

1. Given the balanced equation representing a reaction:



What occurs during this change?

- A) **Energy is absorbed and a bond is broken.**
 B) Energy is absorbed and a bond is formed.
 C) Energy is released and a bond is broken.
 D) Energy is released and a bond is formed.
2. A chemical bond results when two nuclei have a simultaneous attraction for
- A) nucleons B) protons
 C) neutrons D) **electrons**
3. 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?
- A) the carbon valence electrons, only
 B) the hydrogen valence electrons, only
 C) **the carbon and hydrogen valence electrons**
 D) all of the carbon and hydrogen electrons
4. An element with an electronegativity of 0.9 bonds with an element with an electronegativity of 3.1. Which phrase best describes the bond between these elements?
- A) mostly ionic in character and formed between two nonmetals
 B) **mostly ionic in character and formed between a metal and a nonmetal**
 C) mostly covalent in character and formed between two nonmetal
 D) mostly covalent in character and formed between a metal and a nonmetal
5. In which compound do the atoms have the greatest difference in electronegativity?
- A) NaBr B) AlCl₃ C) **KF** D) LiI
6. Which element is most likely to form a compound with krypton?
- A) **fluorine** B) chlorine
 C) bromine D) iodine
7. Which substance contains bonds that involved the transfer of electrons from one atom to another?
- A) CO₂ B) NH₃ C) **KBr** D) Cl₂

8. Which type of bond is found in sodium bromide?

A) covalent B) hydrogen
 C) **ionic** D) metallic

9. Which formula correctly represents the compound calcium hydroxide?

A) CaOH B) Ca₂OH
 C) CaOH₂ D) **Ca(OH)₂**

10. As sodium reacts with fluorine to form the compound NaF, each sodium atom will

A) gain 1 electron B) gain 2 electrons
 C) **lose 1 electron** D) lose 2 electrons

11. Which substance is an electrolyte?

A) CH₃OH B) C₆H₁₂O₆
 C) H₂O D) **KOH**

Do Now Unit 5 Chemical Bonding

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

Substance	Melting Point ($^{\circ}\text{C}$)	Boiling Point ($^{\circ}\text{C}$)	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?

- A) *A* B) *B* C) *C* D) *D*

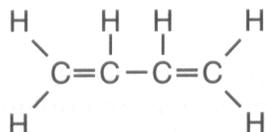
13. A characteristic of ionic solids is that they

- A) **have high melting points**
 B) have low boiling points
 C) conduct electricity
 D) are non-crystalline

14. Which substance contains metallic bonds?

- A) **Hg(*l*)** B) H₂O(*l*)
 C) NaCl(*s*) D) C₆H₁₂O₆(*s*)

15. Given the formula of a substance:



What is the total number of shared electrons in a molecule of this substance?

- A) **22** B) 11 C) 9 D) 6

16. Which two substances are covalent compounds?

- A) C₆H₁₂O₆(*s*) and KI(*s*)
B) C₆H₁₂O₆(*s*) and HCl(*g*)
 C) KI(*s*) and NaCl(*s*)
 D) NaCl(*s*) and HCl(*g*)

17. The bonds in the compound MgSO₄ can be described as

- A) ionic, only
 B) covalent, only
C) both ionic and covalent
 D) neither ionic nor covalent

18. Which element has atoms that can form single, double, and triple covalent bonds with other atoms of the same element?

- A) hydrogen B) oxygen
 C) fluorine D) **carbon**

19. A substance was found to be a soft, non-conducting solid at room temperature. The substance is most likely

- A) **a molecular solid** B) a network solid
 C) a metallic solid D) an ionic solid

20. Which characteristic is a property of molecular substances?

- A) good heat conductivity
 B) good electrical conductivity
C) low melting point
 D) high melting point

21. Which type of bonding involves positive ions immersed in a sea of mobile electrons?

- A) ionic B) nonpolar covalent
 C) polar covalent D) **metallic**

22. Which formula represents a nonpolar molecule containing polar covalent bonds?

- A) H₂O B) **CCl₄** C) NH₃ D) H₂

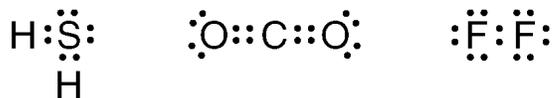
23. The degree of polarity of a chemical bond in a molecule of a compound can be predicted by determining the difference in the

- A) melting points of the elements in the compound
 B) densities of the elements in the compound
C) electronegativities of the bonded atoms in a molecule of the compound
 D) atomic masses of the bonded atoms in a molecule of the compound

Do Now Unit 5 Chemical Bonding

24. At STP, fluorine is a gas and iodine is a solid. This observation can be explained by the fact that fluorine has
- A) **weaker intermolecular forces of attraction than iodine**
 B) stronger intermolecular forces of attraction than iodine
 C) lower average kinetic energy than iodine
 D) higher average kinetic energy than iodine
25. Which statement best explains why a CH₄ molecule is nonpolar?
- A) C and H are nonmetals.
 B) C and H have the same electronegativity.
 C) **CH₄ has a symmetrical charge distribution.**
 D) CH₄ is a gas at room temperature.
26. Which two compounds contain only polar bonds?
- A) CCl₄ and CH₄ B) HCl and Cl₂
 C) **HCl and NH₃** D) CO and O₂

Base your answers to questions **27** and **28** on your knowledge of chemical bonding and on the Lewis electron-dot diagrams of H₂S, CO₂, and F₂ below.



27. Which atom, when bonded as shown, has the same electron configuration as an atom of argon?
28. Explain, in terms of structure and/or distribution of charge, why CO₂ is a nonpolar molecule.

29. Base your answer to the following question on the table below.

Physical Properties of Four Gases

Name of Gas	hydrogen	hydrogen chloride	hydrogen bromide	hydrogen iodide
Molecular Structure	H-H	H-Cl	H-Br	H-I
Boiling Point (K) at 1 Atm	20.	188	207	237
Density (g/L) at STP	0.0899	1.64	?	5.66

Explain, in terms of intermolecular forces, why hydrogen has a *lower* boiling point than hydrogen bromide.

30. Base your answer to the following question on the information below.

Each molecule listed below is formed by sharing electrons between atoms when the atoms within the molecule are bonded together.

Molecule *A*: Cl₂ Molecule *B*: CCl₄ Molecule *C*: NH₃

Explain how the bonding in KCl is different from the bonding in molecules *A*, *B*, and *C*.

Answer Key

Do Now Unit 5 Chemical Bonding 2015-2016

1. A
 2. D
 3. C
 4. B
 5. C
 6. A
 7. C
 8. C
 9. D
 10. C
 11. D
 12. D
 13. A
 14. A
 15. A
 16. B
 17. C
 18. D
 19. A
 20. C
 21. D
 22. B
 23. C
 24. A
 25. C
 26. C
 27. Sulfur
 28. Responses include, but are not limited to:
 - CO₂ is symmetrical
 - CO₂ has an even distribution of charge
 - CO₂ is linear with O at each end.
 29. Examples: –
 - Hydrogen has weaker intermolecular forces than HBr.
 - hydrogen
 - weaker forces.
 30. Examples:
 - KCl — ionic bond;
 - A, B, C — no ionic bonds
 - Atoms do not share electrons when bonding.
 - There is a transfer of electrons from K to Cl.
 - KCl forms by electrostatic attraction.
 - Bonding involves a metal with a nonmetal.
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