

## Self Test: Bonding

Name: \_\_\_\_\_

From the list A-F below, select the bond or attractive force that is most closely associated with each of the following phrases.

- |                   |                      |                        |
|-------------------|----------------------|------------------------|
| A. Ionic Bonds    | B. Hydrogen Bonds    | C. Coordinate Covalent |
| D. Metallic Bonds | E. Dispersion forces | F. Covalent bonds      |

1. \_\_\_\_\_ Hold the iodine atoms together in a molecule of  $I_2$ .
2. \_\_\_\_\_ Hold the many molecules of  $I_2$  together in a crystal of iodine.
3. \_\_\_\_\_ Account for the relatively high boiling and melting points of water.
4. \_\_\_\_\_ Are illustrated by the compounds formed when fluorine reacts with active metals.
5. \_\_\_\_\_ Hold magnesium atoms in a crystal lattice (structure).
6. \_\_\_\_\_ Mobile electrons in the crystal that permit electrical conductivity in the solid state.
7. \_\_\_\_\_ Responsible for the extremely high melting point of diamonds (above  $3500^\circ$ )
8. \_\_\_\_\_ Permit helium and hydrogen to exist in liquid phases under conditions of low temperatures and high pressure.
9. \_\_\_\_\_ Link water molecules to neighboring water molecules.
10. \_\_\_\_\_ Produce substances that are nonconductors in the solid phase but conductors in the liquid phase.
11. \_\_\_\_\_ Are weak enough to permit solid  $CO_2$  to sublime ( $s \rightarrow g$ ) readily upon heating.
12. \_\_\_\_\_ Cause the boiling point of hydrogen fluoride (HF) to be much higher than that of hydrogen chloride (HCl), hydrogen bromide (HBr), or hydrogen iodide (HI).
13. \_\_\_\_\_ Link the atoms within a molecule of a diatomic gaseous element. (ex.  $O_2$ )
14. \_\_\_\_\_ Bond noble gas atoms in the liquid phase.
15. \_\_\_\_\_ Responsible for the formation of ice crystals.

From the list A-D below, select the compound that best answers each question.

- A) CsCl                      B) CO<sub>2</sub>                      C) CCl<sub>4</sub>                      D) H<sub>2</sub>O

16. \_\_\_\_\_ Which compound is a tetrahedral molecule  
17. \_\_\_\_\_ Which compound would show a bent molecular structure?  
18. \_\_\_\_\_ Which compound has the highest degree of ionic bonding?  
19. \_\_\_\_\_ Which compound has double bonds within its molecular structure?
- 

From the list A-D below, select the type of bond that is found between the atoms described in each phrase.

- A) Ionic bond    C) Metallic bond  
B) Nonpolar covalent bond    D) Polar covalent bond

20. \_\_\_\_\_ the hydrogen and chlorine atoms in HCl  
21. \_\_\_\_\_ the magnesium and chlorine particles in MgCl<sub>2</sub>  
22. \_\_\_\_\_ the nitrogen and hydrogen atoms in NH<sub>3</sub>  
23. \_\_\_\_\_ the nitrogen atoms in N<sub>2</sub>  
24. \_\_\_\_\_ the atoms in Cu wire
- 

From the list A-G below, select the formula most closely associated with each phrase.

- A) HCl    B) SiO<sub>2</sub>    C) CH<sub>4</sub>    D) N<sub>2</sub>    E) Cu    F) Xe    G) KBr

25. \_\_\_\_\_ Conducts electric current in the molten state but not in the solid state.  
26. \_\_\_\_\_ Its molecules contain only one atom.  
27. \_\_\_\_\_ Mobile electrons permit electrical conductivity in the solid phase.  
28. \_\_\_\_\_ A nonpolar covalent compound.  
29. \_\_\_\_\_ An example of a network solid.  
30. \_\_\_\_\_ A dipole.

**Multiple Choice:**

31. Which of the following compounds has the highest degree of ionic bonding?  
A) CCl<sub>4</sub>                      B) HF                      C) H<sub>2</sub>O                      D) CO<sub>2</sub>
32. A compound that is composed of polar molecules is  
A) CCl<sub>4</sub>                      B) MgCl<sub>2</sub>                      C) H<sub>2</sub>O                      D) CO<sub>2</sub>

## Self Test: Bonding

Name: Tjersland

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D. Metallic Bonds

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- F Hold the iodine atoms together in a molecule of  $I_2$ .
- E Hold the many molecules of  $I_2$  together in a crystal of iodine.  
*← np molecule*
- B Account for the relatively high boiling and melting points of water.
- A Are illustrated by the compounds formed when fluorine reacts with active metals. *(GROUP 1+2)*
- D Hold magnesium atoms in a crystal lattice (structure).
- D Mobile electrons in the crystal that permit electrical conductivity in the solid state.
- F Responsible for the extremely high melting point of diamonds (above  $3500^\circ$ )  
*(network solid)*
- E Permit helium and hydrogen to exist in liquid phases under conditions of low temperatures and high pressure.
- B Link water molecules to neighboring water molecules.
- A Produce substances that are nonconductors in the solid phase but conductors in the liquid phase.
- E Are weak enough to permit solid  $CO_2$  to sublime ( $s \rightarrow g$ ) readily upon heating.  
*— np*
- B Cause the boiling point of hydrogen fluoride (HF) to be much higher than that of hydrogen chloride (HCl), hydrogen bromide (HBr), or hydrogen iodide (HI).
- F Link the atoms within a molecule of a diatomic gaseous element. (ex.  $O_2$ )
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*← np*
- B Responsible for the formation of ice crystals.

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16. C                      Which compound is a tetrahedral molecule  
17. D                      Which compound would show a bent molecular structure?  
18. A                      Which compound has the highest degree of ionic bonding?  
19. B                      Which compound has double bonds within its molecular structure?

From the list A-D below, select the type of bond that is found between the atoms described in each phrase.

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B) Nonpolar covalent bond    D) Polar covalent bond

20. D                      the hydrogen and chlorine atoms in HCl  
21. A                      the magnesium and chlorine particles in MgCl<sub>2</sub>  
22. D                      the nitrogen and hydrogen atoms in NH<sub>3</sub>  
23. B                      the nitrogen atoms in N<sub>2</sub>  
24. C                      the atoms in Cu wire

From the list A-G below, select the formula most closely associated with each phrase.

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25. G                      Conducts electric current in the <sup>(liquid)</sup> molten state but not in the solid state. (Ionic)  
26. F                      Its molecules contain only one atom.  
27. E                      Mobile electrons permit electrical conductivity in the solid phase.  
28. C                      A nonpolar covalent compound.  
29. B                      An example of a network solid.  
30. A                      A dipole.

Multiple Choice:

- B 31. Which of the following compounds has the highest degree of ionic bonding?  
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- C 32. A compound that is composed of polar molecules is  
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