**UNIT 9 PRACTICE TEST** Name _____

**Multiple Choice Questions**

1. Ionic bonds are normally formed when
   A. electrons are shared between a metal and a nonmetal
   B. electrons are shared between two nonmetals
   C. electrons are transferred from a metal to a nonmetal
   D. electrons are transferred from a nonmetal to a metal

2. Covalent bonds are normally formed when
   A. electrons are shared between a metal and a nonmetal
   B. electrons are shared between two nonmetals
   C. electrons are transferred from a metal to a nonmetal
   D. electrons are transferred from a nonmetal to a metal

3. Which of these compounds is classified as IONIC?
   A. $CO_2$ C. $SF_2$
   B. $ZnCl_2$ D. $SeBr_2$

4. Which of these compounds is classified as COVALENT?
   A. A. $PF_3$ C. $GaCl_3$
   B. C. $NiBr_3$ D. $CrO_3$

5. Which of these compounds requires a Roman numeral in its name?
   A. $SF_6$ C. ZnO
   B. $AlBr_3$ D. $PdCl_2$

6. The correct formula for strontium phosphide is
   A. $Sr_2P_3$ C. $Sr_3P_2$
   B. $SrPO_4$ D. $Sr_3(PO_4)_2$

7. The correct formula for aluminum sulfide is
   A. $Al_2S_3$ C. $Al_3S_2$
   B. $AlSO_4$ D. $Al_2(SO_4)_3$

8. The correct formula for calcium hydroxide is
   A. CaO C. $CaH_2$
   B. $CaOH_2$ D. $Ca(OH)_2$

9. The correct name for $Na_3N$ is
   A. sodium nitride
   B. trisodium mononitride
   C. sodium(III) nitride
   D. sodium nitrate

10. The correct name for $CaCl_2$ is
    A. calcium(II) chloride
    B. calcium chloride
    C. calcium dichloride
    D. calcium chlorate

11. The correct formula for sodium carbonate is
    A. $Na_4C$ C. $NaCO_3$
    B. $Na_2CO_3$ D. $Na_3CO_3$

12. The correct name for $Mg(NO_3)_2$ is
    A. magnesium nitride
    B. magnesium nitrate
    C. magnesium dinitrate
    D. magnesium(II) nitrate

13. The correct formula for dinitrogen trioxide is
    A. $N_2O$ C. $N_2O_3$
    B. $N_2O_4$ D. $N_3O_2$

14. The correct name for $SF_4$ is
    A. sulfur(IV) fluoride
    B. sulfur fluoride(IV)
    C. sulfur trifluoride
    D. sulfur tetrafluoride

15. Which of the following choices has classified both bonds correctly?

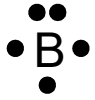
| | Covalent Bond | Ionic Bond |
|---|---|---|
| (A) | C–Cl | H–N |
| (B) | Na–I | Sr–Br |
| (C) | Sc–F | S–P |
| (D) | H–O | Ca–N |

16. As a bond between a hydrogen atom and a sulfur atom is formed, electrons are
    A. Shared to form an ionic bond
    B. Shared to form a covalent bond
    C. Transferred to form an ionic bond
    D. Transferred to form a covalent bond

17. Which of the following Lewis dot diagrams is correct?

(A) 


(C) 

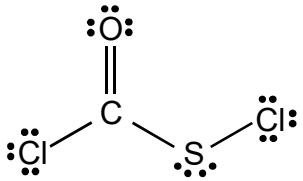

(B) 


(D) 


18. The molecular shape of $BF_3$ is
    A. bent
    B. pyramidal
    C. tetrahedral
    D. trigonal planar

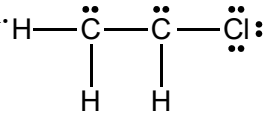
19. The molecular shape of silicon dioxide is
    A. linear
    B. pyramidal
    C. bent
    D. trigonal planar

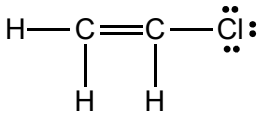
20. Given the Lewis structure  , what is the total number of electrons shared between the two oxygen atoms?
    A. 1
    B. 2
    C. 3
    D. 4

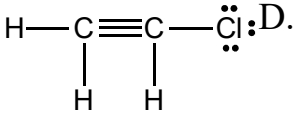
21. 

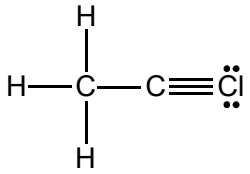
Which of the atoms in the Lewis structure above has violated the octet rule?
    A. sulfur
    B. carbon
    C. chlorine
    D. oxygen

22. Which of the Lewis structures below best represents the molecule $C_2H_3Cl$ ?

A. 

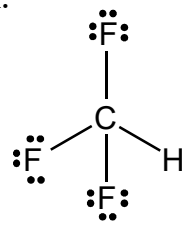
C. 

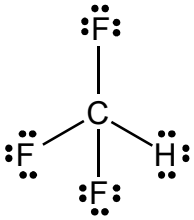
B. 

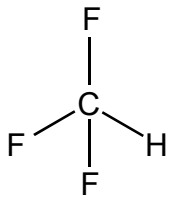
D. 

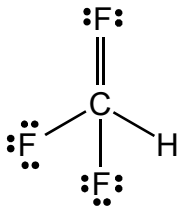
23. Hexane ($C_6H_{14}$) and water do not form a solution. Which statement explains this phenomenon?
    A. Hexane is polar and water is nonpolar.
    B. Hexane is ionic and water is polar.
    C. Hexane is nonpolar and water is polar.
    D. Hexane is nonpolar and water is ionic.

24. Which of the Lewis structures below best represents the molecule $CHF_3$ ?

A. 

B. 

C. 

D. 

25. Electronegativity is defined as the tendency of an atom to
    A. donate electrons to other atoms in a chemical bond
    B. share electrons equally with other atoms
    C. lose its valence electrons to become an ion
    D. attract electrons towards itself in a chemical bond

26. Based on its location on the periodic table, which of the following elements should have the largest value for electronegativity?
    A. lithium
    B. oxygen
    C. potassium
    D. Selenium

27. Which formula represents a nonpolar molecule containing polar covalent bonds?
    A. $H_2O$
    B. $CCl_4$
    C. $NH_3$
    D. $H_2$

**SHORT ANSWERS**

1. Decide if the description represents IONIC bonding or COVALENT bonding

_____It is a non conductor of electricity, whether it exists as a solid, melted, or dissolved in water.

_____It is a nonelectrolyte in the solid form, but it can become a good conductor when melted or dissolved in water.

_____The building blocks of this type of compound are called molecules.

_____The electrons are transferred from one element to another to form this type of bond.

_____The electrons are shared in between elements in this type of bond.

2. Rank from ionic, covalent and metallic from strongest to weakest strength between molecules

**NAMING COMPOUNDS & WRITING CHEMICAL FORMULAS PRACTICE**

## I. Simple Binary Ionic Compounds:

| | |
|---|---|
| 1. $MgCl_2$ | 1. Lithium oxide |
| 2. NaI | 2. Barium fluoride |
| 3. $Na_2S$ | 3. Cesium sulfide |
| 4. $Cs_2Se$ | 4. Beryllium oxide |
| 5. $Al_2S_3$ | 5. Strontium iodide |

## II. Binary Ionic Compounds with Multi-Valent Metals:

| | |
|---|---|
| 1. $FeCl_3$ | 1. Chromium (IV) sulfide |
| 2. $SnS_2$ | 2. Cobalt (II) bromide |
| 3. $Ti_2O_3$ | 3. Nickel (III) phosphide |
| 4. $PbF_2$ | 4. Gold (I) nitride |
| 5. $PtSe_2$ | 5. Iron (II) arsenide |

## III. Ionic Compounds with Polyatomic Ions:

| | |
|---|---|
| 1. $NaCH_3COO$ | 1. Silver nitrate |
| 2. $ZnCO_3$ | 2. Ammonium hydroxide |
| 3. $Al(NO_3)_3$ | 3. Magnesium Phosphate |
| 4. $KNO_3$ | 4. Lead (IV) nitrate |
| 5. $Zn_3(PO_4)_2$ | 5. Iron (III) carbonate |

## IV. Covalent Compounds:

| | |
|---|---|
| 1. $SF_6$ | 1. Nitrogen monoxide |
| 2. $P_2O_5$ | 2. Carbon dioxide |
| 3. $SiO_4$ | 3. Bromine trioxide |
| 4. $NO_2$ | 4. Xenon hexafluoride |
| 5. $H_2O$ | 5. Difluorine disulfide |

## LEWIS STRUCTURES

1. What is meant by the HONC Rule and Octet Rule for bonding? What are the exceptions?

2. Draw two Lewis structures for HCl, $N_2$, and $NH_3$ and place them in the proper boxes based on the type of intermolecular forces found between the molecules. Then, rank them in terms of their relative strengths using the number 1, 2, and 3, where 1 is used to indicate the strongest of these forces.

| IMF | London Dispersion | Hydrogen Bonding | Dipole-Dipole |
|---|---|---|---|
| **Lewis Structures** | | | |
| **Ranking** | | | |

3. Naphthalene, a nonpolar substance that sublimes at room temperature, can be used to protect wool clothing from being eaten by moths. Explain why naphthalene is not expected to dissolve in water.

4. Complete the following table

| | **Essential Information:** | **Structure:** | **Essential Questions:** | **Additional Information:** |
|---|---|---|---|---|
| **$NH_3$** | Total valence electrons: | | VSEPR Formula<br><br>Shape: | Polar or Nonpolar Molecule: |
| | Electrons in Bonds: | | Hybridization | Major intermolecular force: |
| | Electrons in Lone Pairs: | | | |
| **$CO_2$** | Total valence electrons: | | VSEPR Formula<br><br>Shape: | Polar or Nonpolar Molecule: |
| | Electrons in Bonds: | | Hybridization | Major intermolecular force: |
| | Electrons in Lone Pairs: | | | |
| **$C_2F_2$** | Total valence electrons: | | VSEPR Formula<br><br>Shape: | Polar or Nonpolar Molecule: |
| | Electrons in Bonds: | | Hybridization | Major intermolecular force: |
| | Electrons in Lone Pairs: | | | |