

EECE 2150 - Circuits and Signals: Biomedical
Applications Fall 2017 - Section 3
Quiz 1

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Student Name: _____

On the next page is the circuit for Lab 1, which you completed last week. When I did the experiment, my resistors were both measured as 480 Ohms, the voltages were;

R_1 and R_2	4.70	V
Yellow <i>LED1</i>	1.99	V
Red <i>LED2</i>	2.20	V
“9 Volt Source”	8.95	V

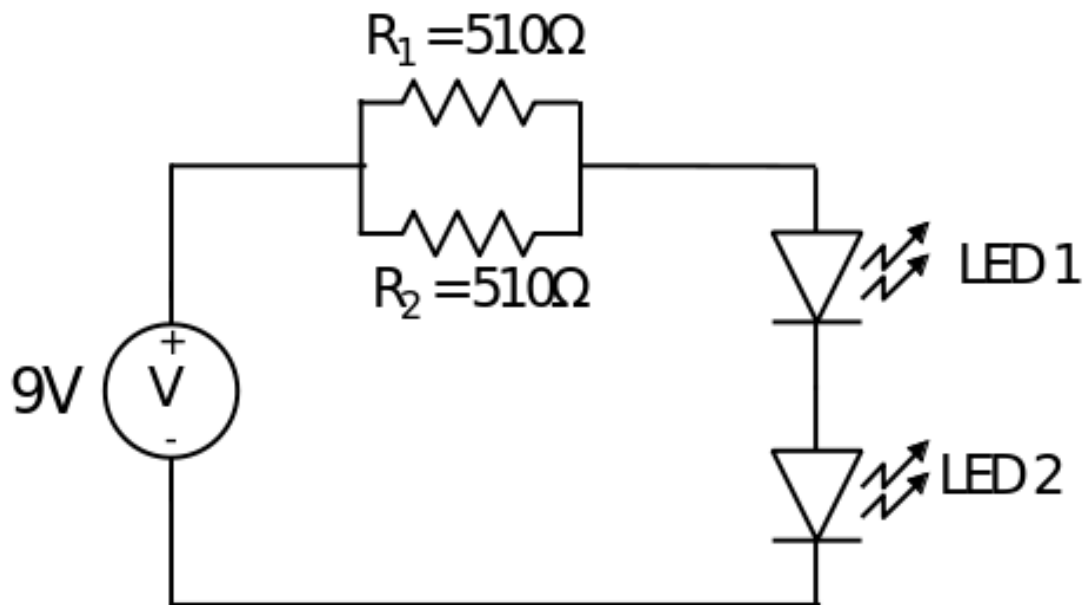
1. Is Kirchoff's Voltage Law closely satisfied? What is the voltage error?

2. What is the current through one of the resistors?

3. What is the power absorbed by each resistor?

4. If the resistors are rated at 1/8 Watt, how much margin of safety is there?

5. If I replace the parallel $480\ \Omega$ resistors with a single $240\ \Omega$ what is the margin of safety?



1. $4.7+1.99+2.20 = 8.89V$. Error is 0.06 V, which is small compared to all voltages in the circuit.

2. The current through one resistor is

$$I = \frac{V}{R} = \frac{4.70 \text{ V}}{480 \text{ Ohms}} = 0.0098 \text{ A}$$

so the current is 9.8 mA.

3. The power is $P = IV$ so

$$P = 4.70 \text{ V} \times 0.0098 \text{ A} = 0.046 \text{ W}$$

4. This power is $0.046/(1/8) = 0.37$ of the maximum allowed.

5. With a single resistor the current is doubled, so

$$P = 4.70 \text{ V} \times 0.0098 \text{ A} \times 2 = 0.092 \text{ W}$$

and now the ratio is $0.046/(1/8) = 0.74$, which is getting close.