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### Covalent Bonding Optional Review

1. ☐ The electronegativity difference between the atoms in a molecule of HCl can be used to determine
  1. the entropy of the atoms
  2. the atomic number of the atoms
  3. the first ionization energy of the atoms
  4. the polarity of the bond between the two atoms
2. ☐ Two molecules of HBr collide and then form  $H_2$  and  $Br_2$ . During the collision, the bonds in the HBr molecules are
  1. broken as energy is absorbed
  2. broken as energy is released
  3. formed as energy is absorbed
  4. formed as energy is released
3. ☐ Which formula represents a molecule with the most polar bond?
  1. CO    3. HI
  2. NO    4. HCl
4. ☐ Which atom has the *weakest* attraction for the electrons in a bond with an H atom?
  1. Cl atom    3. O atom
  2. F atom    4. S atom
5. ☐ The bond between which two atoms is most polar?
  1. Br and Cl    3. I and Cl
  2. Br and F    4. I and F
6. ☐ An atom of argon in the ground state tends *not* to bond with an atom of a different element because the argon atom has
  1. more protons than neutrons
  2. more neutrons than protons
  3. a total of two valence electrons
  4. a total of eight valence electrons
7. ☐ A solid substance is an excellent conductor of electricity. The chemical bonds in this substance are most likely
  1. ionic, because the valence electrons are shared between atoms
  2. ionic, because the valence electrons are mobile
  3. metallic, because the valence electrons are stationary
  4. metallic, because the valence electrons are mobile
8. ☐ Given the balanced equation:  $I + I \rightarrow I_2$   
Which statement describes the process represented by this equation?
  1. A bond is formed as energy is absorbed.
  2. A bond is formed and energy is released.
  3. A bond is broken as energy is absorbed.
  4. A bond is broken and energy is released.
9. ☐ Solid samples of the element phosphorus can be white, black, or red in color. The variations in color are due to different
  1. atomic masses    3. ionization energies
  2. molecular structures    4. nuclear charges
10. ☐ The degree of polarity of a chemical bond in a molecule of a compound can be predicted by determining the difference in the
  1. melting points of the elements in the compound
  2. densities of the elements in the compound
  3. electronegativities of the bonded atoms in a molecule of the compound
  4. atomic masses of the bonded atoms in a molecule of the compound

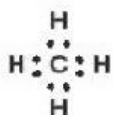
11. ☐ A solid substance was tested in the laboratory. The test results are listed below.

- dissolves in water
- is an electrolyte
- melts at a high temperature

Based on these results, the solid substance could be

1. Cu
2.  $\text{CuBr}_2$
3. C
4.  $\text{C}_6\text{H}_{12}\text{O}_6$

12. ☐ Given the Lewis electron-dot diagram:



Which electrons are represented by all of the dots?

1. the carbon valence electrons, only
2. the hydrogen valence electrons, only
3. the carbon and hydrogen valence electrons
4. all of the carbon and hydrogen electrons

13. ☐ The data table below represents the properties determined by the analysis of substances *A*, *B*, *C*, and *D*.

Substance	Melting Point (°C)	Boiling Point (°C)	Conductivity
<i>A</i>	-80	-20	none
<i>B</i>	20	190	none
<i>C</i>	320	770	as solid
<i>D</i>	800	1250	in solution

Which substance is an ionic compound?

1. *A*
2. *B*
3. *C*
4. *D*

14. ☐ Which of these formulas contains the most polar bond?

1. H-Br
2. H-Cl
3. H-F
4. H-I

15. ☐ If the electronegativity difference between the elements in compound  $\text{NaX}$  is 2.1, what is element  $\text{X}$ ?

- 1. bromine    3. fluorine
- 2. chlorine    4. oxygen

16. ☐ Which statement best describes the substance that results when electrons are transferred from a metal to a nonmetal?

- 1. It contains ionic bonds and has a low melting point.
- 2. It contains ionic bonds and has a high melting point.
- 3. It contains covalent bonds and has a low melting point.
- 4. It contains covalent bonds and has a high melting point.

17. ☐ When combining with nonmetallic atoms, metallic atoms generally will

- 1. lose electrons and form negative ions
- 2. lose electrons and form positive ions
- 3. gain electrons and form negative ions
- 4. gain electrons and form positive ions

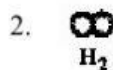
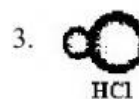
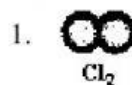
18. ☐ When a metal atom combines with a nonmetal atom, the nonmetal atom will

- 1. lose electrons and decrease in size
- 2. lose electrons and increase in size
- 3. gain electrons and decrease in size
- 4. gain electrons and increase in size

19. ☐ Which combination of atoms can form a polar covalent bond?

- 1. H and H    3. N and N
- 2. H and Br    4. Na and Br

20. ☐ Which diagram best represents a polar molecule?



21. ☐ Which electronegativity is possible for an alkali metal?

- 1. 1.0    3. 3.0
- 2. 2.0    4. 4.0

22. ☐ A substance was found to be a soft, nonconducting solid at room temperature. The substance is most likely

- 1. a molecular solid    3. a metallic solid
- 2. a network solid    4. an ionic solid