Introduction

During this exercise you will analyze a series/parallel DC circuit in order to determine the various voltages and currents present in the circuit, after which you will construct the circuit and measure the same voltages and currents, the results from which will be compared to your theoretical calculations.

Procedure (Theoretical Calculations)

1. Analyze the circuit shown in **Figure 4.1**, using the Reduce-and-Return approach, in order to determine the following electrical quantities:

Currents:	I_S, I_2, and I_5
Resistor Voltages:	V_{R1}, V_{R3}, and V_{R5}
Node Voltages:	V_A, V_B, V_C, and V_D

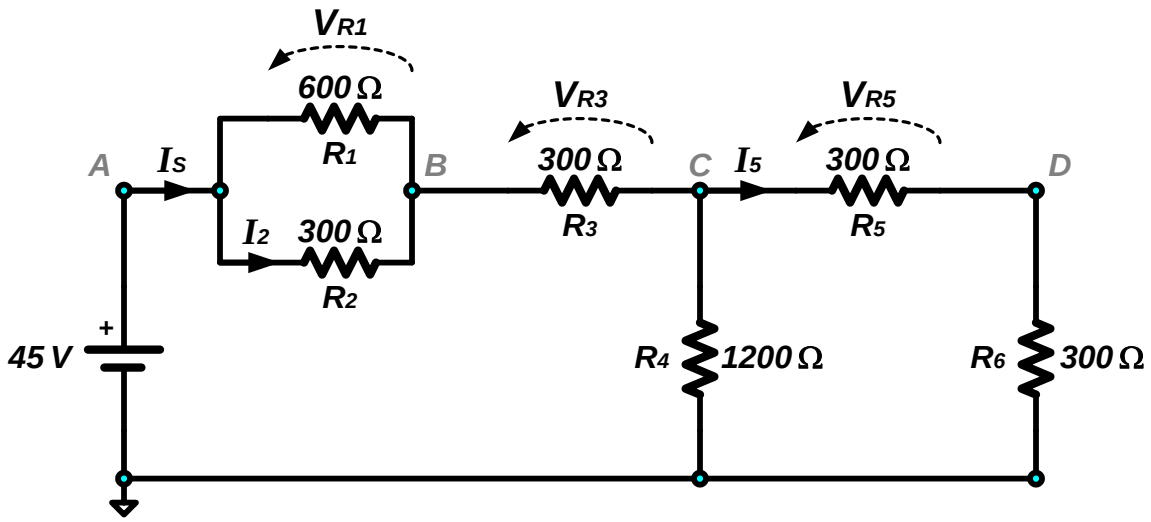


Figure 4.1 – Series/Parallel DC Circuit

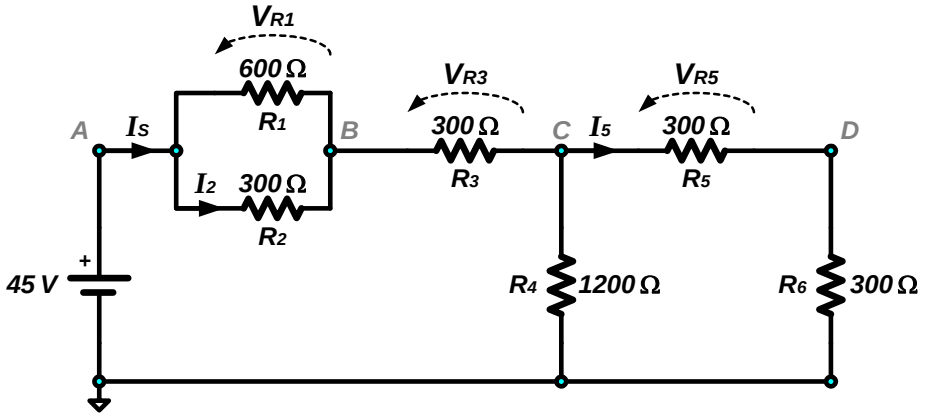
I_S = _____ mA I_2 = _____ mA I_5 = _____ mA

V_{R1} = _____ V V_{R3} = _____ V V_{R5} = _____ V

V_A = _____ V V_B = _____ V V_C = _____ V V_D = _____ V

2. Have your instructor check your calculated results **before** continuing on to the next step.

Currents: I_S, I_2, and I_5 Resistor Voltages: V_{R1}, V_{R3}, and V_{R5} Node Voltages: V_A, V_B, V_C, and V_D



(Show your work in the space below)

Procedure (Measurements)

3. Construct the circuit shown in **Figure 4.1**, utilizing two of the Variable Resistance Boxes to provide the required resistors. The physical connections required to construct the circuit are shown in **Figure 4.2**.

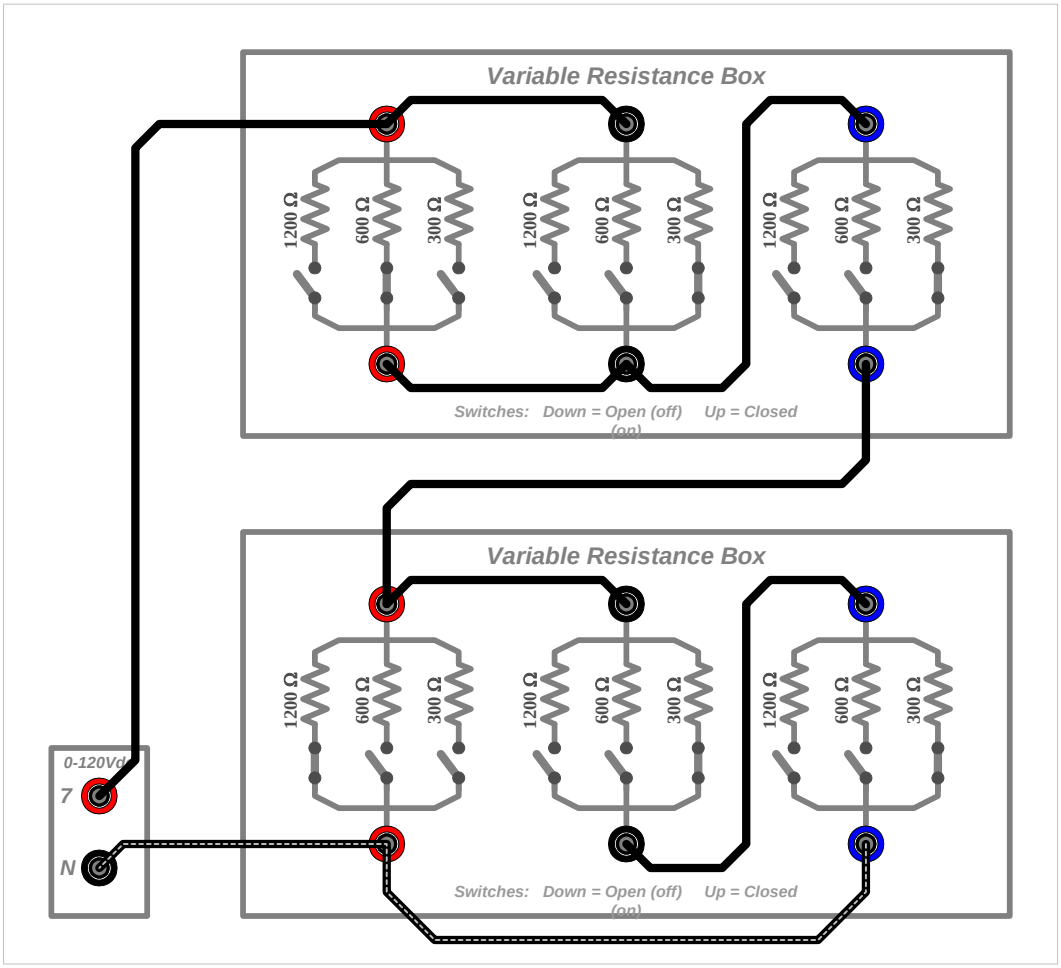


Figure 4.2 – Series/Parallel DC Circuit Construction

Figure 4.3 (back of this page) shows the constructed circuit with all of the currents and voltages labeled.

4. Switch ON the LabVolt supply and raise the variable DC voltage to 45V_{DC}.

5. Using a Digital Multi-Meter (DMM) measure the currents $\boldsymbol{I_S}$, $\boldsymbol{I_2}$, and $\boldsymbol{I_5}$.

$\boldsymbol{I_S}$ = _____ mA $\boldsymbol{I_2}$ = _____ mA $\boldsymbol{I_5}$ = _____ mA

6. Using a Digital Multi-Meter (DMM) measure the resistor voltages $\boldsymbol{V_{R1}}$, $\boldsymbol{V_{R3}}$, and $\boldsymbol{V_{R5}}$.

$\boldsymbol{V_{R1}}$ = _____ V $\boldsymbol{V_{R3}}$ = _____ V $\boldsymbol{V_{R5}}$ = _____ V

7. Using a Digital Multi-Meter (DMM) measure the node voltages $\boldsymbol{V_A}$, $\boldsymbol{V_B}$, $\boldsymbol{V_C}$, and $\boldsymbol{V_D}$.

$\boldsymbol{V_A}$ = _____ V $\boldsymbol{V_B}$ = _____ V $\boldsymbol{V_C}$ = _____ V $\boldsymbol{V_D}$ = _____ V

8. Have your instructor check your measured values **before** disconnecting the circuit.

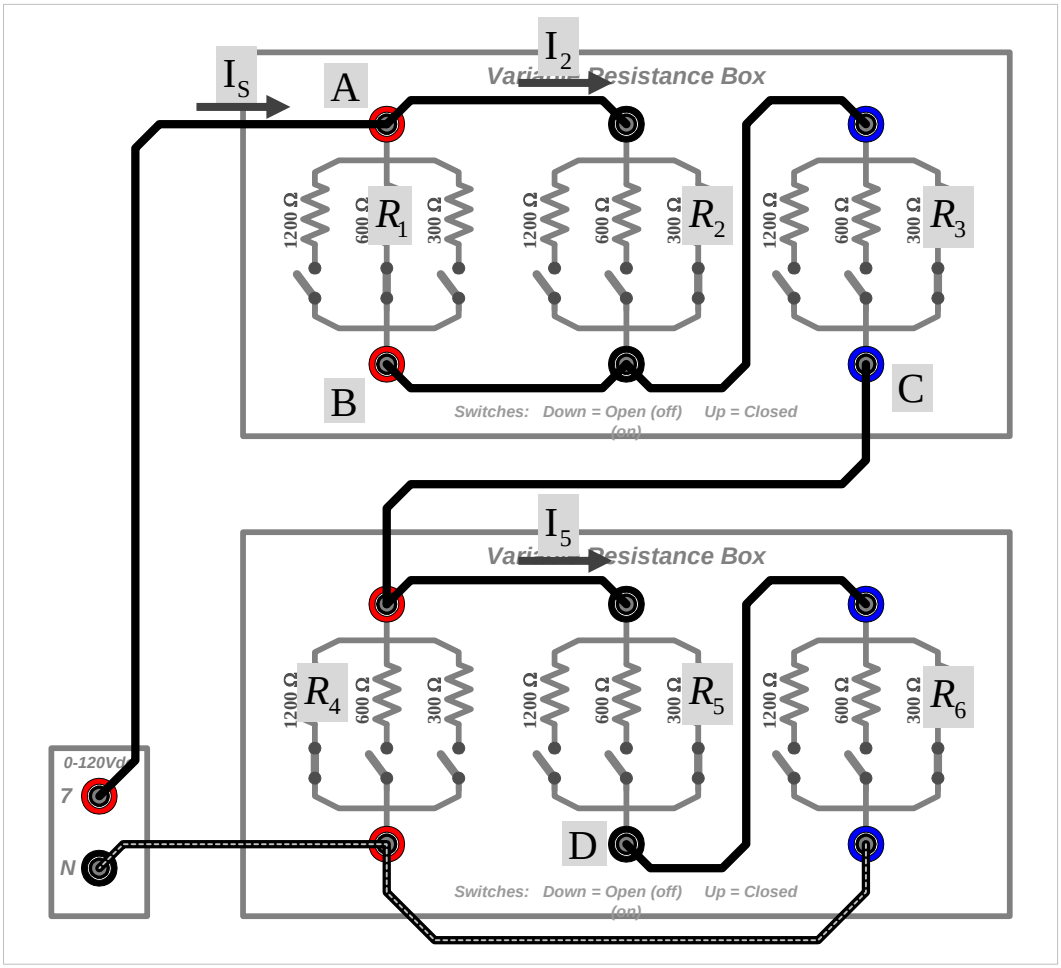


Figure 4.3 – Series/Parallel DC Circuit with Labels