Answer Key

Electricity Unit

Name: _____
Date: _____

Ohm's Law Calculations

$V = IR$

1. A heating element operates on 115 V. If it has a resistance of 12.0 Ω, what current passes through the element?

9.58 A

2. A coffee pot operates on 12.0 V. If it draws 2.50 A, find its resistance.

4.8Ω

3. An electric heater draws a maximum of 14.0 A. If its resistance is 15.7 Ω, to what voltage should it be connected?

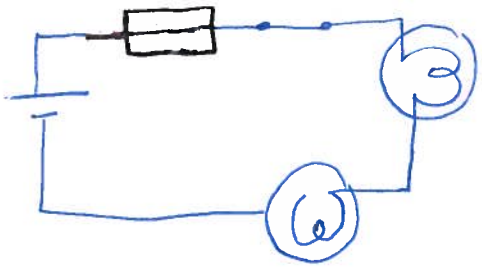
220V

4. What is the potential difference does a toaster have if it has a resistance of 17.6 Ω and a current of 12.5 A passing through the toaster?

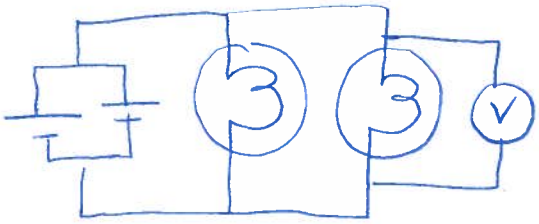
220V

Understanding Series and Parallel Circuits

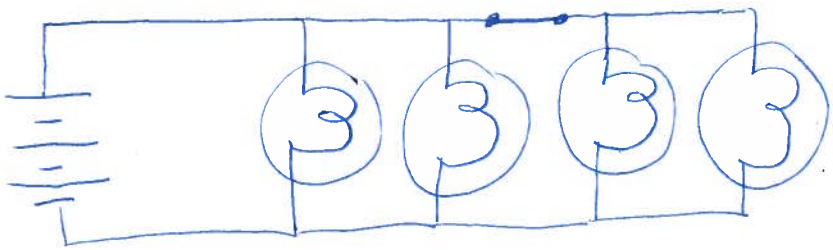
1. Draw a <u>series</u> circuit using symbols for a source, a fuse, a switch, 2 lamps and conducting wires.



2. Draw 2 cells hooked in <u>parallel</u> with 2 lights and a voltmeter to measure the voltage for one of the light bulbs.



3. Draw 3 cells hooked <u>in series</u> with 4 lights <u>in parallel</u> and one switch that turns off 2 of the lights.



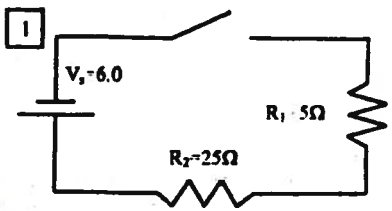
SNC
Ohm's Law in Series & Parallel Circuits

Name: _____
Date: _____

Identify the type of circuit and find the missing values for each of the circuits shown below.

1. Type of circuit: SERIES

Equations:



V_s= 6.0V I_T= $\frac{6.0}{30}$ = 0.20A R_T= 30Ω

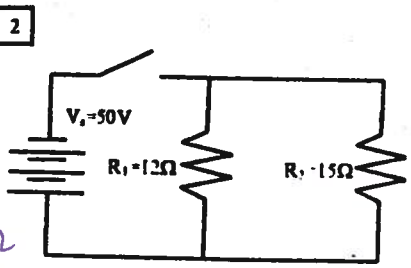
$R_T = R_1 + R_2$
$= 25 + 5$
$= 30\Omega$

V_1 = (0.20A)(5Ω) = 1.0V I_1= 0.20A R_1= 5Ω

V_2= 5.0V I_2= 0.20A R_2= 25Ω

2. Type of circuit: Parallel

Equations:



V_s= 50V I_T= $\frac{50}{6.67}$ = 7.5A R_T= 6.67Ω

V_1= 50V I_1= $\frac{50V}{12\Omega}$ = 4.17A R_1= 12Ω

V_2 50V I_2 = $\frac{50V}{15\Omega}$ = 3.33A R_2= 15Ω

$\frac{1}{R_T} = \frac{1}{12} + \frac{1}{15}$

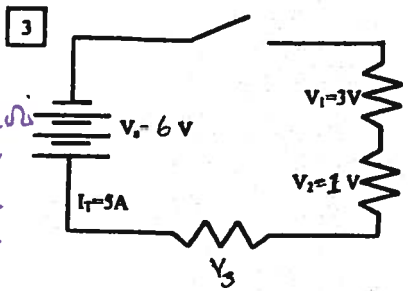
$= \frac{15+12}{180}$

$= \frac{27}{180}$

$R_T = \frac{180}{27} = 6.67\Omega$

3. Type of circuit: SERIES

Equations:



V_s= 6V I_T= 5A R_T= $\frac{6}{5}$ = 1.2Ω

V_1= 3V I_1= 5A R_1= 0.6Ω

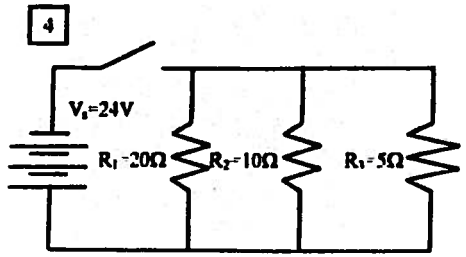
V_2= 1V I_2= 5A R_2= 0.2Ω

V_3= 2V I_3= 5A R_3= 0.4Ω

$V_3 = V_s - (V_1 + V_2)$
$= 6V - 3V - 1V$
$= 2V$

4. Type of circuit: PARALLEL

Equations:



V_s= 24V I_T= $\frac{24V}{2.8\Omega}$ = 8.4A R_T= 2.8Ω

V_1= 24V I_1= $\frac{24}{20}$ = 1.2A R_1= 20Ω

V_2 24V I_2= $\frac{24}{10}$ = 2.4A R_2= 10Ω

V_3 24V I_3= $\frac{24}{5}$ = 4.8A R_3= 5Ω

$\frac{1}{R_T} = \frac{1}{20} + \frac{1}{10} + \frac{1}{5}$

$\frac{1}{R_T} = \frac{1+2+4}{20}$

$\frac{1}{R_T} = \frac{7}{20} \rightarrow R_T = \frac{20}{7} = 2.86\Omega$