

Chemistry Unit 4 Test Review

Electron Configuration

1. What are the four sublevels and the orbital shapes in each sublevel?

s is a hollow sphere, p is s dumbbell shape, d is a double dumbbell, f is complicated 😊

2. How many electrons can be found in an s orbital and where on the periodic table are the “s block” elements located? 2 e-; located in groups 1 & 2

p orbital and location? 6 e-; located in groups 13 - 18

d orbital and location? 10 e-; located in groups 3 – 12, the transition metals

3. How many electrons are needed to completely fill the first energy level? 2

Second energy level? 10

Third energy level? 18

4. Which one of the three rules explains why electrons have opposite spins?

Pauli Exclusion Principle

5. Which rule tells us that one electron must fill each orbital before pairing up?

Hund's rule

6. Which rule explains why we must fill lowest energy levels first?

Aufbau Principle

7.* Be able to write the electron configuration for any element in the first four energy levels And be able to read electron configurations to determine if they are in the ground state (unexcited) or excited state. Copy of 1st 20 attached

Lewis Dots for Atoms and Formulas

8. What do the dots in a Lewis dot structure represent? Valence e-

9. Draw a Lewis diagram for: I can't do this in MS Word

a. CaCl_2

b. CHF_3

c. N_2

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10. Why are charges included in the Lewis structure of an ionic compound but not for a covalent compound? **Electrons are transferred from one atom to another in ionic bonds while electrons are shared in covalent bonds.**

11. We tend to say that ionic compounds form between positive ions and negative ions. In actuality, electronegativity determines whether a bond will be ionic or covalent. **True** or False

12. Metals form **positive** / negative ions and non-metals form positive / **negative** ions. Circle one for each type of element.

Molecular Geometry

13. How does VSEPR theory explain the shape a molecule will have?

Molecules adjust their shape so that valence electron pairs can move as far apart as possible.

14. In general, atoms in the same group (aka family) will form molecules of the same shape when they are the central atom. Complete the following table; the first one has been done for you.

Group #	Molecular Geometry
13	Trigonal planar
14	Tetrahedral
15	Trigonal pyramidal
16	Bent

Metallic Bonding

15. How does the sea of electron model for metallic bonding explain conductivity – **electrons can flow freely therefore transfer energy (both heat and electrical)** , malleability and ductility of metals – **The sea of drifting electrons insulates the metal cations from each other so they can slide past each other but not break away from each other.**

16. What is the term that means a metal can be drawn (stretched) into a wire? **ductility**

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17. What is the term for the property of metal that allows it to be hammered or rolled into a thin sheet? **malleability**

18. Use what you have learned about metals and the type of ions they form to determine if they have a higher or lower electronegativity than non-metals.

Metals have lower electronegativity than non-metals. That is why they lose electrons to form positive ions aka cations.

NOTE: To do well on the test, you must know:

- how to draw and write electron configuration for atoms in the ground state and excited state.
- How to draw Lewis dot diagrams for atoms, ionic and covalent compounds
- How to apply the sea of electron model to properties of metals.
- Go back through your assignments and work the problems AGAIN for practice
- **Read all the printed notes for this unit. If you lost yours or turned them in with your portfolio, the word documents are in unit 4 on my fusion page.**