

Pre-Lab Exercises

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Lab Section:

Hand this in at the beginning of the lab period. The grade for these exercises will be included in your lab grade this week. Show all work.

- Two resistors $R_1 = 252\Omega$ and $R_2 = 180\Omega$ are placed in series with a battery of 8.0V. What is the net resistance, current through the battery and net power supplied by the battery?

Resistors in series add up normally, so the total resistance is

$$R_1 + R_2 = 252\Omega + 180\Omega = 432\Omega$$

The current through the battery can be found through Ohm's law:

$$I = \frac{V}{R} = \frac{8.0\text{ V}}{332\Omega} = 0.019\text{ A}$$

$$P = IV = \frac{V^2}{R} = \frac{64\text{ V}^2}{332\Omega} = 0.15\text{ W}$$

- Two resistors $R_1 = 168\Omega$ and $R_2 = 120\Omega$ are placed in parallel with a 8.0V battery. What is the net resistance, current through the battery and net power supplied by the battery?

$$R_{\text{net}} = \frac{1}{R_1^{-1} + R_2^{-1}} = \frac{1}{168^{-1} + 120^{-1}} = 70\Omega$$

$$I = \frac{V}{R} = \frac{8.0\text{ V}}{70\Omega} = 0.114\text{ A}$$

$$P = IV = \frac{V^2}{R} = \frac{64\text{ V}^2}{70\Omega} = 0.91\text{ W}$$

- In this lab you will use a voltmeter (Voltage Sensor) and ammeter (current sensor). Which of these must NOT be "part of the circuit"? Why?

the voltmeter must not be a part of the circuit. this is because when using a voltmeter the desired measurement is the potential drop across a part of the circuit, which is exactly the same as the voltmeter reading (kirchoffs loop rule!), but if the voltmeter is a part of the circuit it would just alter the circuit without measuring the potential difference between two points.