

$V = IR$	<i>Series – Circuits :</i>	<i>Parallel – Circuits :</i>
$P = VI$	$V_{Total} = V_1 + V_2 + V_3 + V \dots$	$V_{Total} = V_1 = V_2 = V_3 = V \dots$
$F_c = k \frac{q_1 q_2}{d^2}$	$I_{Total} = I_1 = I_2 = I_3 = I \dots$	$I_{Total} = I_1 + I_2 + I_3 + I \dots$
	$R_{Total} = R_1 + R_2 + R_3 + R \dots$	$\frac{1}{R_{Total}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R \dots}$

Vocabulary:

Electrostatic Force
 Coulomb
 Coulomb's Law
 Conductors
 Insulators
 Electroscope
 Electric Potential Energy
 Voltage/Potential Difference
 Grounding
 Electric Field
 Ohmmeter

Current
 AC vs. DC Current
 Resistance
 Ohm's Law
 Electric Circuits
 Open vs. Closed Circuits
 Circuit Breaker
 Short Circuit
 Series
 Parallel
 Kirchoff's Laws

Possible Questions:

1. A 12 V battery transfers 45 C of charge to an external circuit in 10 s.
 A. What current flows through the circuit? [1pt]

$$Amp = \text{current} = \frac{C}{s} = \frac{45}{10} = 4.5 \text{ amps}$$

- B. What is the resistance of the circuit? [2pt]

$$12 = 4.5 \cdot R$$

$$R = 2.67 \Omega$$

- C. What is the Power of the battery? [2pt]

$$P = 12 \cdot 4.5 = 54 \text{ W}$$

2. Two identical light bulbs, wired in parallel to a battery are equally bright. When one of the bulbs burns out, however, the other bulb is observed to glow brighter. Using the principles of physics, explain why the battery causes to the other bulb to glow more brightly. [4 pts]

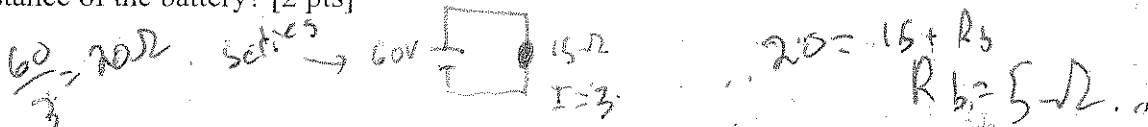
The current is split into two when in parallel, when one burns out, the entire current is sent through one bulb.

1. What is the equivalent resistance of a 10-ohm and a 30-ohm resistor connected in parallel? [2pts]

$$\frac{1}{R_T} = \frac{1}{10} + \frac{1}{30}$$

$$R_T = 7.5 \Omega$$

2. A 60V battery is connected across a 15-ohm resistor and produces a current of 3A. What is the internal resistance of the battery? [2 pts]



3. What is a series circuit? How do voltages, currents, and resistances add in a series circuit? Give an example. [2 pts]

when bulbs/resistors are all connected in a straight, linear circuit.
 Voltages, current, and resistances all add normally

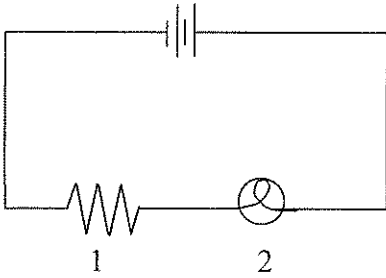
4. What is a parallel circuit? How do voltages, currents, and resistances add in a parallel circuit? Give an example. [2 pts]

When bulbs/resistors are branched off



- Voltages & currents add normally
- Resistances add inversely

5. Solve for the missing values in this series circuit (show work) [2pts]



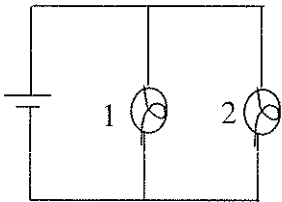
$V_T = \underline{8V}$ $V_1 = 6V$ $V_2 = 2V$

$I_T = 3A$

$R_T = \underline{2.67\Omega}$

$8 = 3 \cdot R$
 $\frac{8}{3} = R = 2.67\Omega$

6. Solve for the missing values in this parallel circuit (show work) [2pts]



$V_T = 7V$

$V_1 = \underline{7V}$

$V_2 = \underline{7V}$

$I_T = 20A$

$I_1 = \underline{16A}$

$I_2 = 4A$

Check the circuits practice worksheet for extra practice on solving circuits!