

Name: _____ Lab Section: _____ Date: _____

OVERVIEW:

This laboratory introduces the concepts of parallel DC circuits. You will need a dc power supply, a Fluke 189 Digital MultiMeter (DMM), and four resistors. Your instructor will also instruct you with the proper operation of each. You will measure and record voltages and currents in a parallel dc circuit. From these measurements you will verify Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL).

CAUTIONS:

- Record all data in ink. Do not erase. Make corrections by drawing a line through the incorrect data and write the correct data next to the deleted data.
- Do not energize a circuit until your instructor or lab assistant checks it.
- Remove all power from a circuit before attempting to measure resistance in the circuit with an ohmmeter. Remember to disconnect the resistance from the circuit.
- Remove all power before making changes in a circuit.

PROCEDURE:

Your ability to measure and record your data in a neat and organized manner is important. Start a habit of being professional by using a lab notebook and generating tables.

1. For the circuit shown in Figure 1, calculate neatly on separate paper I_{R1} , I_{R2} , I_{R3} , I_{R4} , V_{R1} , V_{R2} , V_{R3} , and V_{R4} .

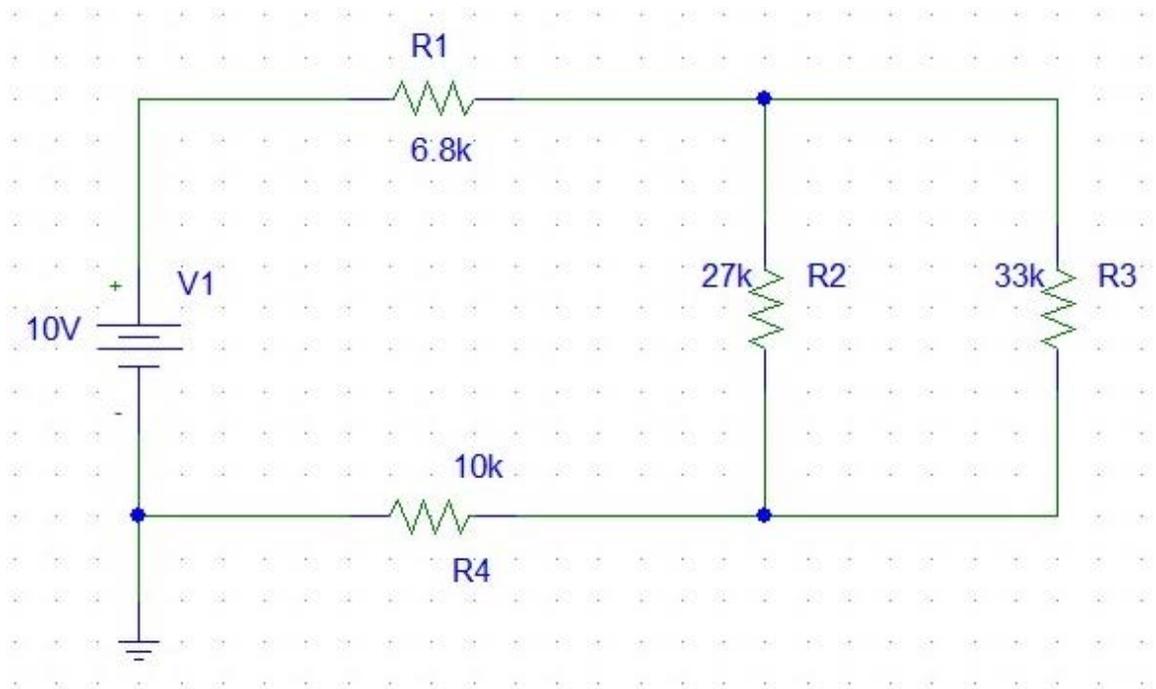


Figure 1. Series-Parallel dc Circuit

2. Simulate the circuit shown in Figure 1 using PSpice. Use Pspice to determine and display all currents and voltages. Print out a copy of your simulation. Do the PSpice values agree with your calculations? If not, make corrections!

3. Prepare the dc power supply for use by setting the current limit to 10 mA.

4. Measure and record the resistance of the following four resistors. Compare these measurements to the nominal values including their relative difference.

Resistor	Measured Value (KΩ)	Nominal Value (KΩ)	Relative Difference (%)
R ₁		6.8	
R ₂		10	
R ₃		27	
R ₄		33	

5. Connect the circuit in Figure 1.

6. Now connect your power supply to the circuit. Set your power supply to 10 V after the circuit is connected. Remember to verify your voltage with the DMM.

7. Measure and record the voltages E , V_{R1} , V_{R2} , V_{R3} , and V_{R4} . Compare your voltage measurements to calculated values using the nominal values of resistance.

	E	V_{R1}	V_{R2}	V_{R3}	V_{R4}
Measured					
Calculated Using Nominal Values					
Relative Difference					

8. Do your measured voltages verify Kirchoff's Voltage Law? Show your calculations and relative difference.

9. Measure and record the currents I_E , I_{R1} , I_{R2} , I_{R3} , and I_{R4} . Compare these to calculated values determined by using the nominal values of resistance.

	I_E	I_{R1}	I_{R2}	I_{R3}	I_{R4}
Measured					
Calculated Using Nominal Values					
Relative Difference					

10. Do your measured currents verify Kirchoff's Current Law? Show your calculations and relative difference.

REPORTING:

Once you have completed your measurements, have your lab instructor check your work. Clean up your bench, turn off and unplug all equipment at your bench, return all equipment to its proper location, clean all trash and debris off your bench and deposit it in the trash receptacle.

Turn in your calculations, PSpice printout, and completed lab worksheets at the end of lab.