

Assessment

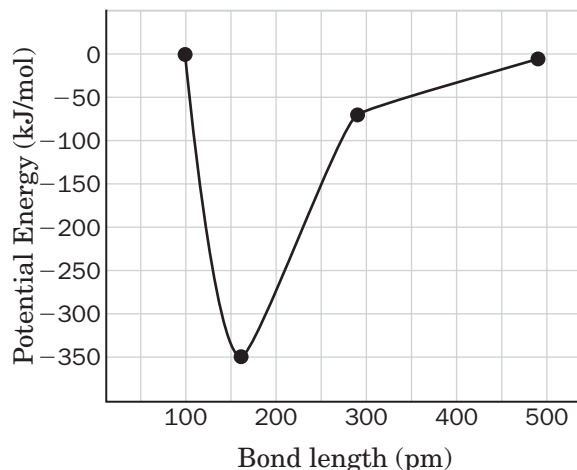
Chapter Test A**Chapter: Chemical Bonding**

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

- _____ 1. The charge on an ion is
- always positive.
 - always negative.
 - either positive or negative.
 - zero.
- _____ 2. According to the octet rule, a calcium atom has a tendency to
- lose one electron.
 - lose two electrons.
 - gain one electron.
 - gain two electrons.
- _____ 3. If a compound forms by ionic bonding, which is *not* true?
- A positively charged atom or group of atoms attracts a negatively charged atom or group of atoms.
 - The net charge of the compound is zero.
 - The compound contains just two atoms, each of opposite charge.
 - Several ions group together in a tightly packed structure.
- _____ 4. The only property listed that is *not* characteristic of ionic compounds is
- high melting point.
 - hardness.
 - lack of crystal structure.
 - brittleness.
- _____ 5. Which formula listed below represents a polyatomic ion?
- HCO_3^-
 - H_2SO_4
 - Cl^-
 - Na^+
- _____ 6. The crystal structure of an ionic compound depends on the
- sizes of the cations and anions.
 - ratio of cations to anions.
 - masses of the cation and anion.
 - Both (a) and (b)

Chapter Test A, *continued*

- _____ 7. The melting points of ionic compounds are higher than the melting points of molecular compounds because
- ionic substances tend to vaporize at room temperature.
 - ionic substances are brittle.
 - attractive forces between ions are greater than the attractive forces between molecules.
 - the numbers of positive and negative charges are equal in an ionic compound.
- _____ 8. A covalent bond is formed when two atoms
- share an electron with each other.
 - share one or more pairs of electrons with each other.
 - gain electrons.
 - gain and lose electrons.

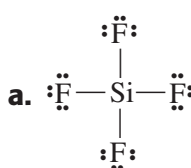
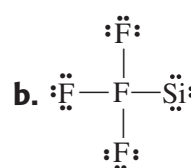
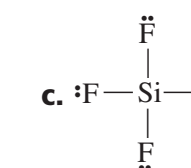
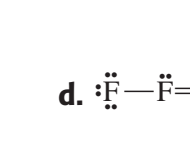
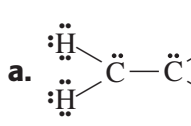
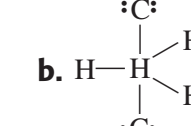
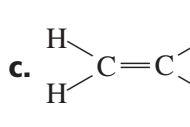
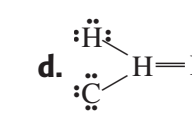


- _____ 9. The molecule described by the figure above has an average bond length of
- 70 kJ/mol.
 - 347 kJ/mol.
 - 154 pm.
 - 290 pm.
- _____ 10. The bond energy for the molecule described by the figure above is
- 70 kJ/mol.
 - 347 kJ/mol.
 - 154 pm.
 - 290 pm.

Chapter Test A, *continued*

- _____ **11.** Two atoms will likely form a polar covalent bond if the electronegativity difference is
- 0.1.
 - 1.0.
 - 2.5.
 - 4.0.
- _____ **12.** In which of these compounds is the bond between the atoms *not* a nonpolar covalent bond?
- Cl₂
 - H₂
 - HCl
 - O₂
- _____ **13.** Bonding in molecules or ions that cannot be represented adequately by a single Lewis structure is represented by
- resonance structures.
 - covalent bonding.
 - overlapping orbitals.
 - double bonding.
- _____ **14.** As the electronegativity difference between bonded atoms decreases, the bond becomes more
- covalent.
 - ionic.
 - metallic.
 - Both (b) and (c)
- _____ **15.** The boiling point of water, H₂O, is higher than the boiling point of hydrogen sulfide, H₂S, because water molecules are
- less polar and form hydrogen bonds.
 - more covalent and form hydrogen bonds.
 - ionic and form hydrogen bonds.
 - more polar and form hydrogen bonds.
- _____ **16.** Even though the following molecules contain polar bonds, the only polar molecule is
- CCl₄.
 - CO₂.
 - NH₃.
 - CH₄.

Chapter Test A, *continued*

- _____ 17. As atoms bond with each other, they
- increase their potential energy, thus creating less stable arrangements of matter.
 - decrease their potential energy, thus creating less stable arrangements of matter.
 - increase their potential energy, thus creating more stable arrangements of matter.
 - decrease their potential energy, thus creating more stable arrangements of matter.
- _____ 18. In which of the following compounds has the central atom *not* formed sp^3 hybrid orbitals?
- CCl_4
 - CO_2
 - PCl_3
 - NH_3
- _____ 19. When a carbon atom's $2s$ and $2p$ orbitals hybridize, which orbitals do they form?
- four sp^3
 - two sp^3
 - four sp
 - two sp
- _____ 20. Which is the correct Lewis structure for SiF_4 ?
- a.  b.  c.  d. 
- _____ 21. Which is the correct Lewis structure for C_2H_4 ?
- a.  b. 
- c.  d. 

Chapter Test A, *continued*

- _____ **22.** Which type of hybrid orbitals do oxygen atoms form in water molecules?
- a.** sp^4
 - b.** sp^3
 - c.** sp^2
 - d.** sp
- _____ **23.** Which type of bonding is characterized by overlapping orbitals that allow outer electrons of atoms to move about freely throughout the entire lattice?
- a.** ionic
 - b.** covalent
 - c.** metallic
 - d.** multiple
- _____ **24.** According to VSEPR theory, what is the shape of a molecule of CS_2 ?
- a.** linear
 - b.** bent
 - c.** trigonal-planar
 - d.** tetrahedral
- _____ **25.** According to VSEPR theory, what is the shape of a molecule of NBr_3 ?
- a.** bent
 - b.** trigonal-planar
 - c.** tetrahedral
 - d.** trigonal-pyramidal