Solving Series and Parallel Circuits Worksheet

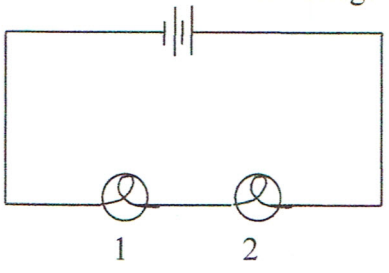
Use the examples in your notes to help you solve the unknown values in the following circuits. Don't forget to include units with your answers.

1. State the three mathematical equations for **series circuits** that explain how current, voltage and resistance in one part of the circuit is related to the total current, voltage or resistance (i.e. use V_1, V_2 for A); I_1, I_2 for B); and R_1, R_2 for C)) :

A) $V_T =$ $V_1 + V_2$ B) $I_T =$ $I_1 = I_2$

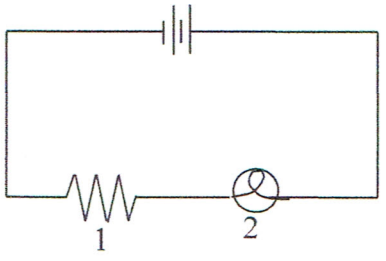
C) $R_T =$ $R_1 + R_2$

2. What is the voltage of light bulb 1(V_1)? (show your calculations).



$V_T =$ 6 V $V_1 =$ 4 V $V_2 =$ 2 V

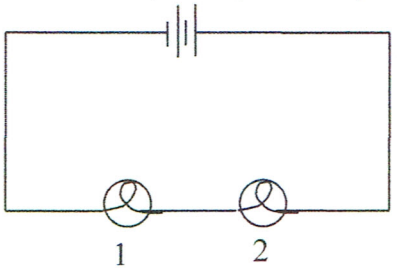
3. What is the total voltage (V_T) for the circuit? What is the current at the resistor (I_1)?



$V_T =$ 4 V $V_1 =$ 3 V $V_2 =$ 1 V

$I_T =$ 6 A $I_1 =$ 6 A $I_2 =$ 6 A

4. Calculate the total resistance using the information given and your Ohm's Law equations (R=V/I). *Hint- you will only need to use V_T as the voltage for the circuit in your calculation.



$V_T =$ 10 V $V_1 =$ 6 V $V_2 =$ 4 V

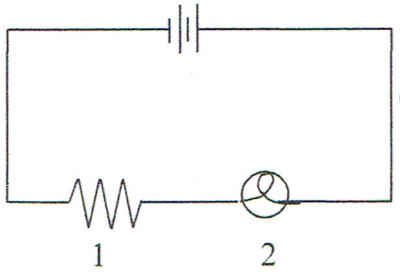
$I_T =$ 5A

$R_T =$ 2 Ω

use total voltage to calculate total resistance

$R = \frac{V}{I} = \frac{10\,V}{5A} = 2\,\Omega$

5. Solve for all of the missing values. Use your Ohm's Law equations (R=V/I) to solve for resistance.



① $V_T =$ 8 V $V_1 =$ 5 V $V_2 =$ 3 V

$I_T =$ 2A

② $R_T =$ 4 Ω

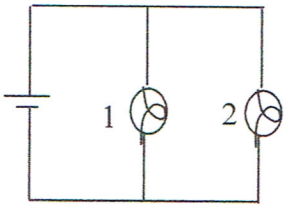
① Find V_T first

② $R = \frac{V}{I} = \frac{8\,V}{2A} = 4\,\Omega$

6. State the two equations for **parallel circuits** that explain how current and voltage in one part of the circuit is related to the total current and voltage for the circuit (i.e. use V_1, V_2 for A); and I_1, I_2 for B)) :

A) $V_T =$ $V_1 = V_2$ B) $I_T =$ $I_1 + I_2$

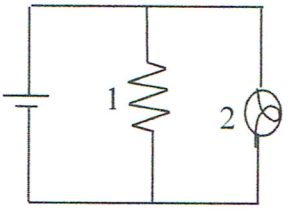
7. What is the voltage for light bulb 2 (V_2)? What is the current at light bulb 1 (I_1)?



$V_T = 6$ V $V_1 = 6$ V $V_2 =$ 6 V

$I_T = 12$ A $I_1 =$ 5 A $I_2 = 7$ A

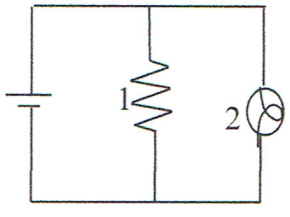
8. Solve for all of the missing values.



$V_T = 120$ V $V_1 =$ 120 V $V_2 =$ 120 V

$I_T =$ 26 A $I_1 = 16$ A $I_2 = 10$ A

9. Solve for all of the missing values. Use your Ohm's Law equations (R=V/I) to solve for total resistance.



$V_T =$ 11 V $V_1 = 11$ V $V_2 =$ 11 V

$I_T =$ 12A $I_1 = 4$ A $I_2 = 8$ A

$R_T =$ 0.92 Ω

$R = \frac{V}{I} = \frac{11\text{ V}}{12\text{ A}} = 0.92\ \Omega$