Name: _____ **Date:** _____

Your Mission to the Octet: A Junior Chemist's Bonding Quest

Valence shell identification, electron transfer, and lattice stability — recall the fundamental forces that keep our physical world from falling apart.

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1. In the crystal lattice of Potassium Bromide (KBr), what force is primarily responsible for holding the structure together?

A. Gravitational pull between atoms
B. Electrostatic attraction between ions
C. Sharing of valence electrons
D. Magnetic alignment of nuclei

2. An atom that loses an electron and takes on a positive charge is known as a(n) _____.

A. Anion
B. Isotope
C. Cation
D. Molecule

3. Noble gases like Neon rarely form chemical bonds because they already possess a stable octet of valence electrons.

A. True
B. False

4. Which of these substances would you expect to exhibit high electrical conductivity in its solid state due to a 'sea of electrons'?

A. Solid Silver (Ag)
B. Table Sugar ($C_{12}H_{22}O_{11}$)
C. Quartz (SiO_2)
D. Dry Ice (CO_2)

5. When two Nitrogen atoms combine to form N_2, they share three pairs of electrons, creating a _____ bond.

A. Single covalent
B. Ionic
C. Triple covalent
D. Metallic

6. Brittle materials that shatter when struck, such as Lithium Fluoride crystals, are typically held together by covalent bonds.

A. True
B. False

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7. In a molecule of Hydrogen Chloride (HCl), the electrons are shared unequally. This type of bond is specifically called:

A. Nonpolar covalent
B. Metallic
C. Polar covalent
D. Ionic

8. The tendency of atoms to prefer a valence shell with eight electrons is known as the _____ Rule.

A. Hund's
B. Octet
C. Pauli
D. Aufbau

9. Which of the following elements is most likely to form an ionic bond with Sulfur?

A. Oxygen (Nonmetal)
B. Carbon (Nonmetal)
C. Barium (Metal)
D. Chlorine (Nonmetal)

10. Double bonds represent the sharing of four total electrons between two atoms.

A. True
B. False