

- Which compound contains only covalent bonds?
  - NaOH
  - $\text{Ca}(\text{OH})_2$
  - $\text{Ba}(\text{OH})_2$
  - $\text{CH}_3\text{OH}$
- Which element forms an ionic compound when it reacts with lithium?
  - K
  - Kr
  - Br
  - Fe
- As a bond between a hydrogen atom and a sulfur atom is formed, electrons are
  - shared to form an ionic bond
  - shared to form a covalent bond
  - transferred to form an ionic bond
  - transferred to form a covalent bond
- The bonds in BaO are best described as
  - ionic, because valence electrons are transferred
  - ionic, because valence electrons are shared
  - covalent, because valence electrons are transferred
  - covalent, because valence electrons are shared
- When sodium and fluorine combine to produce the compound NaF, the ions formed have the same electron configuration as atoms of
  - both argon and neon
  - neither argon nor neon
  - neon, only
  - argon, only
- Element *X* reacts with chlorine to form an ionic compound that has the formula  $X\text{Cl}_2$ . To which group on the Periodic Table could element *X* belong?
  - Group 1
  - Group 2
  - Group 13
  - Group 15
- Which formulas represent one ionic compound and one molecular compound?
  - $\text{Cl}_2$  and  $\text{H}_2\text{S}$
  - $\text{N}_2$  and  $\text{SO}_2$
  - $\text{BaCl}_2$  and  $\text{N}_2\text{O}_4$
  - $\text{NaOH}$  and  $\text{BaSO}_4$
- A molecular compound is formed when a chemical reaction occurs between atoms of
  - chlorine and sodium
  - chlorine and yttrium
  - oxygen and hydrogen
  - oxygen and magnesium
- Which type of bond results when one or more valence electrons are transferred from one atom to another?
  - a polar covalent bond
  - an ionic bond
  - a nonpolar covalent bond
  - a hydrogen bond
- Which element is composed of molecules that each contain a multiple covalent bond?
  - nitrogen
  - hydrogen
  - chlorine
  - fluorine
- Given the Lewis electron-dot diagram:

$$\begin{array}{c} \text{H} \\ \vdots \\ \text{H} : \text{C} : \text{H} \\ \vdots \\ \text{H} \end{array}$$

Which electrons are represented by all of the dots?
  - all of the carbon and hydrogen electrons
  - the carbon and hydrogen valence electrons
  - the hydrogen valence electrons, only
  - the carbon valence electrons, only
- Which pair of atoms will share electrons when a bond is formed between them?
  - Li and I
  - Br and Cl
  - Ba and I
  - K and Cl
- Which electron-dot diagram represents  $\text{H}_2$ ?
  - $\text{H} : \text{H}$
  - $\text{H} \cdot \text{H}$
  - $\begin{array}{cc} \cdot & \cdot \\ \cdot & \cdot \\ \text{H} & \cdot \text{H} \\ \cdot & \cdot \\ \cdot & \cdot \end{array}$
  - $\begin{array}{cc} \cdot & \cdot \\ \cdot & \cdot \\ \text{H} & : \text{H} \\ \cdot & \cdot \\ \cdot & \cdot \end{array}$

14. Compared to a calcium atom, the calcium ion  $\text{Ca}^{2+}$  has
- more protons
  - fewer protons
  - fewer electrons
  - more electrons

15. What is the total number of electrons shared in a double covalent bond?

- 1
- 2
- 3
- 4

16. Which Lewis electron-dot diagram correctly represents a hydroxide ion?

- $\left[ \begin{array}{c} \cdot\cdot \\ :\ddot{\text{O}}:\text{H} \\ \cdot\cdot \end{array} \right]^{-}$
- $\left[ \begin{array}{c} \cdot\cdot \\ :\text{O}:\ddot{\text{H}}: \\ \cdot\cdot \end{array} \right]^{-}$
- $\left[ \begin{array}{c} \cdot\cdot \\ :\text{O}:\text{H}: \\ \cdot\cdot \end{array} \right]^{-}$
- $\left[ \begin{array}{c} \cdot\cdot \\ :\ddot{\text{O}}::\text{H} \\ \cdot\cdot \end{array} \right]^{-}$

17. Covalent bonds are formed when electrons are

- captured by the nucleus
- mobile within a metal
- transferred from one atom to another
- shared between two atoms

Base your answers to questions **18** and **19** on the information below.

Ozone,  $\text{O}_3(\text{g})$ , is produced from oxygen,  $\text{O}_2(\text{g})$  by electrical discharge during thunderstorms. The unbalanced equation below represents the reaction that forms ozone.



18. Identify the type of bonding between the atoms in an oxygen molecule.

19. Explain, in terms of electron configuration, why an oxygen molecule is more stable than an oxygen atom.

20. Draw a Lewis Structure of  $\text{ClO}_4^-$  in the space provided.

21. Draw the Lewis Structure of  $\text{CaCO}_3$  in the space provided.

22. Explain, in terms of valence electrons, why the bonding in magnesium oxide,  $\text{MgO}$ , is similar to the bonding in barium chloride,  $\text{BaCl}_2$ .

23. Draw two isomers of  $\text{C}_4\text{H}_9\text{NO}$ .