

Name:

More Bonding Review

1. Given the balanced equation representing a reaction:
- $$\text{H}_2 + \text{energy} \rightarrow \text{H} + \text{H}$$
- What occurs as bonds are broken in one mole of H_2 molecules during this reaction?
- 1) Energy is absorbed and one mole of unbonded hydrogen atoms is produced.
 - 2) Energy is absorbed and two moles of unbonded hydrogen atoms are produced.**
 - 3) Energy is released and one mole of unbonded hydrogen atoms is produced.
 - 4) Energy is released and two moles of unbonded hydrogen atoms are produced.
2. Given the balanced equation representing a reaction:
- $$2\text{H}_2\text{O} + \text{energy} \rightarrow 2\text{H}_2 + \text{O}_2$$
- Which statement describes the changes in energy and bonding for the reactant?
- 1) Energy is absorbed as bonds in H_2O are formed.
 - 2) Energy is absorbed as bonds in H_2O are broken.**
 - 3) Energy is released as bonds in H_2O are formed.
 - 4) Energy is released as bonds in H_2O are broken.
3. Which diatomic molecule is formed when the two atoms share six electrons?
- 1) H_2
 - 2) N_2**
 - 3) O_2
 - 4) F_2
4. Which symbol represents an atom in the ground state with the most stable valence electron configuration?
- 1) B
 - 2) O
 - 3) Li
 - 4) Ne**
5. Which element has an atom with the greatest tendency to attract electrons in a chemical bond?
- 1) carbon
 - 2) chlorine**
 - 3) silicon
 - 4) sulfur
6. Which term indicates how strongly an atom attracts the electrons in a chemical bond?
- 1) alkalinity
 - 2) atomic mass
 - 3) electronegativity**
 - 4) activation energy
7. What occurs when potassium reacts with chlorine to form potassium chloride?
- 1) Electrons are shared and the bonding is ionic.
 - 2) Electrons are shared and the bonding is covalent.
 - 3) Electrons are transferred and the bonding is ionic.**
 - 4) Electrons are transferred and the bonding is covalent.
8. Which element reacts with oxygen to form ionic bonds?
- 1) calcium**
 - 2) hydrogen
 - 3) chlorine
 - 4) nitrogen
9. Gold can be flattened into an extremely thin sheet. The malleability of gold is due to the
- 1) radioactive decay mode of the isotope Au-198
 - 2) proton-to-neutron ratio in an atom of gold
 - 3) nature of the bonds between gold atoms**
 - 4) reactivity of gold atom
10. Which sample of matter has a crystal structure?
- 1) $\text{Hg}(l)$
 - 2) $\text{H}_2\text{O}(l)$
 - 3) $\text{NaCl}(s)$**
 - 4) $\text{CH}_4(g)$
11. A sample of a substance has these characteristics:
- melting point of 984 K
 - hard, brittle solid at room temperature
 - poor conductor of heat and electricity as a solid
 - good conductor of electricity as a liquid on in an aqueous solution
- This sample is classified as
- 1) a metallic element
 - 2) a radioactive element
 - 3) a molecular compound
 - 4) an ionic compound**
12. Which statement describes a multiple covalent bond?
- 1) Two electrons are shared.
 - 2) Four electrons are shared.**
 - 3) Two electrons are transferred.
 - 4) Four electrons are transferred.
13. What is formed when two atoms of bromine bond together?
- 1) a monatomic molecule
 - 2) a diatomic molecule**
 - 3) a heterogeneous mixture
 - 4) a homogeneous mixture

14. A molecular compound is formed when a chemical reaction occurs between atoms of

- 1) chlorine and sodium
- 2) chlorine and yttrium
- 3) oxygen and hydrogen**
- 4) oxygen and magnesium

15. Which formula represents a molecular compound?

- 1) Kr
- 2) LiOH
- 3) N₂O₄**
- 4) NaI

16. Which type of bonding is present in a sample of an element that is malleable?

- 1) ionic
- 2) metallic**
- 3) nonpolar covalent
- 4) polar covalent

17. Which type of bond is found between atoms of solid cobalt?

- 1) nonpolar covalent
- 2) polar covalent
- 3) metallic**
- 4) ionic

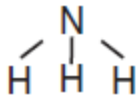
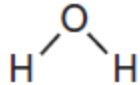
18. A solid substance is an excellent conductor of electricity. The chemical bonds in this substance are most likely

- 1) ionic, because the valence electrons are shared between atoms
- 2) ionic, because the valence electrons are mobile
- 3) metallic, because the valence electrons are stationary
- 4) metallic, because the valence electrons are mobile**

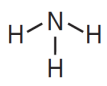
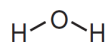
19. Which pair of atoms has the most polar bond?

- 1) H – Br
- 2) H – Cl**
- 3) I – Br
- 4) I – Cl

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

- 1) H–H
- 2) O=C=O**
- 3) 
- 4) 

21. Which molecule has a nonpolar covalent bond?

- 1) H–H**
- 2) 
- 3) 
- 4) H–Cl

22. Which compound has hydrogen bonding between its molecules?

- 1) CH₄
- 2) CaH₂
- 3) KH
- 4) NH₃**

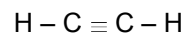
23. Which formula represents a polar molecule?

- 1) O₂
- 2) CO₂
- 3) NH₃**
- 4) CH₄

24. Which statement explains why a CO₂ molecule is nonpolar?

- 1) Carbon and oxygen are both nonmetals.
- 2) Carbon and oxygen have different electronegativities.
- 3) The molecule has a symmetrical distribution of charge.**
- 4) The molecule has an asymmetrical distribution of charge.

25. Given the formula representing a molecule:

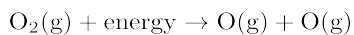


The molecule is

- 1) symmetrical and polar
- 2) symmetrical and nonpolar**
- 3) asymmetrical and polar
- 4) asymmetrical and nonpolar

Base your answers to questions **26** through **28** on the information below and on your knowledge of chemistry.

The balanced equation below represents a reaction.



26. Explain, in terms of bonds, why energy is absorbed during this reaction.

27. Draw a Lewis electron-dot diagram of one oxygen atom.

28. Identify the type of chemical bond in a molecule of the reactant.

29. Explain, in terms of electronegativity difference, why the bond in a molecule of HF is more polar than the bond in a molecule of HI.

30. Explain, in terms of valence electrons, why the bonding in magnesium oxide, MgO, is similar to the bonding in barium chloride, BaCl₂.

Answer Key More Bonding Review

1. 2
2. 2
3. 2
4. 4
5. 2
6. 3
7. 3
8. 1
9. 3
10. 3
11. 4
12. 2
13. 2
14. 3
15. 3
16. 2
17. 3
18. 4
19. 2
20. 2
21. 1
22. 4
23. 3
24. 3
25. 2

26. –Energy is needed to break the bonds in O₂

27.



28. –covalent –double
covalent –nonpolar
–double

29. Acceptable responses include, but are not limited to: • The electronegativity difference between H and F is greater than the electronegativity difference between H and I. • The difference for HF is 1.9, and the difference for HI is 0.6.

30. –The bonding in each compound involves a transfer of valence electrons from the metal to the nonmetal. –Both metals lose all of their valence electrons.