Name: _____ Date: _____

Bonding Escape Room: 7th Grade Chemical Chaos Quiz

Challenge assumptions about atomic structures; this mix of synthesis questions requires justifying why specific elements form unique electrostatic or shared connections.

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1. An unknown substance 'X' has a high melting point and conducts electricity only when dissolved in water. Predict the bonding mechanism based on these properties.

A. Electrons are shared equally in a non-polar covalent bond.
B. A sea of delocalized electrons allows for constant movement.
C. Electrostatic attraction between ions freed in a liquid state.
D. Intermolecular forces between discrete neutral molecules.

2. When Nitrogen (N) bonds with another Nitrogen atom to form N_2, they must achieve a full valence shell. To do this, they form a _____ bond.

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

3. True or False: In a metallic bond, the positive nuclei of metal atoms are held together by a shared 'sea' of valence electrons that are not attached to any single atom.

A. True
B. False

4. Aluminum (Group 13) reacts with Oxygen (Group 16). Based on their valence electron count, what is the most likely chemical formula for the resulting compound?

A. AlO
B. AlO_2
C. Al_2O_3
D. Al_3O_2

5. The property of a metal that allows it to be hammered into thin sheets without breaking the metallic bond is called _____.

A. Ductility
B. Electronegativity
C. Volatility
D. Malleability

6. Why does Diamond (pure Carbon) have an incredibly high melting point compared to Sulfur (S_8), even though both involve covalent bonds?

A. Diamond is ionic while Sulfur is covalent.

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B. Diamond forms a continuous giant covalent network of atoms.
C. Sulfur has metallic bonds that are weaker than carbon's.
D. Diamond atoms are held together by magnetic forces.

7. True or False: An atom that loses an electron becomes a negatively charged ion called an anion.

A. True
B. False

8. In a molecule of Hydrogen Chloride (HCl), the chlorine atom pulls the shared electrons more strongly than hydrogen. This creates a _____ covalent bond.

A. Non-polar
B. Ionic
C. Polar
D. Metallic

9. Identify which of the following pairs is most likely to form a covalent bond based on their positions in the Periodic Table.

A. Potassium (K) and Bromine (Br)
B. Magnesium (Mg) and Fluorine (F)
C. Phosphorus (P) and Chlorine (Cl)
D. Iron (Fe) and Copper (Cu)

10. True or False: Noble gases like Neon (Ne) rarely form chemical bonds because they already possess a stable configuration of eight valence electrons.

A. True
B. False