Grade 9 Unit 6 Quiz: Bonding and Structure

Bonding, shape, polarity, and intermolecular forces

Name: _____ Date: _____

Time: 25–30 minutes. **Tools:** calculator not needed. Use models carefully: a bond type, a molecular shape, and an intermolecular force answer different questions.

1. Classify each as primarily ionic, covalent, or metallic bonding: NaCl, CO_2, and Cu metal. [3 pts]

2. Why can a solid ionic compound fail to conduct electricity while its molten form can conduct? [2 pts]

3. Draw or describe a Lewis structure for CO_2. Include the central atom, bond arrangement, and lone pairs on the outer atoms. [2 pts]

4. Use VSEPR language to name the molecular shape of CO_2 and the shape of H_2O. [2 pts]

5. Carbon–oxygen bonds are polar. Why is the whole CO_2 molecule nonpolar in the simple shape model? [2 pts]

6. Which has stronger intermolecular attractions in a typical comparison, water or methane? Name the relevant force and explain briefly. [2 pts]

7. Two liquids have the same mass. Liquid A boils at 35 °C and Liquid B at 100 °C. What cautious inference can be made about intermolecular attractions? What cannot be concluded from boiling point alone? [2 pts]

8. A classmate says, “Breaking a bond releases energy, so a reaction releases energy whenever bonds break.” Correct this statement using bond breaking and bond formation. [2 pts]

9. A material is shiny, malleable, and conducts as a solid. Give a bonding-model explanation and one additional test or datum that would strengthen, but not prove, your classification. [3 pts]