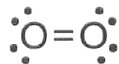


- 1) What occurs when an atom of chlorine and an atom of hydrogen become a molecule of hydrogen chloride?
 A) A chemical bond is broken and energy is released.
 B) A chemical bond is broken and energy is absorbed.
 C) A chemical bond is formed and energy is released.
 D) A chemical bond is formed and energy is absorbed.
- 2) When a chemical bond is broken, energy is
 A) absorbed, only B) released, only
 C) both absorbed and released D) neither absorbed nor released
- 3) When a sodium atom reacts with a chlorine atom to form a compound, the electron configurations of the ions forming the compound are the same as those in which noble gas atoms?
 A) krypton and neon B) krypton and argon
 C) neon and helium D) neon and argon
- 4) Which bond is *least* polar?
 A) As-Cl B) Bi-Cl C) P-Cl D) N-Cl
- 5) Which type of bonding is usually exhibited when the electronegativity difference between two atoms is 1.1?
 A) ionic B) covalent C) metallic D) network
- 6) Which compound has the greatest degree of ionic character?
 A) NaF B) MgF₂ C) AlF₃ D) SiF₄
- 7) In which compound does the bond between the atoms have the *least* ionic character?
 A) HF B) HCl C) HBr D) HI
- 8) Which type of substance can conduct electricity in the liquid phase but *not* in the solid phase?
 A) ionic compound B) molecular compound
 C) metallic element D) nonmetallic element
- 9) A characteristic of ionic solids is that they
 A) have high melting points B) have low boiling points
 C) conduct electricity D) are non-crystalline
- 10) Given a formula for oxygen:



What is the total number of electrons shared between the atoms represented in this formula?

- A) 1 B) 2 C) 8 D) 4
- 11) Which two substances are covalent compounds?
 A) C₆ H₁₂ O₆ (s) and KI(s) B) C₆ H₁₂ O₆ (s) and HCl(g)
 C) KI(s) and NaCl(s) D) NaCl(s) and HCl(g)
- 12) Which type of bonding is found in all molecular substances?
 A) covalent bonding B) hydrogen bonding
 C) ionic bonding D) metallic bonding
- 13) Covalent bonds are formed when electrons are
 A) transferred from one atom to another
 B) captured by the nucleus
 C) mobile within a metal
 D) shared between two atoms
- 14) The bond between Br atoms in a Br₂ molecule is
 A) ionic and is formed by the sharing of two valence electrons
 B) ionic and is formed by the transfer of two valence electrons
 C) covalent and is formed by the sharing of two valence electrons
 D) covalent and is formed by the transfer of two valence electrons
- 15) Which formula represents a molecular compound?
 A) Kr B) LiOH C) N₂ O₄ D) NaI
- 16) Which characteristic is a property of molecular substances?
 A) good heat conductivity B) good electrical conductivity
 C) low melting point D) high melting point

- 17) What is the maximum number of covalent bonds that a carbon atom can form?
 A) 1 B) 2 C) 3 D) 4
- 18) Which element consists of positive ions immersed in a "sea" of mobile electrons?
 A) sulfur B) nitrogen C) calcium D) chlorine
- 19) A solid substance is an excellent conductor of electricity. The chemical bonds in this substance are most likely
 A) ionic, because the valence electrons are shared between atoms
 B) ionic, because the valence electrons are mobile
 C) metallic, because the valence electrons are stationary
 D) metallic, because the valence electrons are mobile
- 20) Which molecule contains a nonpolar covalent bond?
 A) $\text{O}=\text{C}=\text{O}$ B) $\text{C}\equiv\text{O}$
 C) $\text{Br}-\text{Br}$ D) $\begin{array}{c} \text{Cl} \\ | \\ \text{Cl}-\text{C}-\text{Cl} \\ | \\ \text{Cl} \end{array}$
- 21) The bonds between hydrogen and oxygen in a water molecule are classified as
 A) polar covalent B) nonpolar covalent
 C) ionic D) metallic
- 22) Which electron-dot diagram represents a molecule that has a polar covalent bond?
 A) $\text{H} \times \text{Cl} \cdot \cdot$ B) $\text{Li}^+ [\times \text{Cl} \cdot \cdot]^-$
 C) $\begin{array}{c} \times \times \\ \times \text{Cl} \times \text{Cl} \times \\ \times \times \end{array}$ D) $\text{K}^+ [\times \text{Cl} \cdot \cdot]^-$
- 23) Which molecule contains a polar covalent bond?
 A) $\begin{array}{c} \times \times \\ \times \text{I} \times \text{I} \\ \times \times \end{array}$ B) $\text{H} \times \text{H}$
 C) $\begin{array}{c} \cdot \cdot \\ \text{H} \times \text{N} \times \text{H} \\ \cdot \cdot \\ \times \\ \text{H} \end{array}$ D) $:\text{N} \times \times \text{N} \times$
- 24) Which molecule is nonpolar?
 A) H₂O B) NH₃ C) CO D) CO₂
- 25) Which structural formula represents a polar molecule?
 A) $\begin{array}{c} \text{S} \\ / \quad \backslash \\ \text{H} \quad \text{H} \end{array}$ B) $\text{O}=\text{C}=\text{O}$
 C) $\begin{array}{c} \text{H} \\ | \\ \text{H}-\text{C}-\text{H} \\ | \\ \text{H} \end{array}$ D) $\text{N}\equiv\text{N}$
- 26) The shape and bonding in a diatomic bromine molecule are best described as
 A) symmetrical and polar B) symmetrical and nonpolar
 C) asymmetrical and polar D) asymmetrical and nonpolar
- 27) Which formula represents a tetrahedral molecule?
 A) CH₄ B) CaCl₂ C) HBr D) Br₂