Name: _____ **Date:** _____

Answer Key: Basic Bonds: Building Big Blocks for College Chemistry

Assess foundational knowledge of atomic interactions with 10 questions covering valence shells, electronegativity basics, and primary bonding classifications.

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1. Which of the following elements is most likely to form an ionic bond by losing an electron to achieve a stable octet?

Answer: A) Potassium (K)

Potassium is an alkali metal with one valence electron; it has a low ionization energy and readily loses that electron to reach a stable noble gas configuration.

2. A covalent bond involves the complete transfer of one or more electrons from one atom to another.

Answer: B) False

Covalent bonds are defined by the sharing of electron pairs between atoms, whereas the transfer of electrons characterizes ionic bonding.

3. In a ____ bond, electrons are not associated with any single atom but move freely throughout a three-dimensional lattice.

Answer: C) Metallic

Metallic bonding is described by the 'sea of electrons' model where delocalized valence electrons move freely among metal cations.

4. Which molecule contains a triple covalent bond to satisfy the octet rule for both atoms?

Answer: B) N2

Nitrogen has five valence electrons and needs three more to complete its octet; therefore, two nitrogen atoms share three pairs of electrons.

5. Electronegativity is a measure of an atom's ability to attract shared electrons in a chemical bond.

Answer: A) True

Electronegativity is a chemical property that describes the tendency of an atom to attract a bonding pair of electrons towards itself.

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6. Which of these substances is held together by electrostatic attractions between oppositely charged ions?

Answer: C) Lithium Bromide (LiBr)

Lithium Bromide is an ionic compound formed from a metal (Li+) and a non-metal (Br-), resulting in strong electrostatic attraction.

7. When two atoms with identical electronegativities share electrons, the bond is classified as ____.

Answer: B) Non-polar covalent

A non-polar covalent bond occurs when electrons are shared equally, which happens when the electronegativity difference is zero or very low.

8. Which property is typically high in compounds with strong ionic bonds?

Answer: C) Melting point

The strong electrostatic forces in ionic lattices require significant energy to break, leading to high melting and boiling points.

9. The valence electrons are the innermost electrons of an atom and do not participate in bonding.

Answer: B) False

Valence electrons are the outermost electrons and are the primary participants in chemical bonding and reactions.

10. The ____ rule suggests that atoms lose, gain, or share electrons to acquire a full set of eight valence electrons.

Answer: B) Octet

The octet rule is a chemical rule of thumb that reflects the observation that atoms of main-group elements tend to combine such that each atom has eight electrons in its valence shell.