

ELT 101: Basic Electricity: AC/DC

LAB 9-1: Series-parallel circuits

Objectives

- 1) Given an electrical trainer, build a functioning series-parallel circuit.
- 2) Calculate all circuit values of the series-parallel circuit to include E, I, R and P.
- 3) Measure circuit values to verify calculations are correct.

Equipment and materials

- 1) Safety glasses
- 2) Fluke 179 DMM
- 3) Electrical trainer
- 4) Jumper leads

Procedure 1: Build a series circuit

- 1) Using the components listed below and your jumper leads, build the circuit shown above on your trainer:

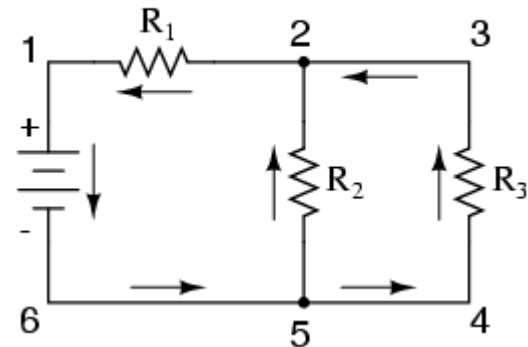
$R_1 = 33 \text{ ohms}$
 $R_2 = 47 \text{ ohms}$
 $R_3 = 220 \text{ ohms}$
 DC power = 5V

Procedure 2: Calculate circuit values

- 1) Calculate the circuit parameter s and record them in the table below.

	Calculated	Measured
RT		
IT		
VR1		
VR2		
VR3		
IR1		
IR2		
IR3		

Series-parallel



Procedure 3: Measure circuit values

- 1) Complete the pre-use tests on the Fluke 179.
- 2) Temporarily disconnect the power to your circuit and with your DMM set to read ohms, measure your total circuit resistance; it should match what you calculated. If it doesn't, your circuit is not connected properly!
- 3) Set the Fluke 179 to read current; make sure to position your leads in the meter correctly.
- 4) With the power off, break the circuit, insert the meter and restore power and measure circuit current.

$I_T =$ _____

- 4) Turn off power, reinsert the meter in between resistors as needed to measure the current through R_1 , R_2 , and R_3 ; record your answers below.

$I_1 =$ _____ $I_2 =$ _____ $I_3 =$ _____

- 5) Set the meter to read voltage and measure the voltage drops across R_1 , R_2 , and R_3 and record your answers below.

$V_{R1} =$ _____ $V_{R2} =$ _____ $V_{R3} =$ _____

Circuit checks

- 1) Does $V_{R1} + V_{R2}$ equal the applied voltage?

- 2) Does $I_{R1} + I_{R2} + I_{R3}$ equal the total current?

- 3) Assuming one fault, can you think of how you could troubleshoot this entire circuit with a single measurement? How would you do it?

**** end of lab 9-1 ****