

Attenuator lab

Purpose – To test the internal resistance of a power source

To design an attenuator

To build an attenuator

To test the output of the attenuator

Background –

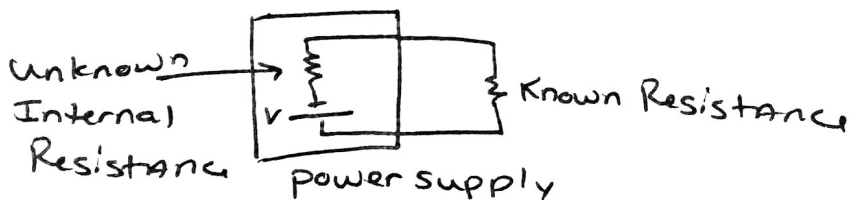
Imagine you have a 10.0V power source. You would like to have a constant 0.02 amp current. You need to design an attenuator that will keep this current constant.

Procedure –

Part 1 – Measure the internal resistance of a power supply

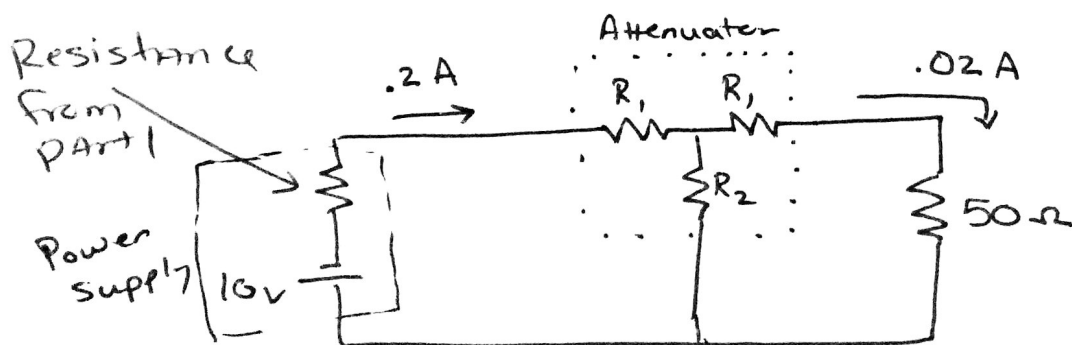
1. Set the power supply to 10 V
2. Place a resistor in a simple circuit with the power supply and place a voltmeter in parallel to the resistor.
3. If the reading of the voltage is greater than 5V, find a lower ohm resistor and replace it. If the reading is lower than 5V, find a larger ohm resistor. Continue until you find a resistor that give you a 5 V reading.

Questions – 1. This resistor will be equal to the internal resistance. Explain why this is so using the circuit below as a guide.



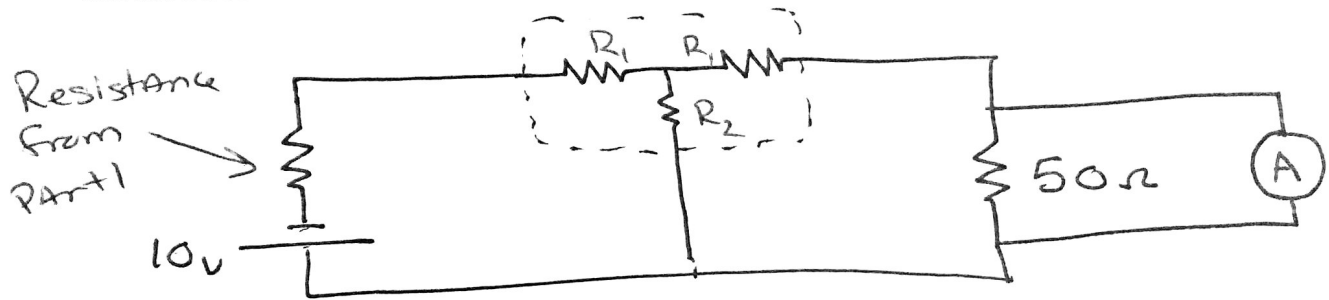
Part 2 – Calculations of resistance values

Questions – 2. Calculate the resistances of the two different resistors that would be used in the attenuator given the values in the diagram below. Use the loop and junction rules



Part 3 – Build and test an attenuator

1. Follow the diagram below and build an attenuator. Make sure that the two resistors labeled R_1 have the same values. Try different combinations of resistors for R_1 and R_2 in order to bring the current across the 50 ohm resistor to 0.02 A



Questions – 3. List some possible sources of error.

4. Think back on labs you have done. How might this concept of internal resistance affected the results of past labs?