure 2.2. Verify the theoretical values found in preliminary work.

Table 2.4

	R_T	V_{Source}	V_1	V_2	V_3	i_1	i_2	i_3	i_4
Theoretical									
Measured									
Percent Error									

E3 Setup the circuit given in Figure 2.3. Verify the theoretical values found in preliminary work.

Table 2.5

Resistance	Calculated	Measured	Percent Error
R_{A-B}			
R_{A-C}			
R_{C-D}			

CONCLUSION

Answer the following questions individually in your laboratory report. Support your answers with your experimental results and relevant calculations.

C1 Compare the theoretical and measured values obtained in E1, E2, and E3. Identify the quantity with the largest percentage error and explain at least three possible reasons for the differences between your theoretical and experimental results.

C2 For the series circuit in Figure 2.1, use your measured voltages to verify Kirchhoff's Voltage Law. Explain why the same current flows through all three resistors and why the voltage drops are different. Do your results agree with the voltage-divider rule?

C3 For the parallel circuit in Figure 2.2, compare the measured voltages across the three resistors with the source voltage. Use your measured currents to verify Kirchhoff's Current Law: $i_1 = i_2 + i_3 + i_4$. Which branch carries the largest current, and why?