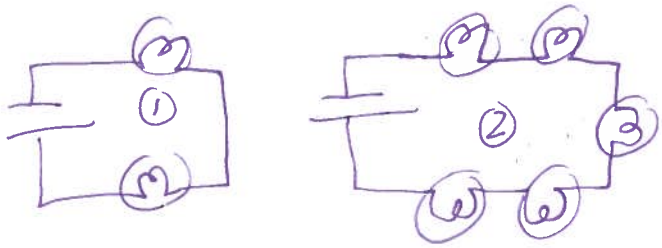
Answers to Circuit Practice Textbook Problems

11.2 #1, 11.3 Practice Problems

#11

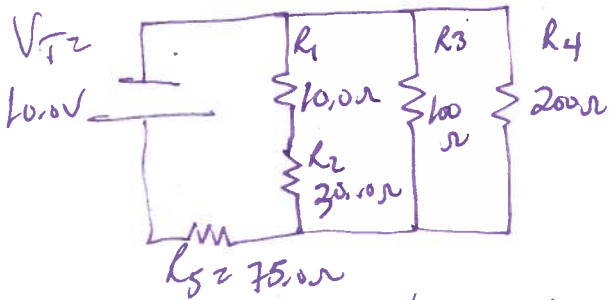


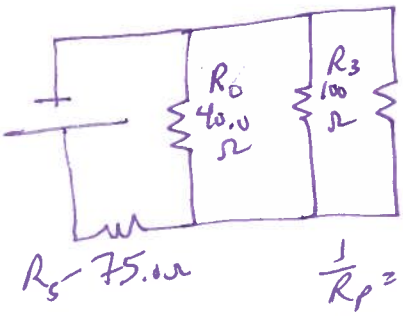
a) Circuit 1 would have a larger current as it has a lower total resistance (fewer bulbs connected in series)

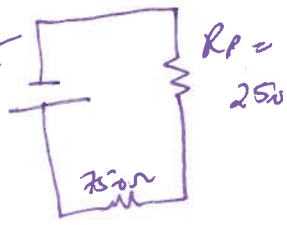
b) Bulbs would glow brighter in circuit 1 as the power converted by each bulb is greater ($P=I^2R$), since the total current is greater.

11.3

Practice 1



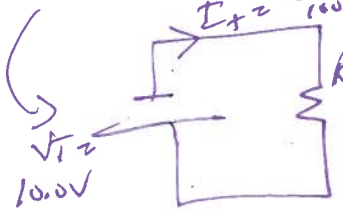




$$\frac{1}{R_p} = \frac{1}{40.0} + \frac{1}{100.0} + \frac{1}{200.0}$$

$$\frac{1}{R_p} = \frac{5+2+1}{200.0}$$

$$R_p = \frac{200.0}{8} = 25.0\Omega$$



$V_p = I_T R_p = (0.100A)(25.0\Omega) = 2.50V$

$V_5 = 10.0V - 2.50V = 7.50V$

$V_1 = I_5 R_1 = (0.0625)(10.0\Omega) = 0.625V$

$V_2 = I_{0,4} R = (0.0625)(30.0\Omega) = 1.875V$

$V_3 = V_4 = 2.50V$

$I_0 = \frac{V_p}{R_0} = \frac{2.50V}{40.0\Omega} = 0.0625A$

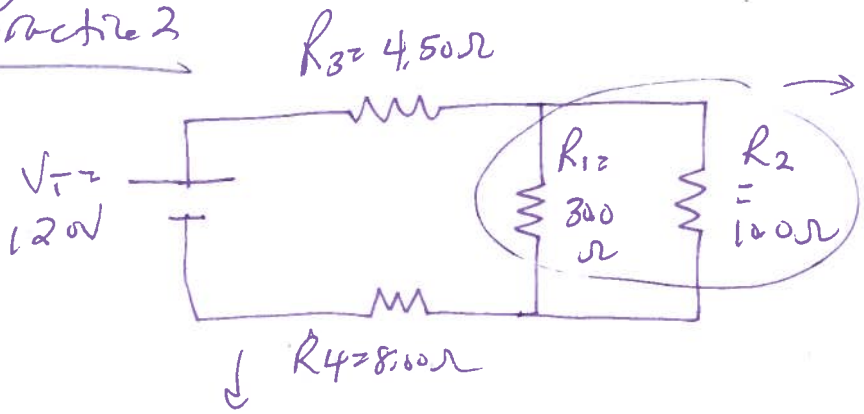
$I_3 = \frac{V_p}{R_3} = \frac{2.50V}{100.0\Omega} = 0.0250A$

$I_4 = \frac{V_p}{R_4} = \frac{2.50V}{200\Omega} = 0.0125A$

$I_1 = I_2 = 0.0625$

$I_5 = I_T = 0.100A$

Practice 2

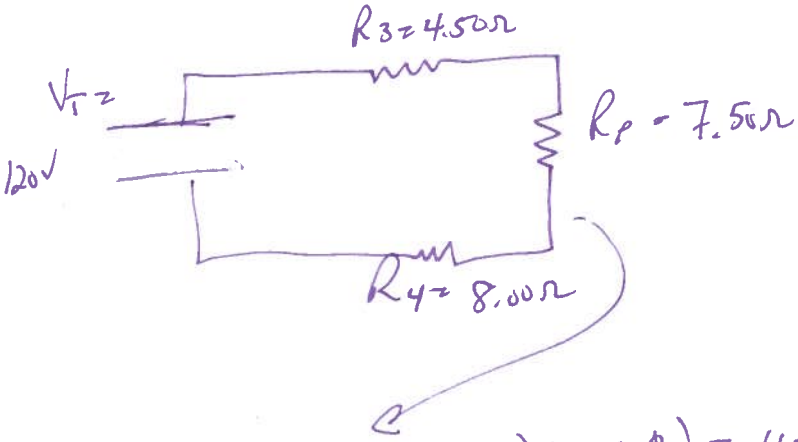


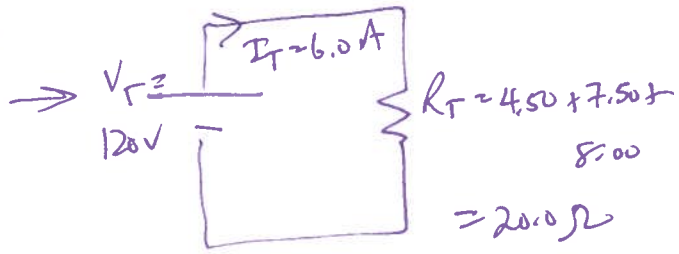
$$\frac{1}{R_p} = \frac{1}{30.0} + \frac{1}{10.0}$$

$$\frac{1}{R_p} = \frac{1}{30.0} + \frac{3}{30.0}$$

$$\frac{1}{R_p} = \frac{4}{30.0}$$

$$R_p = \frac{30.0}{4} = 7.50\,\Omega$$





$$V_p = I_T R_p = (6.0\,A)(7.50\,\Omega) = 45.0\,V$$

$$V_3 = I_T R_3 = (6.0\,A)(4.50\,\Omega) = 27.0\,V \rightarrow I_3 = 6.0\,A$$

$$V_4 = I_T R_4 = (6.0\,A)(8.00\,\Omega) = 48.0\,V \rightarrow I_4 = 6.0\,A$$

$$I_1 = \frac{V_p}{R_1} = \frac{45.0\,V}{(30.0\,\Omega)} = 1.5\,A$$

$$I_2 = \frac{V_p}{R_2} = \frac{45.0\,V}{(10.0\,\Omega)} = 4.5\,A$$