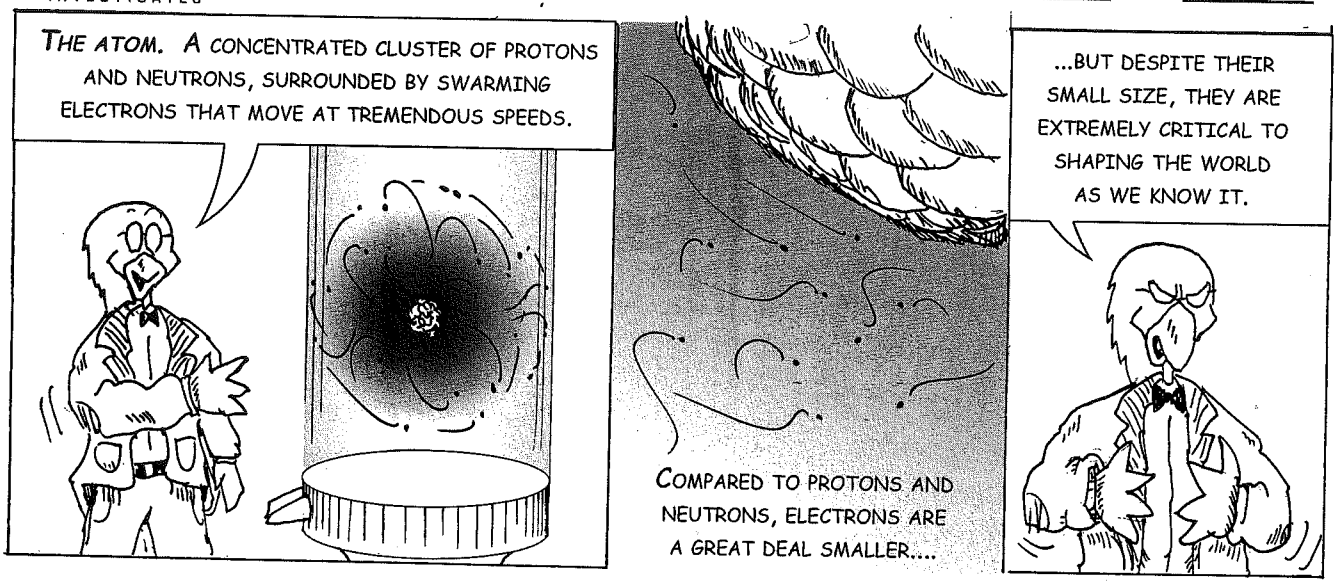
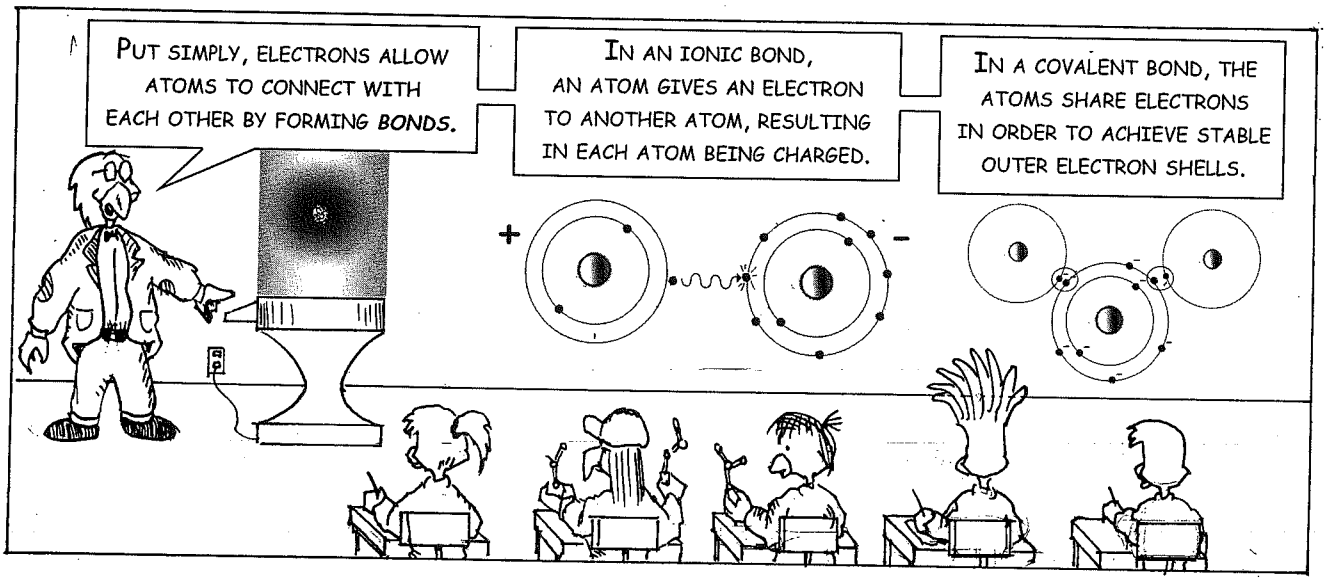
DR. BIRDLEY INVESTIGATES

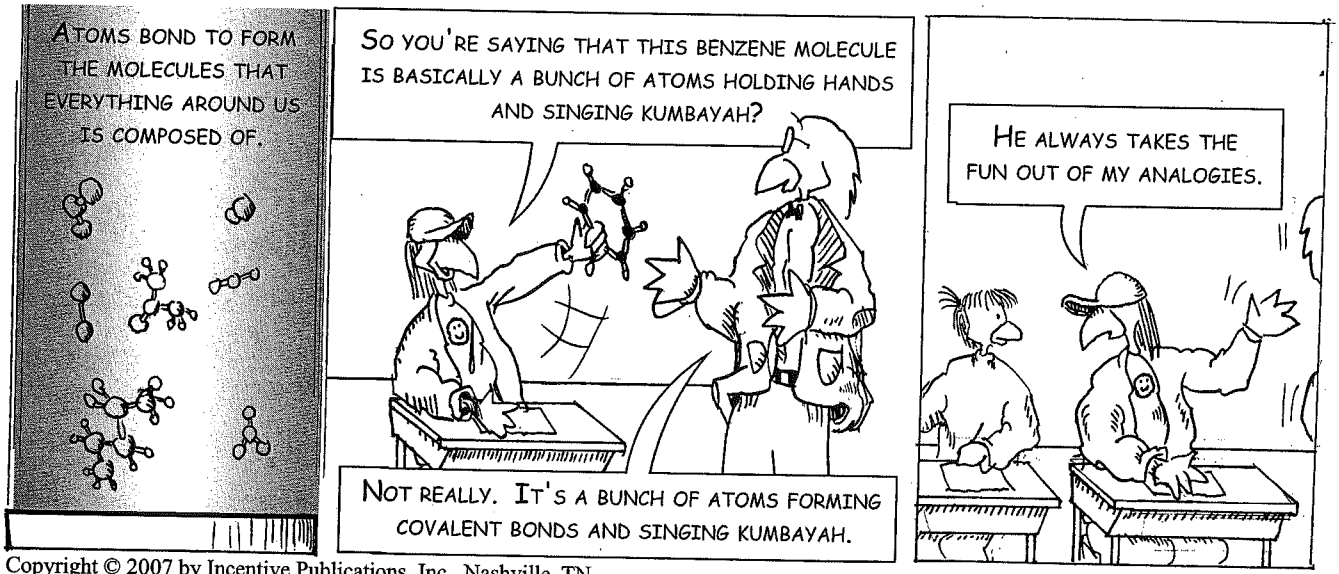
ATOMIC BONDING

NAME:_____

CLASS:_____ DATE:_____







Name:_____
Class:_____Date:_____

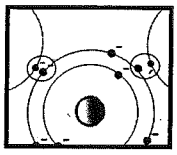
Study Questions

Directions: Read the related source cartoon and then answer the questions that follow.

1. Why are electrons so important?

_____

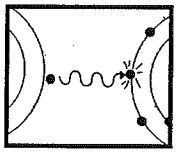
_____



2. How are covalent bonds different from ionic bonds?

_____

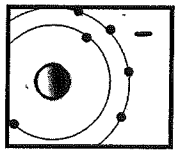
_____



3. Which element is the negatively charged ion? Why does accepting an electron cause this atom to take on a partially negative charge?

_____

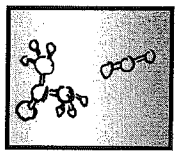
_____



4. Which element is the positively charged ion? Why does donating the electron cause this atom to take on a partially positive charge?

_____

_____



5. How does bonding relate to the formation of molecules?

_____

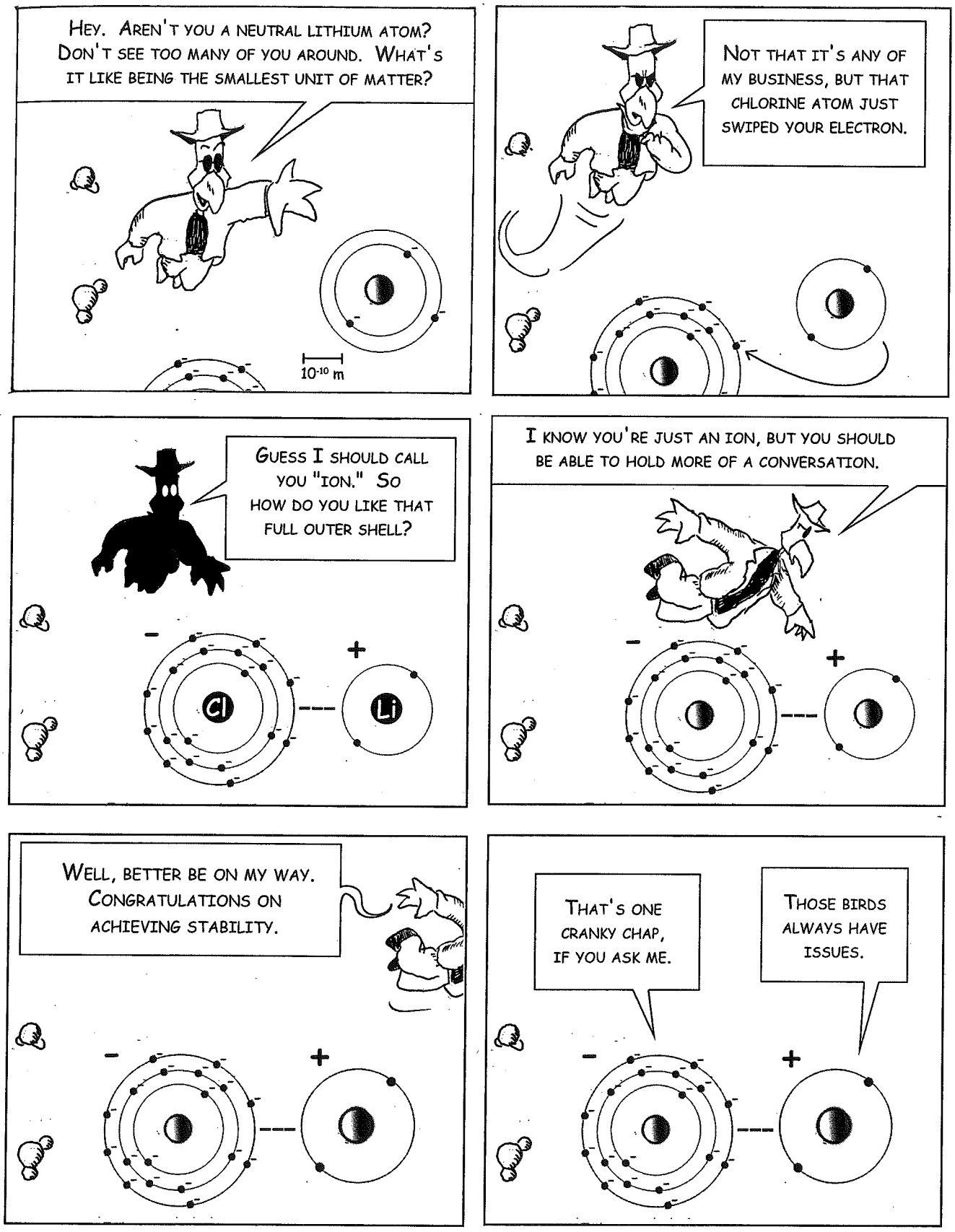
_____

DR. BIRDLEY INVESTIGATES

IONIZATION

NAME:_____

CLASS:_____ DATE:_____

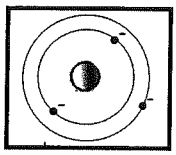


DR. BIRDLEY INVESTIGATES IONIZATION

Name:_____
Class:_____Date:_____

Study Questions

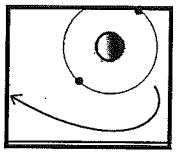
Directions: Read the related source cartoon and then answer the questions that follow.



1. How does the lithium atom become an ion?

_____

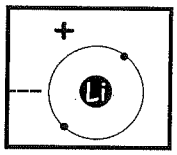
_____



2. Why did the lithium atom want to lose an electron?

_____

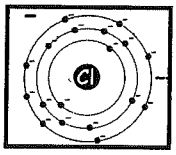
_____



3. Why does the lithium atom develop a positive charge?

_____

_____



4. Which is more stable: neutral chlorine atoms or chlorine ions? Why?

_____

_____

5. Which do you think are fewer in number: neutral unbonded lithium atoms or lithium ions that have connected with other atoms? Why?

_____

_____

NAME:_____

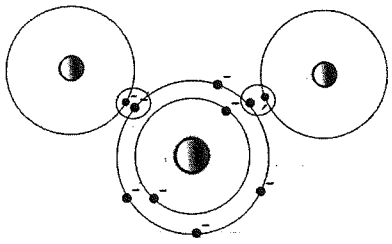
CLASS:_____ DATE:_____

BACKGROUND: IONIC AND COVALENT BONDING

An atom will form bonds to achieve a full outer shell of electrons. This may involve sharing, donating, or accepting electrons. To learn more about how this works, read about two types of bonds below:

COVALENT BONDS

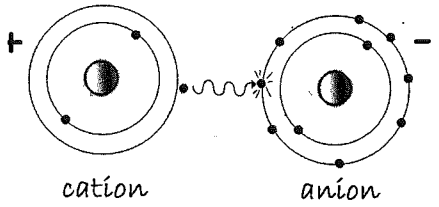
Covalent bonds involve two atoms sharing electrons. They usually occur between two non-metals. When carbon, oxygen, and hydrogen bond together, many of their bonds are covalent. The water molecule pictured below is held together by covalent bonds.



Because each atom still has equal numbers of protons and electrons, atoms that are covalently bonded do not have significant charges. Notice that the atoms are using electrons in their outer shell to bond.

IONIC BONDS

Ionic bonds involve one atom giving one or more electrons to a receiving atom. An atom becomes an ion when it has unequal numbers of protons and electrons. There are two types: anions and cations. Look at the picture below that depicts Lithium bonding to Fluorine:



Because the "donor" atom loses an electron, it develops a positive charge and becomes a cation. Because the "accepter" atom gains an electron, it develops a negative charge and becomes an anion.

1. What is the difference between an ionic and covalent bond?

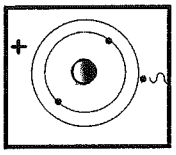
2. Why does lithium take on a positive charge when it bonds to Fluorine? Why does Fluorine take on a negative charge?

DR. BIRDLEY INVESTIGATES ATOMIC BONDING

Name:_____
Class:_____Date:_____

Vocabulary & Practice Problems

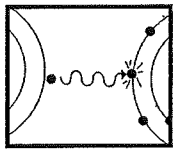
Directions: Use the following underlined words in sentences that convey their meaning.



1. An <u>ion</u> is a charged atom. Ions have unequal numbers of protons and electrons. Use the word <u>ion</u> in a sentence.

_____

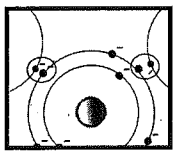
_____



2. An <u>ionic bond</u> occurs when an element (usually a metal) donates electron(s) to non-metal element. Use <u>ionic bond</u> in a sentence.

_____

_____



3. A <u>covalent bond</u> involves the sharing of electrons between two non-metal elements. Use the term <u>covalent</u> in a sentence.

_____

_____

4. Identify each molecule as ionic (I) or covalent (C).

a. __H_2O b. __LiF c. __$CaCl_2$ d. __CH_4

e. __$MgCl_2$ f. __NaCl g. __H_2SO_4 h. __$AlCl_3$

5. The charge of an atom is equal to the number of electrons it gains or loses.

If calcium loses two electrons, what is its charge? _____

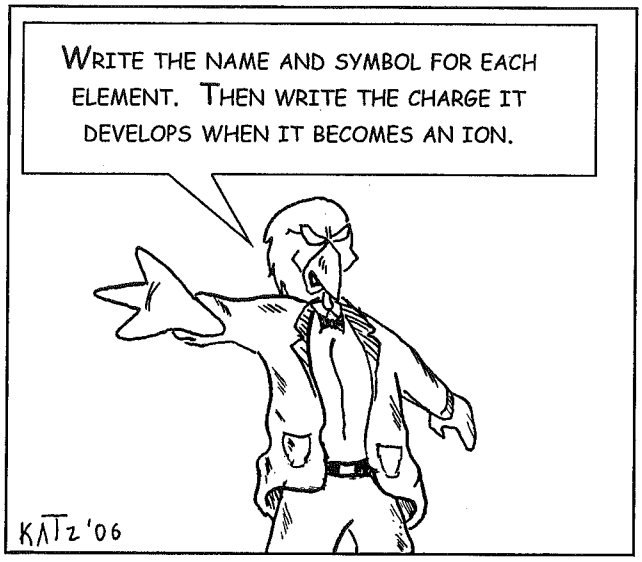
If chlorine gains one electron, what is its charge? _____

DR. BIRDLEY INVESTIGATES

BECOMING AN ION

NAME:_____

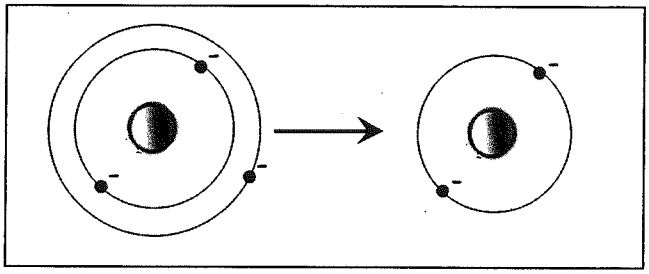
CLASS:_____DATE:_____



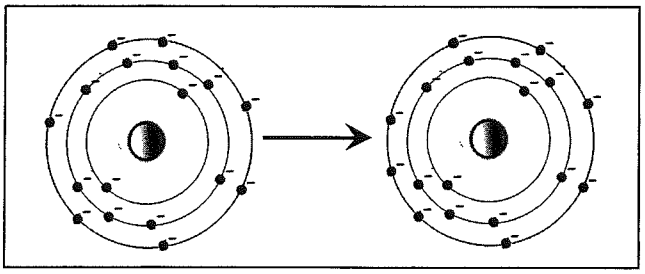
ATOMIC NUMBERS

HYDROGEN - 1	SODIUM - 11
CHLORINE - 17	FLOURINE - 9
LITHIUM - 3	MAGNESIUM - 12
HELIUM - 2	CARBON - 6

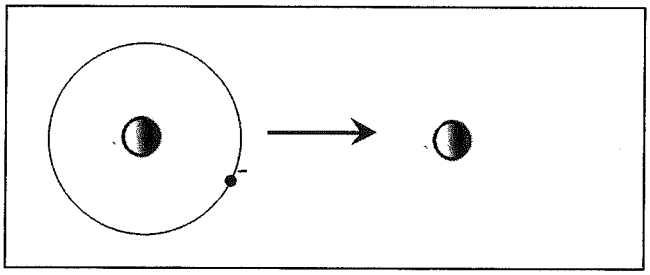
EACH BOX ILLUSTRATES *IONIZATION:* WHEN AN ATOM GAINS OR LOSES AN ELECTRON AND BECOMES AN ION.



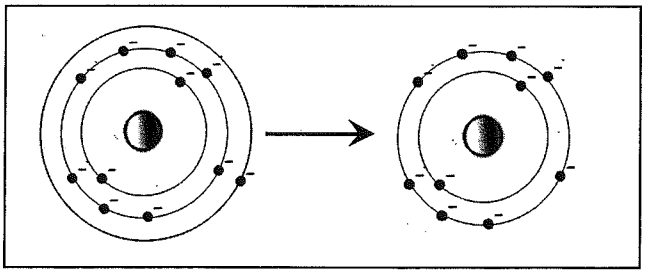
1. Name:_____Symbol:____Charge:___



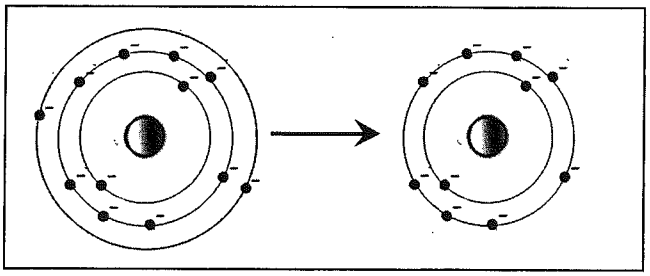
4. Name:_____Symbol:____Charge:___



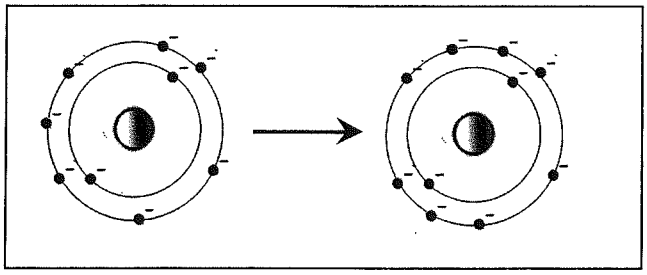
2. Name:_____Symbol:____Charge:___



5. Name:_____Symbol:____Charge:___



3. Name:_____Symbol:____Charge:___



6. Name:_____Symbol:____Charge:___