

Name: _____ Block: _____ Date: _____

Test Review: Chapter 8 Ionic Bonding

Part 1: Fill-in-the-blank. Choose the word from the word bank below. Each word may be used only 1 time.

electron dot structure
covalent bond
nonpolar covalent

metallic
stable
ionic

electronegativity
polar covalent

ionic bond
valence electrons

1. **Electronegativity** is the ability of an atom to attract e⁻ to itself when bonded.
2. A(n) **Ionic Bond** forms when e⁻ are transferred from 1 atom to another.
3. Elements form bonds to become **stable**.
4. A(n) **covalent bond** forms when e⁻ are shared between atoms.
5. An **electron dot structure** shows the number of valence e⁻ in an atom.
6. **Valence electrons** are electrons in the outer energy level of an atom.
7. A **metallic** bond forms between 2 or more metals.
8. A **nonpolar covalent** bond results when e⁻ are equally shared between atoms.
9. A **polar covalent** bonds when e⁻ are unequally shared between atoms.
10. If the electronegativity difference between 2 atoms is greater than 1.7, a(n) **ionic** bond will form.
11. If the electronegativity difference between 2 atoms is less than 1.7, but greater than 0 a(n) **polar covalent** bond will form.
12. If the electronegativity difference between 2 atoms is equal to 0, a(n) **nonpolar covalent** bond will form.

Part 2: Short Answer.

13. Use the electronegativity to determine what type of bond will form for the following atoms.

- a. Br-Br **Electronegativity difference = 0 NONPOLAR COVALENT BOND**
- b. Zn& Cl **$\Delta E = 1.17 = \text{Polar covalent}$**
- c. H &F **$\Delta E = 1.90 = \text{Ionic}$**
- d. N & H **$\Delta E = 0.87 = \text{polar covalent}$**
- e. Cl & Cl **$\Delta E = 0 = \text{nonpolar covalent}$**

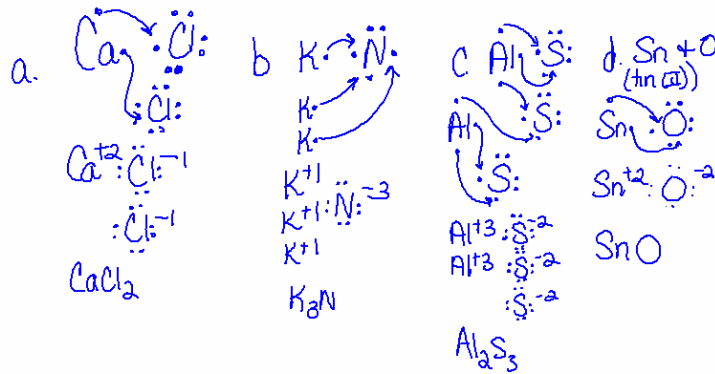
14. Draw electron dot structures to show the transfer of electrons (ionic bond) for the following atoms. Give the resulting charges and the ionic formula.

a. Ca & Cl
CaCl₂

b. K & N
K₃N

c. Al & S
Al₂S₃

d. Sn & O (Tin (II))
SnO



Part 3: Name the following ionic compounds

- | | | | |
|-------------------------|----------------------------------------------|------------------------------------|--------------------------------------|
| 15. MgBr ₂ | magnesium bromide | 19. SnBr ₂ | tin (II) bromide
stannous bromide |
| 16. NH ₄ F | ammonium fluoride | 20. K ₂ CO ₃ | potassium carbonate |
| 17. Cu(OH) ₂ | copper (II) hydroxide
or cupric hydroxide | 21. Fe ₂ O ₃ | iron (III) oxide
ferric oxide |
| 18. CaS | calcium sulfide | 22. FeO | iron (II) oxide or ferrous oxide |
- Part 4: Write the formulas for the following ionic compounds. (Make sure the charges add up to zero)

- | | | | |
|-----------------------|------------------|------------------------|---------------------------------|
| 23. Lithium fluoride | LiF | 26. Iron (II) sulfate | FeSO ₄ |
| 24. potassium nitrate | KNO ₃ | 27. sodium carbonate | Na ₂ CO ₃ |
| 25. magnesium oxide | MgO | 28. Lead (IV) chloride | PbCl ₄ |

Determine the charge of the metal in the following compounds.

- | | |
|--------------------------|--------------------------------------------------------|
| 29. HgO +2 | 31. CoS ₂ +4 |
| 30. Cu ₂ O +1 | 32. Ni ₃ (PO ₄) ₂ +2 |

Write the formula and charge for the following ions.

- | | | |
|---------------------------------------------|-----------------------------------------|-------------------------------------------|
| 33. Chloride Cl ⁻¹ | 36. Oxide O ⁻² | 39. hydroxide OH ⁻¹ |
| 34. Chlorite ClO ₂ ⁻¹ | 37. Potassium ion K ⁺¹ | 40. Aluminum ion Al ⁺³ |
| 35. Chlorate ClO ₃ ⁻¹ | 38. Manganese (IV) ion Mn ⁺⁴ | 41. Nitrite NO ₂ ⁻¹ |

Review Sheet: Ch 9 Covalent Bonding

Molecular Compounds

1. What types of elements typically form molecular compounds?

Nonmetals and metalloids

Write the prefixes used for the following numbers:

2. 1 **mono** 5. 3 **tri** 8. 5 **penta**

3. 2 **di** 6. 10 **deca** 9. 8 **octa**

4. 4 **tetra** 7. 6 **hexa** 10. 7 **hepta**

Name the following molecular compounds

11. CO **carbon monoxide** 13. N₂O **dinitrogen monoxide**

12. CCl₄ **carbon tetrachloride** 14. CO₂ **carbon dioxide**

Write the formulas for the following molecular compounds

15. phosphorus trichloride **PCl₃** 17. carbon difluoride **CF₂**

16. hydrogen trioxide **HO₃** 18. silicon dioxide **SiO₂**

Mixed Compounds

19. What types of elements typically form an ionic compound?

Identify the following compounds as Ionic (I), Molecular (M),. Then correctly name each.

20. MgNO₃ **Ionic magnesium nitrate** 26. ClO₂ **molecular: chlorine dioxide**

21. SnCl₄ **Ionic: Tin (IV) or stannic chloride** 27. FeO **Ionic: Iron (II) or ferric oxide**

22. N₂O₅ **_ molecular: dinitrogen pentaoxide** 28. Ba(OH)₂ **Ionic: barium hydroxide**

23. KBr **ionic: potassium bromide** 29. Li₂SO₃ **Ionic: lithium sulfite**

24. CaCl₂ **ionic: calcium chloride** 30. CO **molecular: carbon monoxide**

25. KMnO₄ **ionic: potassium permanganate** 31. P₃F₄ **molecular: triphosphorus tetrafluoride**

Write the formulas for the following compounds.

32. Sodium chloride **NaCl** 36. dinitrogen pentoxide **N₂O₅**

33. magnesium oxide **MgO** 37. aluminum phosphate **AlPO₄**

34. carbon tetrachloride **CCl₄** 38. copper (I) nitrate **CuNO₃**

35. Iron (III) oxide **Fe₂O₃** 39. strontium oxalate **SrC₂O₄**

40. carbon dioxide **CO₂** 42. sulfur trioxide **SO₃**

41. strontium oxalate SrC_2O_4 43. Manganese (IV) oxide MnO_2

Bonding: Fill-in-the-blank: Choose the answer that best fits each statement. Some choices may be used more than once.

molecule stable double bond single bond nonpolar covalent
covalent triple bond ionic bond covalent bond dipole interaction
polar covalent ionic chemical bond dispersion force intermolecular attractions

44. A **molecule** is made up of atoms that have covalent bonds.
45. A(n) **ionic bond** forms when e^- are transferred from 1 atom to another.
46. Elements form bonds to become **stable**.
47. A(n) **covalent bond** forms when e^- are shared between atoms.
48. A **double bond** forms when 2 pairs of e^- are shared.
49. A **single bond** forms when 1 pair of e^- are shared.
50. A **triple bond** forms when 3 pair of e^- are shared.
51. A **nonpolar covalent** bond results when e^- are equally shared between atoms.
52. A **polar covalent** bonds when e^- are unequally shared between atoms.
53. Weak forces that hold molecules together are called **intermolecular attractions**
54. If the electronegativity difference between 2 atoms is greater than 1.7, an **IONIC** bond will form.
55. If the electronegativity difference between 2 atoms is less than 1.7 but greater than 0, a **polar covalent** bond will form.
56. If the electronegativity difference between 2 atoms equal to 0, a **nonpolar covalent** bond will form.
57. A **chemical bond** forms between atoms while **intermolecular attractions** form between molecules.
58. Polar molecules are held together by **dipole interactions** while nonpolar molecules are held together by **dispersion forces**.

Short Answer. FOR ANSWERS SEE BELOW #62

59. Draw e^- dot structures for the following molecules.

- a. H_2O b. CH_4 c. NH_3 d. HF
e. Cl_2

60. Using e^- dot structures, predict the shapes of the following molecules.

- a. H_2S b. CCl_4 c. H_2 d. NH_3

61. Determine whether the following covalent bonds are polar or nonpolar.

- a. $\text{O}-\text{H}$ b. $\text{Cl}-\text{Cl}$ c. $\text{C}=\text{O}$ d. $\text{H}-\text{Cl}$

62. Determine if the following molecules are polar or nonpolar.

- a. Cl_2 b. HBr c. H_2O d. CCl_4 e. SiO_2

