

Academic Chemistry – Unit 3 Review

Chapter 7 – Ionic & Metallic Bonding

- The electrons in the highest occupied energy level of an atom are called the _____ electrons.
- The _____ rule states that atoms in compounds tend to have the electron configuration of a noble gas.
- Oxygen atoms attain a stable electron configuration by _____ two electrons.
- Ionic compounds are composed of _____ and _____ which are arranged in a repeating 3D crystal structure. This structure makes these compounds _____. When _____, ionic compounds can conduct electricity.
- Determine the number of valence electrons in each of the following and then draw a Lewis dot structure:
 - Magnesium
 - Chlorine
 - Hydrogen
 - Neon
- Write the electron configuration for the following:
 - Calcium ion
 - Strontium ion
 - Sulfur ion
 - Fluorine ion
- Which of these is not an ionic compound?
 - KF
 - Na₂SO₄
 - SiO₂
 - Na₂O
- Using Lewis Dot diagrams, show how an ionic bond of sodium oxide is formed.
- Describe how a metallic bond is formed.

Chapter 8 – Covalent Bonding

- Covalent bonds occur between _____ and _____ due to the _____ of electrons.
- How many electrons are shared in the following bonds?
 - Single covalent bond
 - Double covalent bond
 - Triple covalent bond
- For the following compounds – CF₄, CO₂, NH₃, N₂, BF₃, CH₂Cl₂, H₂O – do the following:
 - Draw the Lewis Dot structure
 - Determine the number of lone pair electrons on the central atom
 - Determine the number of atoms bonded to the central atom
 - Indicate the VSEPR geometry for each molecule
 - Determine if the bonds are nonpolar covalent or polar covalent
 - Determine if the molecule is nonpolar or polar
 - Determine the type(s) of intermolecular attractions (dispersion, dipole, hydrogen bonding)
 - Calculate the bond dissociation energy for all bonds in the molecules (except BF₃)
- Order the types of bonds from strongest to weakest: London dispersion forces, hydrogen bonds, dipole interactions, ionic bonds, covalent bonds.
- Which of these molecules can form a hydrogen bond with a water molecule?
 - N₂
 - NH₃
 - O₂
 - CH₄

Chapter 9 – Chemical Names & Formulas

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|-----------------------------------|---------------------------|------------------------------------|
| 1. nitrogen trifluoride | 9. phosphorus triiodide | 17. H ₂ SO ₃ |
| 2. barium phosphide | 10. disulfur decafluoride | 18. CCl ₄ |
| 3. P ₄ O ₁₀ | 11. K ₂ S | 19. calcium iodide |
| 4. SCl ₂ | 12. NiSO ₄ | 20. hydrobromic acid |
| 5. Cu(OH) ₃ | 13. aluminum phosphate | 21. bromic acid |
| 6. ammonium carbonate | 14. magnesium perchlorate | 22. SrCl ₂ |
| 7. carbonic acid | 15. iron (III) sulfide | 23. PbS |
| 8. HCl | 16. dinitrogen monoxide | 24. dinitrogen tetroxide |