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Period: _____ Date: _____

Electric Circuits problems 3

SERIES	PARALLEL
$V = V_1 + V_2 + V_3$	$V = V_1 = V_2 = V_3$
$I = I_1 = I_2 = I_3$	$I = I_1 + I_2 + I_3$
$R = R_1 + R_2 + R_3$	$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

I. Simplify the following electric circuits. Show your work to get full credit.

1. A 9.0 V battery was recharged with a current of 1.2 A in 1.8×10^4 s. How much charge was transferred during that time?

A. 1.1×10^1 C

B. 2.2×10^4 C

C. 1.6×10^5 C

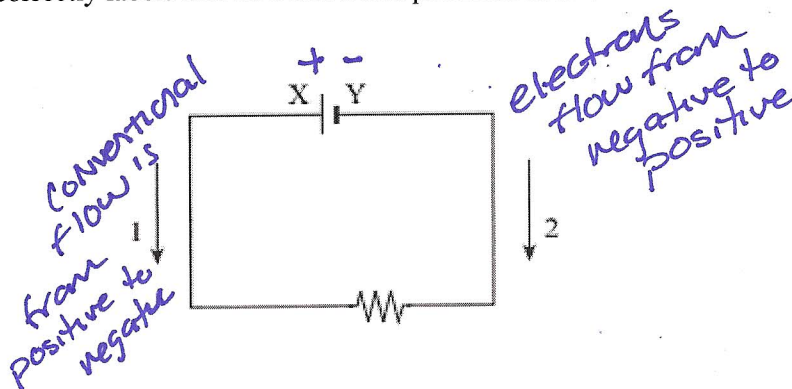
D. 1.9×10^5 C

$$I = \frac{\Delta Q}{\Delta t}$$

$$\Delta Q = I \cdot \Delta t = (1.2 \text{ A})(1.8 \times 10^4 \text{ s})$$

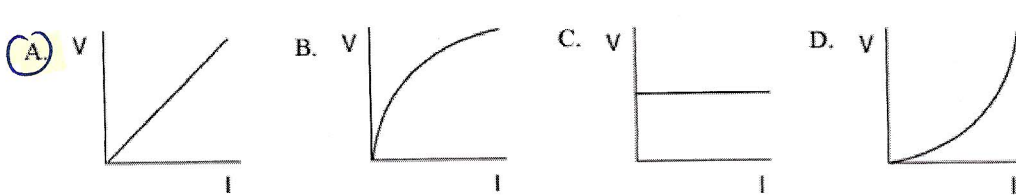
$$\Delta Q = 21,600 \text{ C} = 2.16 \times 10^4 \text{ C}$$

2. Which of the following correctly labels arrows 1 and 2 and polarities X and Y in the circuit below?



	ARROW 1	ARROW 2	POLARITY X	POLARITY Y
A.	Electron Flow	Conventional Current	Positive	Negative
B.	Electron Flow	Conventional Current	Negative	Positive
<input checked="" type="radio"/> C.	Conventional Current	Electron Flow	Positive	Negative
D.	Conventional Current	Electron Flow	Negative	Positive

3. Which of the following graphs illustrates Ohm's law?

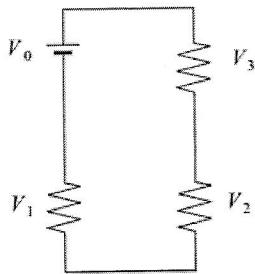


$V = IR$
V & I are directly proportional

4. Current is a measure of
- A. the number of charges stored in a cell.
 - B. the amount of energy given to a charged object.
 - C. the charge passing a point in a circuit in a given time.
 - D. the resistance to the flow of charged particles in a circuit.

$I = \frac{\Delta Q}{\Delta t}$ ← charge
 ← time

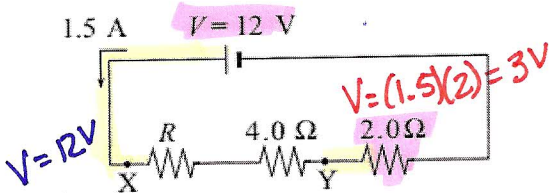
5. Which of the following relationships correctly applies to the circuit shown below?



- A. $V_0 = V_1 + V_2 + V_3$
- B. $V_0 + V_1 = V_2 + V_3$
- C. $V_0 = V_1 = V_2 = V_3$
- D. $\frac{1}{V_0} = \frac{1}{V_1} + \frac{1}{V_2} + \frac{1}{V_3}$

Series Circuit

6. In the following circuit, what is the magnitude of the potential difference between X and Y?



- A. 3.0 V
- B. 6.0 V
- C. 9.0 V
- D. 12 V

Voltage @ X = 12V [connected to battery]
Voltage @ Y = 3V [connected to 2Ω resistor]
 $\Delta V = 12 - 3 = 9V$

7. A potential difference of 12 V causes 0.35 C of electric charge to pass through a resistor in 2.6 s. What power does the resistor dissipate?

- A. 1.6 W
- B. 4.2 W
- C. 11 W
- D. 89 W

$I = \frac{\Delta Q}{\Delta t} = \frac{0.35}{2.6} = 0.13A$
 $P = IV = (0.13)(12) = 1.56W$

8. The headlights in a car use 95 W of power. A driver parks her car but leaves the lights on. The 12 V battery has 3.4×10^5 C of stored charge. How long does it take for the battery to lose its charge?

- A. 1.1×10^3 s
- B. 3.6×10^3 s
- C. 4.3×10^4 s
- D. 2.7×10^6 s

$P = IV$
 $I = \frac{P}{V} = \frac{95}{12} = 7.92A$
 $\Delta t = \frac{\Delta Q}{I} = \frac{3.4 \times 10^5}{7.92} = 4.3 \times 10^4$

9. Which of the following household electrical appliances has the greatest rate of energy consumption? (Think Power)

	ITEM	VOLTAGE	CURRENT
A.	Video Camera	6.0 V	1.6 A
B.	Radio	4.5 V	0.45 A
C.	Cassette Recorder	6.0 V	2.2 A
D.	Ghetto Blaster	12 V	1.4 A

$P = IV$
 9.6W
 2.025W
 13.2W
 16.8W