



9. Write the formula for each of the following compounds:

Phosphoric acid \_\_\_\_\_

Tin (IV) chromate \_\_\_\_\_

Silicon dioxide \_\_\_\_\_

Barium hydroxide \_\_\_\_\_

Carbon tetraiodide \_\_\_\_\_

10. Write the formulas and give the names for each of the compounds formed by the following ions:

Cation	Anion	Formula	Name
$\text{Ca}^{2+}$	$\text{Cl}^-$		
$\text{Pb}^{2+}$	$\text{CrO}_4^{2-}$		
$\text{Al}^{3+}$	$\text{SO}_4^{2-}$		
$\text{Sn}^{4+}$	$\text{PO}_4^{3-}$		

11. Name each of the following ions:

$\text{CN}^-$  \_\_\_\_\_

$\text{O}^{2-}$  \_\_\_\_\_

$\text{OH}^-$  \_\_\_\_\_

12. Write the formulas for the following ions:

Sulfide \_\_\_\_\_

Copper (I) \_\_\_\_\_

Carbonate \_\_\_\_\_

13. Use VSEPR theory to predict the molecular shape of the following molecules.

a. carbon dioxide \_\_\_\_\_

b. methane \_\_\_\_\_

14. The electrons available to be lost, gained, or shared in the formation of chemical compounds are called \_\_\_\_\_.

15. The measure of the ability of an atom in a chemical compound to attract electrons is called \_\_\_\_\_.

16. An atom or group of atoms that has a positive or negative charge is called a(n) \_\_\_\_\_.

17. A chemical bond that results from the attraction between metal atoms and the surrounding sea of electrons is called a \_\_\_\_\_.

18. The degree of ionic or covalent character of a bond is determined from the differences in the \_\_\_\_\_ of the elements. (Hint: to hoard electrons)

19. A neutral group of atoms held together by covalent bonds is called a(n) \_\_\_\_\_.

20. The electron dot notation for a hydrogen atom is \_\_\_\_\_.
21. A charged group of covalently bonded atoms is called a(n) \_\_\_\_\_. (Hint: ammonium, perchlorate, sulfate, nitrate)
22. a. How many electrons are shared in a single covalent bond? \_\_\_\_\_  
 b. double covalent bond? \_\_\_\_\_ c. triple covalent bond? \_\_\_\_\_

**Short Answer**

23. Which principle states that atoms tend to form compounds in which each atom has eight electrons in its highest occupied energy level?
24. How can we describe a covalent bond in which the bonded atoms have an unequal attraction for the shared electrons?
25. Define diatomic molecule.
26. Which seven elements are always found as diatomic molecules?
27. True or False : Sodium chloride is a molecule. Why? \_\_\_\_\_
28. Define bond energy:
29. List four properties of metals:
- |   |   |
|---|---|
| ▪ | ▪ |
| ▪ | ▪ |
30. Which of the metallic properties listed above describes the ability to be drawn, pulled, or extruded through a small opening to produce a wire?
31. Define alloy:
32. Compare and contrast ionic bonding and covalent bonding.
- | <u>Ionic Bonds</u> | <u>Covalent bonding</u> |
|--------------------|-------------------------|
| ▪                  | ▪                       |
| ▪                  | ▪                       |
| ▪                  | ▪                       |
33. Explain why most metals are malleable and ductile while ionic crystals are not.

34. Draw the **Lewis structures** for the following molecules. Determine and draw the proper **geometric shape** and indicate the **bond angles**. If the molecule is polar, draw the **dipole moment**. Draw resonance structures if they exist.

a. nitrogen molecule,  $N_2$

b. hydrochloric acid

c. sulfur trioxide

d. dihydrogen monoxide

e. diphosphorous tetrafluoride

f. phosphite ion

### Calculations

35. Find the molar mass of tetraethyl lead,  $Pb(C_2H_5)_4$ .

36. What is the formula mass of copper (II) chloride?

37. What is the percentage composition by mass of  $CuCl_2$ ?

38. Determine the mass of 0.240 mol glucose,  $C_6H_{12}O_6$ .