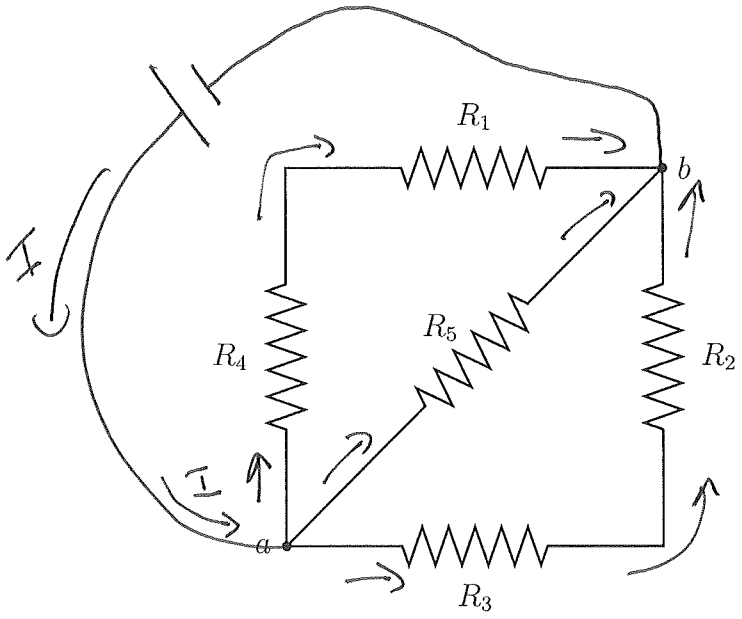
Physics 161 Test 4

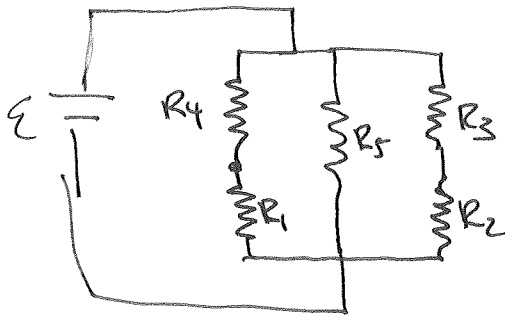


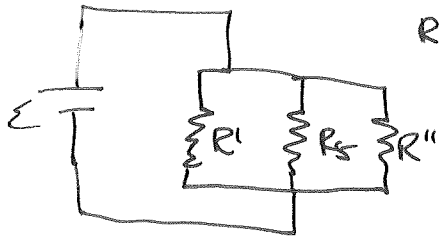
$R_1 = 50\,\Omega$
$R_2 = 150\,\Omega$
$R_3 = 300\,\Omega$
$R_4 = 200\,\Omega$
$R_5 = 350\,\Omega$

(a) If a battery is connected to the points a and b, what is the equivalent resistance for this circuit? *(5pts)*

WITH THIS BATTERY CONNECTION R_1 & R_4 ARE IN SERIES, R_2 & R_3 IN SERIES,

R_5 IN PARALLEL WITH 1/4 AND 2/3 COMBO, i.e.,





$R' = 200\,\Omega + 50\,\Omega = 250\,\Omega$

$R'' = 300\,\Omega + 150 = 450\,\Omega$

R', R_5, R'' in parallel

$\Rightarrow \frac{1}{R_{EQ}} = \frac{1}{250\,\Omega} + \frac{1}{350\,\Omega} + \frac{1}{450\,\Omega}$

$\Rightarrow \boxed{R_{EQ} = 110\,\Omega}$

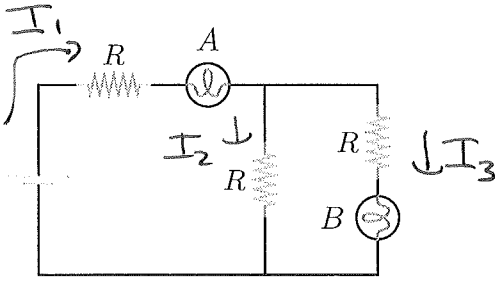
(b) Assuming the battery's emf is $10\,V$, what is the power supplied by the battery? *(2pts)*

$P = I\mathcal{E}$ FROM 

$I = \frac{\mathcal{E}}{R_{EQ}} = \frac{10V}{110\,\Omega} = 0.0908A$

$\therefore P = (0.0908A)(10V) = \underline{0.908\,\text{Watt}}$

(c) In the circuit below, bulbs A and B have identical resistances. Initially both are glowing. If bulb B is removed from its socket, what happens to bulb A? Does it get brighter, dimmer, stay the same, or go out? Explain. **Hint:** Assume that the current flowing through a light bulb determines its brightness. Also, removing a light bulb prevents current from flowing through that part of the circuit. *(3pts)*

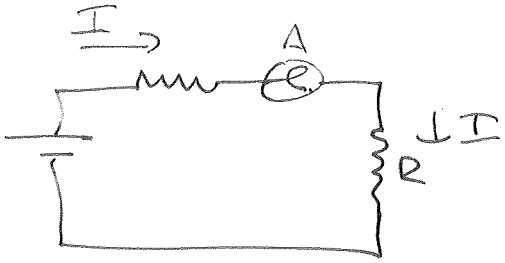


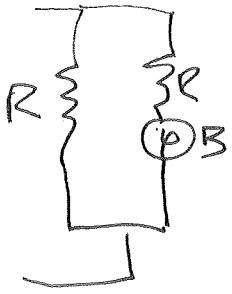
At First there Are 3 Current Values.

Removing B stops I_3

And Now Everything is in Series

with Current I





These guys were in Parallel before $\Rightarrow$ Their Equivalent Resistance had to be smaller than R.

So Removing B MADE the Resistance bigger

$\Rightarrow$ I must be less than I_1

$\Rightarrow$ A Must get DIMMER when B is Removed.