

K	C	A	T
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Name: _____

SNC 1D1 TEST
ELECTRICITY

TRUE OR FALSE SECTION (Label T or F):

1. T Charges that are alike repel each other.
2. F In a neutral material, the number of protons is always greater than the number of electrons.
3. F Static charges result from an imbalance of protons and neutrons.
4. T An insulator is a substance through which electrons cannot travel easily.
5. F In neutral atoms, the number of protons and neutrons is always equal.
6. T Electrical current is the result of the flow of electrons.
7. F Electrons always leave a battery or a power source from the positive terminal.
8. T The number of coulombs per second is measured in amperes (A).
9. T The more electric potential in a circuit, the brighter the bulbs will glow.
10. T In a series circuit, electrons have only one path to follow.
11. F Ohm's law states the resistance R, is the product of voltage, V and current, I.
12. F Potential difference can be measured in watts.
13. T Current is a measure of the rate at which electric charges pass a point in a circuit.
14. T The potential difference across different branches in a parallel circuit is always equal.
15. F The current in different branches in a parallel circuit is always equal.
16. F In a series circuit the potential difference across each load is always equal to the potential difference of the power supply.

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MATCHING SECTION (Place the Best Letter in each blank):

<u>D</u>	the part of an atom that moves easily	A	coulomb
<u>O</u>	does not conduct electricity	B	conductor
<u>K</u>	used to detect static electric charge	C	ohms
<u>B</u>	type of material through which electrons flow easily	D	electrons
<u>H</u>	the part of an atom that has a positive charge	E	ammeter
<u>F</u>	caused by the charge separation between cloud and the earth	F	lightening
<u>I</u>	flow of electrons	G	volts
<u>P</u>	used to measure potential difference	H	protons
<u>Q</u>	converts electrical energy into other forms of energy	I	current
<u>A</u>	contains a total charge of 6.25×10^{18} electrons	J	resistance
<u>M</u>	unit of measure for electrical current	K	electroscope
<u>C</u>	unit of measure for resistance	L	battery
<u>R</u>	a circuit that allows more than one path for electrons	M	amperes
<u>N</u>	a circuit that has only one path for electrons to flow around	N	series
<u>E</u>	device used to measure current	O	insulator
<u>J</u>	calculated by dividing voltage by current	P	voltmeter
<u>G</u>	unit of measure for potential difference	Q	load
<u>L</u>	composed of several cells	R	parallel

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MULTIPLE CHOICE SECTION (Pick the most correct answers):

1. When a negatively charged rod is brought near an uncharged electroscope, the leaves will
 - a) move apart
 - b) move together
 - c) stay the same
 - d) move together and then apart again

2. An object is found to have a charge of positive three on it. This means that it
 - a) gained three electrons
 - b) gained three protons
 - c) lost three electrons
 - d) lost three protons

3. Neutral objects are attracted to charged objects because of
 - a) mutual magnetism
 - b) a nucleus of atoms in the object
 - c) a vacuum occurs between the two
 - d) an induced charge on the object

4. One example of electrical energy being converted into another form of energy is:
 - a) an electric saw
 - b) a roaring fire
 - c) a running automobile

5. This person's work resulted in the law that relates resistance to current and potential difference: $V=IR$
 - a) Henry Cavendish
 - b) James Watt
 - c) Count Alessandro Guiseppe Antonio Anastasio Volta
 - d) Georg Simon Ohm

6. In a series circuit, the current is:
 - a) the same at every point
 - b) largest through the load
 - c) largest near the positive terminal of the dry cell
 - d) largest near the negative terminal of the dry cell

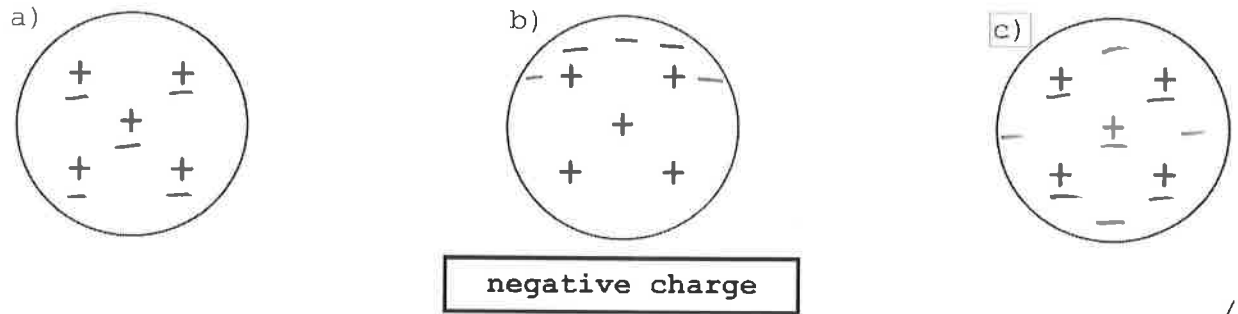
7. Two bulbs X and Y are connected in series to a power supply. If bulb X is removed, bulb Y will:
 - a) glow twice as brightly as before
 - b) glow half as brightly as before
 - c) glow as brightly as before
 - d) go out

8. Two bulbs, X and Y, are connected in parallel to a power supply. If bulb X is removed, bulb Y will:
 - a) glow more brightly
 - b) get dimmer
 - c) glow as brightly as before
 - d) go out

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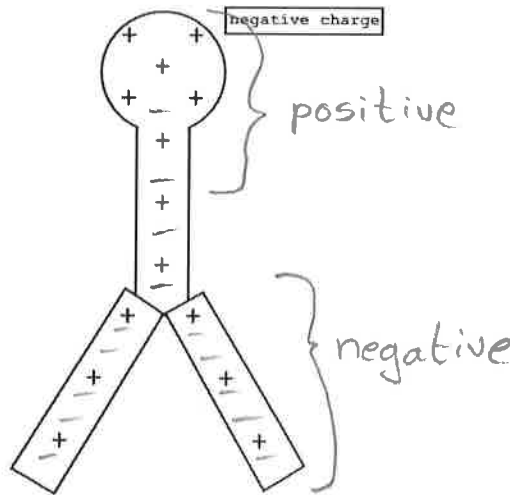
LONG ANSWER SECTION:

1. Show the charge distribution in:
 a) a neutral pith ball
 b) a neutral pith ball approached by a negative object
 c) a pith ball that has come into contact with the negative object (the negative object has been removed)
 Add negative charges as appropriate for each question.



/6A

2. Add electrons to this diagram of an electroscope to show the charge distribution if the SCOPE IS NEUTRAL but has been approached by a negative object. Label regions of charge



/3A

3. Explain how electrical discharge works with reference to ONE of the following (you choose):

- a cat and a human
- a bolt of lightning
- van de Graaff generator

/3C

Clearly explain how static charge build up occurs and why a static spark is observed.

Motion of substance with a difference in affinity for electrical charge causes one substance to become positive and the other negative.

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When the charge difference becomes large enough a static discharge occurs to neutralize.

4. Calculate the resistance in a light bulb, if 0.05 A flows through the bulb when the potential difference (voltage) is raised to 8.0 V. Use full problem solving format including a data table, equation before substitution, equation with substitution and the answer. ($V = IR$)

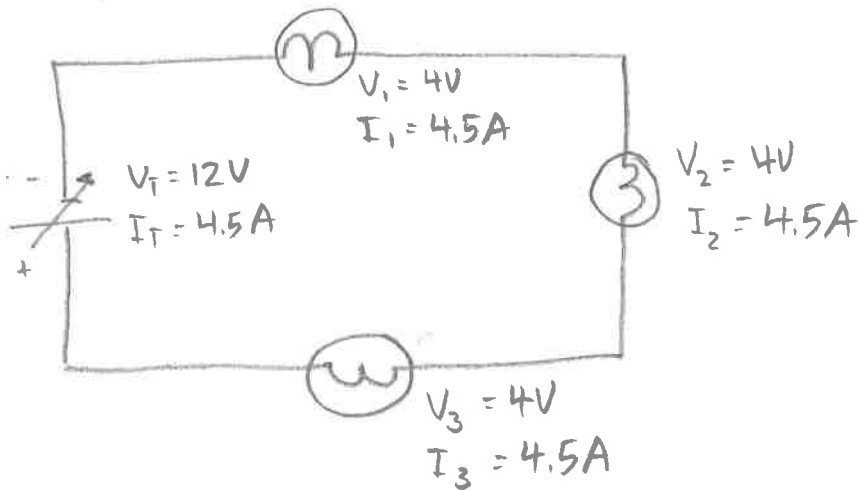
$$V = 8.0V \qquad R = \frac{V}{I} \qquad /3C$$

$$I = 0.05A \qquad R = \frac{8.0V}{0.05A}$$

$$R = ?(\Omega) \qquad /3A$$

$$R = 160 \Omega$$

5. A power supply provided 12 V of electrical potential and 4.5 A of current. Draw a diagram that has three identical bulbs in series. Write the current and the potential difference beside all ~~six~~ ^{three} bulbs and the power supply as well. Be sure to include units!

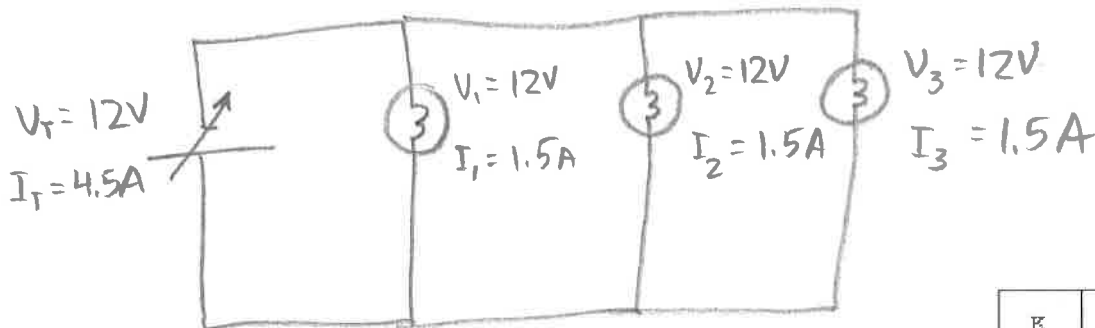


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6. Repeat question #5 for a parallel circuit (use three bulbs)

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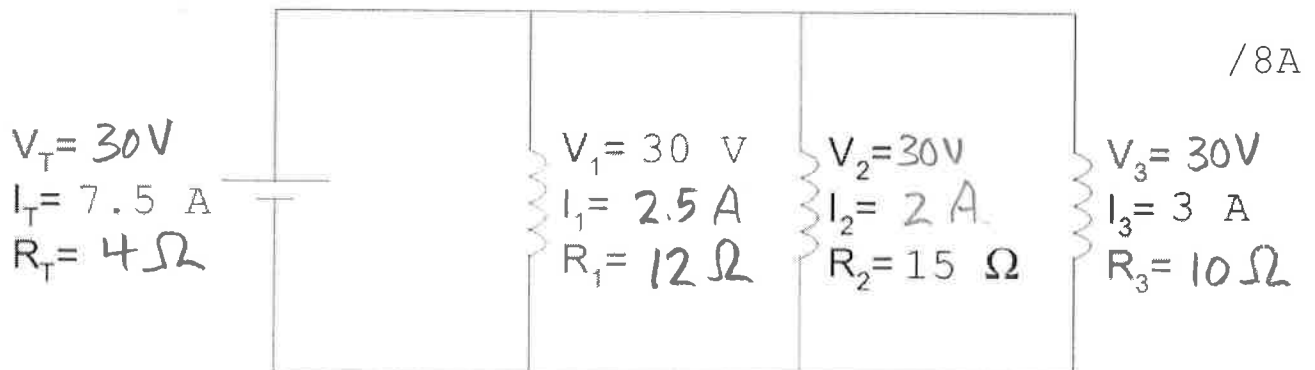
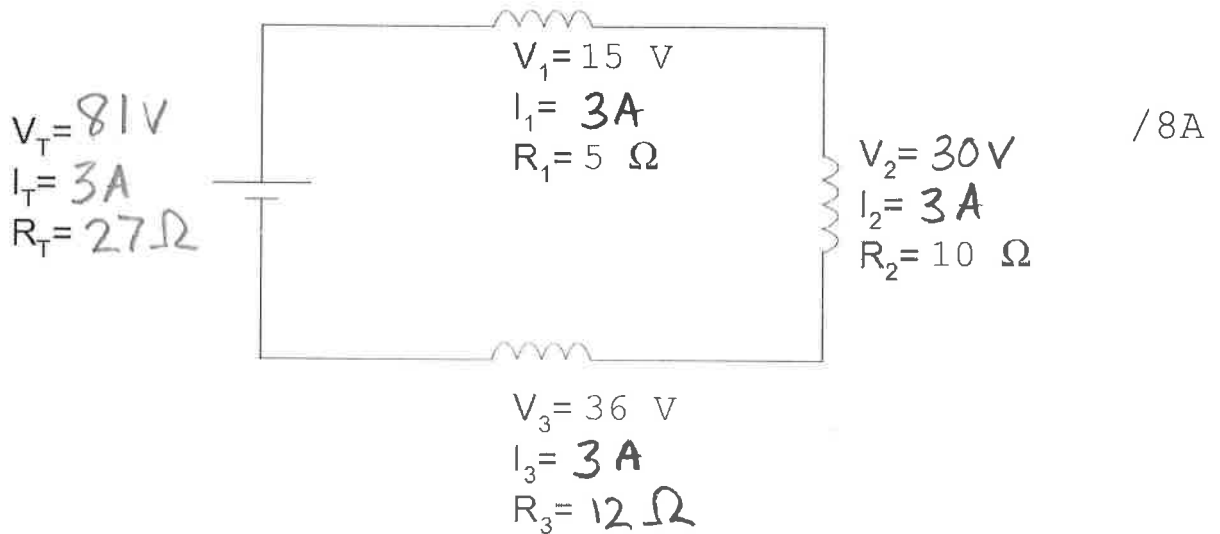


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7. Solve each circuit (fill in all blanks as best you can).
Rough work may help, but no marks are given for your rough work.

Series	Parallel
$I_T = I_1 = I_2 = I_3 = \text{etc.}$	$I_T = I_1 + I_2 + I_3 + \text{etc.}$
$V_T = V_1 + V_2 + V_3 + \text{etc}$	$V_T = V_1 = V_2 = V_3 = \text{etc.}$
$R_T = R_1 + R_2 + R_3 + \text{etc}$	$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$
$V = I \times R \quad I = \frac{V}{R} \quad R = \frac{V}{I}$	



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8. Calculate the current required to supply a 5000 W heater if the voltage is 110 V. If the heater is rewired to work on a 220 V circuit what is new current draw. Show two separate calculations.

$$P = V \times I$$

$$V = \frac{P}{I}$$

$$I = \frac{P}{V}$$

$$P = 5000 \text{ W}$$

$$I = \frac{P}{V}$$

/3C

$$V = 110 \text{ V}$$

$$I = \frac{5000 \text{ W}}{110 \text{ V}}$$

$$I = ?$$

$$I = 45.45 \text{ A}$$

/3A

$$P = 5000 \text{ W}$$

$$I = \frac{P}{V}$$

/3C

$$V = 220 \text{ V}$$

$$I = \frac{5000 \text{ W}}{220 \text{ V}}$$

$$I = ?$$

$$I = 22.72 \text{ A}$$

/3A

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