

Name KEY Date _____ Block _____

Review Chemical Bonding and Molecular Geometry - 272

Complete each of the following sentences by filling in the appropriate word or phrase from the list below.

negative	electrons	octet	polyatomic
positive	unshared pair	trigonal planar	VSEPR theory
noble gas	anion	cation	ions

1. An ionic bond is an attraction between oppositely charged ions.
2. Anions have a negative charge.
3. An atom becomes an ion by losing or gaining electrons.
4. The octet rule states that atoms tend to gain, lose, or share electrons in order to acquire a full set of valence electrons.
5. When sodium and chlorine form an ionic bond, both ions acquire the electron configuration of a(n) noble gas.
6. The atoms that make up polyatomic ions are bonded together by covalent bonds.
7. A pair of electrons not involved in a bond is called a(n) unshared pair.
8. The theory that states that the pairs of valence electrons are arranged as far apart as possible in small molecules is called the VSEPR theory.
9. A trigonal planar molecule is a flat triangular shape.

If the statement is true, write "true." If it is false, change the underlined word or words to make it true. Write your answer on the line.

- seven 10. The Lewis dot diagram for chlorine has six electrons.
- covalent 11. A group of atoms united by ionic bonds is called a molecule.
- T 12. A covalent bond is formed by a shared pair of electrons.
- unshared pair 13. A pair of electrons not involved in bonding is called a shared electron pair.
- equally 14. In non-polar covalent bonds, the electrons are shared unequally between two atoms.
- triple 15. Lewis structures use a triple dash to represent a double bond.

Bonding and Molecular Geometry

Directions: Fill in the blank using the following word list.

anion
cation
chemical bond
chemical reaction
coordinate covalent bond
ionic bond

covalent bond
ionization energy
metal
metallic bond
molecule
noble gas

polyatomic ion
sea of electrons
stable octet
valence shell

The force that holds two atoms together is called a(n) _____ (1). When atoms rearrange to form new combinations, a(n) _____ (2) has taken place. Such changes generally involve electrons in the highest principal energy level, or the _____ (3).

There are several extremely unreactive elements. Each of these is called a(n) _____ (4). The atoms of all but the lightest of these elements have a set of eight outermost electrons, which form a(n) _____ (5).

The amount of energy needed to remove the most loosely held electron from a neutral atom is called its _____ (6). When electrons are transferred from atom to another, a(n) _____ (7) is formed between the resulting charged atoms. A positively charged atom is called a(n) _____ (8). A negatively charged atom is called a(n) _____ (9).

An element that has only one or two outermost electrons is called a(n) _____ (10). The bond that forms between atoms of such an element is called a(n) _____ (11). Such bonding is characterized by a(n) _____ (12).

When atoms share electrons, a(n) _____ (13) is formed. An uncharged group of atoms held together in this way is called a(n) _____ (14). A group of chemically bonded atoms that has a charge is called a(n) _____ (15).

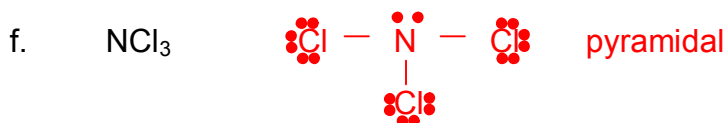
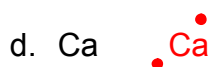
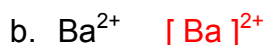
1. chemical bond
2. chemical reaction
3. valence shell
4. noble gas
5. stable octet
6. ionization energy
7. ionic bond
8. cation
9. anion
10. metal
11. metallic
12. sea of electrons
13. covalent
14. molecule
15. polyatomic ion

Matching:

- ___f___ Octet Rule
 - ___l___ Cation
 - ___g___ Chemical bond
 - ___i___ Nonmetals
 - ___a___ Ionic bond
 - ___h___ Anion
 - ___j___ Covalent bond
 - ___e___ Double bond
 - ___c___ Metals
 - ___b___ Dot diagram
 - ___k___ Triple bond
- a bond resulting in a **transfer** of electrons
 - a visual representation of the number of valence electrons on an atom
 - these have a tendency to lose electrons during a chemical bond
 - ions formed from one atom
 - two pairs of electrons or 4 electrons
 - the loss, gain, or sharing of electrons in order to acquire a full set of valence electrons.
 - the force holding atoms together in a combined state
 - particles formed by atoms that **gain** electrons becoming negatively charged.
 - these have a tendency to gain electrons during a chemical reaction
 - the force of attraction between elements **sharing** electrons
 - three pairs of electrons or 6 electrons
 - particles formed by atoms that **lose** electrons becoming positively charged

Part III. Molecular Geometry

Directions: Draw the dot diagram for the following atoms, monatomic ions molecules or polyatomic ions.

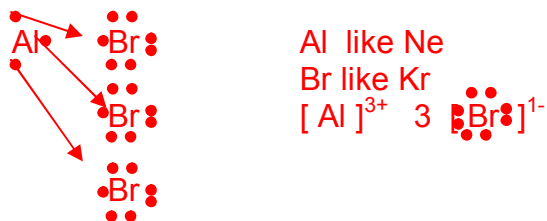


16. Classify the following compounds as ionic or molecular (covalent):

- a. C_2H_4 covalent
b. KF ionic
c. Na_2O ionic
d. SO_2 covalent

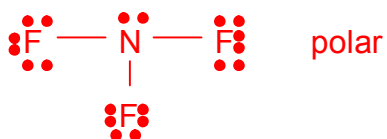
17. Illustrate the formation of an **ionic bond** between one atom of aluminum and three atoms of bromide to form aluminum bromide. Include the following:

- a. Draw an electron dot diagram for each atom involved.
b. Write the symbol of the noble gas each atom desires to be like.
c. Show the **transfer** of electrons from the metal to the non-metal using arrows.
d. Draw an electron dot diagram for the aluminum and bromide ions formed.



18. Draw structures for the following molecules. Identify their molecular geometry.

a. NF_3 Use $26e^-$



pyramidal

c. SO_2 use $18e^-$



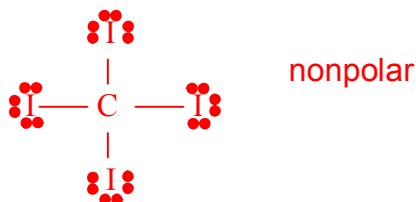
bent angular 2:1 ratio (see M.G. sheet)

b. N_2O Use $16e^-$



linear (double bond both sides)

d. CI_4 Use $32e^-$



tetrahedral – single bonds

19. Explain the difference between miscible and immiscible. Miscible liquids will dissolve into each other (isopropyl alcohol and water) and immiscible liquids will not mix together. (oil and water)

20. What effect does **hydrogen bonding** and **polarity** have on the properties of liquids?

Hydrogen bonding is the unusually strong dipole-dipole interaction that occurs when a highly electronegative atom (N, O, or F) is bonded to a hydrogen atom. These strong intermolecular forces cause higher melting and boiling points, lower vapor pressure, and an increase in surface tension and viscosity of liquids.