

Name _____ “My Bond jo on my knee”

- _____ 1. The charge on the chlorine in the compound BaCl_2 is best described as
A) slightly - B) slightly + C) 1+ D) 1 -
- _____ 2. The charge on the **hydrogen** in HCl is best described as
A) slightly - B) slightly + C) 2+ D) 2-
- _____ 3. Which bond has the smallest amount of ionic character ? A) $\text{H} \text{---} \text{Cl}$
B) $\text{H} \text{---} \text{O}$ C) $\text{O} \text{---} \text{Cl}$ D) $\text{Br} \text{---} \text{Cl}$
- _____ 4. Which of the following elements has the weakest attraction for shared electrons?
A) Cl B) I C) Br D) O
- _____ 5. Which molecule contains a **nonpolar covalent bond**?
A) O_2 B) HCl C) H_2O D) CO_2
- _____ 6. Which molecule contains triple bonds?
A) NH_3 B) H_2O C) N_2 D) CS_2
- _____ 7. Hydrogen bonding is **not** a factor in determining the boiling point of
A) HF B) H_2O C) NH_3 D) HI
- _____ 8. The bond between the H and the N within a molecule of NH_3 is best described as
A) a hydrogen bond B) an ionic bond C) a nonpolar covalent bond
D) a polar covalent bond
- $\text{H} \text{---} \text{C} \equiv \text{C} \text{---} \text{H}$** Base your answers to questions 9 and 10 on the structure of C_2H_2 illustrated above. The molecule has a linear shape as shown.
- _____ 9. How many electrons are shared between the two carbon atoms?
A) 6 B) 2 C) 3 D) 4
- _____ 10. This substance is best described as A) a polar molecule
B) a nonpolar molecule C) an ionic solid D) a hydrogen bonded molecule
- _____ 11. Which substance is likely to show the weakest London dispersion forces?
A) HCl B) H_2S C) I_2 D) H_2
- _____ 12. Which of these forces or attractions tends to be **much** stronger than the other three?
A) hydrogen bonds B) dipole-dipole attractions C) London forces
D) covalent bonds
- _____ 13. Which of these substances is a solid that conducts electricity in the liquid state but NOT in the solid state? A) I_2 B) KF C) Cu D) $\text{C}_{12}\text{H}_{22}\text{O}_{11}$

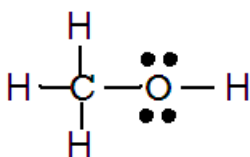
_____14. Which molecule is a dipole ? A) CBr₄ B) O₂ C) HBr D) CO₂

_____15. If you were to draw a correct dot structure of NI₃, what is the total number of "dots" that should appear in your drawing?

_____16. Write the formula of a substance that contains two double bonds.

17. Methanol, CH₃OH, is a liquid at room temperature because of hydrogen bonding.

Draw a diagram that illustrates the hydrogen bonding between CH₃OH molecules.



18. Draw dot structures for the following molecules. In each case indicate whether the molecule is a dipole or a nondipole. (5 pts each)

A) NH₃

B) CH₄

C) HBr

D) H₂S

_____19. The shape of the NH₃ molecule is A) tetrahedral B) linear
 C) triangular D) trigonal pyramidal

_____20. The shape of the CH₄ molecule is A) square planar (flat) B) linear
 C) triangular D) tetrahedral

_____21. Solid table sugar, C₁₂H₂₂O₁₁ is A) an ionic solid B) a network solid
 C) a metallic solid D) a molecular solid.

_____22. Which is a typical property of many molecular solids? A) low melting point
 B) electrical conductivity in the liquid state C) luster D) contain a sea of mobile electrons.

Two teaspoons, one containing NaCl, and the other sucrose (C₁₂H₂₂O₁₁) are heated in the flame from a gas stove. Melting occurs in only one of the teaspoons.

I. Which of the solids melts? Based on bonding forces, why does that solid melt, and NOT the other one?

Extra Credit: Negatively charged polyatomic ions contain extra electrons. For example, the sulfate ion, SO_4^{2-} contains a total of 32 valence electrons - 6 from each oxygen, 6 from the sulfur, and 2 additional that provide the negative charge. With that in mind, draw the dot structure of

A. the chlorate ion, ClO_3^-

B. The carbonate ion, CO_3^{2-}