Name: _____ **Date:** _____

Bonding Forces and Molecular Geometry Quiz for Grade 10

Analyze 10 challenging prompts on electronegativity gradients, crystal lattice structures, and molecular polarity to strengthen chemical reasoning skills.

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1. Which of the following substances relies on a 'sea of electrons' to maintain structural integrity while allowing for high thermal conductivity?

A. Titanium (Ti)
B. Quartz (SiO2)
C. Potassium Bromide (KBr)
D. Ammonia (NH3)

2. In a molecule of Hydrogen Chloride (HCl), the shared pair of electrons is pulled closer to Chlorine due to its higher _____.

A. Atomic Radius
B. Electronegativity
C. Ionization Energy
D. Mass Number

3. True or False: Polyatomic ions are groups of covalently bonded atoms that carry an overall net electrical charge.

A. True
B. False

4. What is the primary reason that Ionic compounds like Aluminum Oxide have such high melting points compared to Covalent compounds like Nitrogen Dioxide?

A. The shared electrons occupy lower energy levels.
B. Ionic bonds involve weak intermolecular forces.
C. Strong electrostatic attractions within a crystal lattice.
D. Covalent bonds always have higher bond dissociation energy.

5. A chemical bond formed when one atom provides both electrons for the shared pair is specifically known as a(n) _____ covalent bond.

A. Non-polar
B. Double
C. Coordinate
D. Ionic

6. True or False: The Nitrogen molecule (N2) contains a double covalent bond to satisfy the octet rule for both atoms.

A. True

Name: _____ **Date:** _____

B. False

7. Which molecule exhibits a non-polar geometry despite containing polar covalent bonds?

A. Sulfur Dioxide (SO_2)
B. Carbon Tetrachloride (CCl_4)
C. Phosphorus Trichloride (PCl_3)
D. Water (H_2O)

8. According to VSEPR theory, the _____ of electron pairs around a central atom determines the final 3D shape of a molecule.

A. Repulsion
B. Attraction
C. Neutralization
D. Inversion

9. True or False: Metals are malleable because the metallic bonds are non-directional, allowing atoms to slide past each other without breaking the bond.

A. True
B. False

10. If an atom of Barium (Group 2) reacts with an atom of Sulfur (Group 16), what is the most likely ratio of atoms in the resulting compound?

A. Ba_2S
B. BaS_2
C. BaS
D. Ba_2S_3