

Name: _____ Lab Section: _____ Date: _____

OVERVIEW:

This week you will design, simulate, and test a simple voltage divider. The specifications for your divider is as follows:

- The input voltage, V_{in} , should be 10 V.
- The output voltage, V_{out} , should be 3.84 V.
- The only resistors available for your design (no more than one each) are 6.8 K Ω , 10 K Ω , 27 K Ω , and 33 K Ω .

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:

1. Prepare the dc power supply for use by setting the current limit to 10 mA.
2. Measure and record the resistance of the following four resistors. Compare these measurements to the nominal values including their relative difference.

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

- Design your voltage divider using Mathcad to perform all your calculations. Print out your MathCad results.
- Verify your design by building and simulating your circuit using PSpice. Print out your PSpice results.
- Connect the power supply to the circuit. Set your power supply to 10 V after the circuit is connected. Remember to verify this voltage with the Fluke DMM.
- Measure and record the following voltages: E, V_{in}, and V_{out}.

Voltage	Measured Value (V)	Calculated Value (V)	Relative Difference (%)
E		10	
V _{in}		10	
V _{out}		3.84	

- Connect a 10 K Ω resistor across the load (V_{out}). Measure the voltage across this resistor. Explain your results.

EXTRA CREDIT:

Repeat this lab to design a current divider. The input current should be 3 mA. The output current should be 0.54 mA.

REPORTING:

Once you have completed your measurements, have your Lab Instructor check and sign off on 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 this completed lab worksheet along with your Mathcad and PSpice work at the end of lab.