

Honors Chemistry CH 8 Review and Preview**Matching**

Match each item with the correct statement below.

- | | |
|-----------------------------|-------------------------|
| a. coordinate covalent bond | d. single covalent bond |
| b. double covalent bond | e. polar bond |
| c. structural formula | f. hydrogen bond |

- _____ 1. a depiction of the arrangement of atoms in molecules and polyatomic ions
- _____ 2. a covalent bond in which only one pair of electrons is shared
- _____ 3. a covalent bond in which two pairs of electrons are shared
- _____ 4. a covalent bond in which the shared electron pair comes from only one of the atoms
- _____ 5. a covalent bond between two atoms of significantly different electronegativities
- _____ 6. a type of bond that is very important in determining the properties of water and of important biological molecules such as proteins and DNA

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 7. Which is a typical characteristic of an ionic compound?
 - a. Electron pairs are shared among atoms.
 - b. The ionic compound has a low solubility in water.
 - c. The ionic compound is described as a molecule.
 - d. The ionic compound has a high melting point.
- _____ 8. What is shown by the structural formula of a molecule or polyatomic ion?
 - a. the arrangement of bonded atoms
 - b. the number of ionic bonds
 - c. the number of metallic bonds
 - d. the shapes of molecular orbitals
- _____ 9. Which of these elements does not exist as a diatomic molecule?
 - a. Ne
 - b. F
 - c. H
 - d. I
- _____ 10. How do atoms achieve noble-gas electron configurations in single covalent bonds?
 - a. One atom completely loses two electrons to the other atom in the bond.
 - b. Two atoms share two pairs of electrons.
 - c. Two atoms share two electrons.
 - d. Two atoms share one electron.
- _____ 11. Why do atoms share electrons in covalent bonds?
 - a. to become ions and attract each other
 - b. to attain a noble-gas electron configuration
 - c. to become more polar
 - d. to increase their atomic numbers

Name: _____

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- _____ 12. Which of the following elements can form diatomic molecules held together by triple covalent bonds?
- a. carbon
 - b. oxygen
 - c. fluorine
 - d. nitrogen
- _____ 13. Which noble gas has the same electron configuration as the oxygen in a water molecule?
- a. helium
 - b. neon
 - c. argon
 - d. xenon
- _____ 14. Which elements can form diatomic molecules joined by a single covalent bond?
- a. hydrogen only
 - b. halogens only
 - c. halogens and members of the oxygen group only
 - d. hydrogen and the halogens only
- _____ 15. Which of the following is the name given to the pairs of valence electrons that do not participate in bonding in diatomic oxygen molecules?
- a. unvalenced pair
 - b. outer pair
 - c. inner pair
 - d. unshared pair
- _____ 16. Which of the following diatomic molecules is joined by a double covalent bond?
- a. O_2
 - b. Cl_2
 - c. N_2
 - d. He_2
- _____ 17. A molecule with a single covalent bond is ____.
- a. CO_2
 - b. Cl_2
 - c. CO
 - d. N_2
- _____ 18. How many valid electron dot formulas—having the same number of electron pairs for a molecule or ion—can be written when a resonance structure occurs?
- a. 0
 - b. 1 only
 - c. 2 only
 - d. 2 or more
- _____ 19. In which of the following compounds is the octet expanded to include 12 electrons?
- a. H_2S
 - b. PCl_3
 - c. PCl_5
 - d. SF_6
- _____ 20. What causes water molecules to have a bent shape, according to VSEPR theory?
- a. repulsive forces between unshared pairs of electrons
 - b. interaction between the fixed orbitals of the unshared pairs of oxygen
 - c. ionic attraction and repulsion
 - d. the unusual location of the free electrons
- _____ 21. What is thought to cause the dispersion forces?
- a. attraction between ions
 - b. motion of electrons
 - c. sharing of electron pairs
 - d. differences in electronegativity

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- _____ 22. What causes dipole interactions?
- a. sharing of electron pairs
 - b. attraction between polar molecules
 - c. bonding of a covalently bonded hydrogen to an unshared electron pair
 - d. attraction between ions
- _____ 23. What are the weakest attractions between molecules?
- a. ionic forces
 - b. Van der Waals forces
 - c. covalent forces
 - d. hydrogen forces

Numeric Response

- 24. How many valence electrons does an iodine atom have?
- 25. What is the total number of covalent bonds normally associated with a single carbon atom in a compound?
- 26. How many electrons are shared in a single covalent bond?
- 27. How many electrons does a nitrogen atom need to gain in order to attain a noble-gas electron configuration?
- 28. How many unshared pairs of electrons does the nitrogen atom in ammonia possess?
- 29. How many electrons does carbon need to gain in order to obtain a noble-gas electron configuration?
- 30. How many electrons are shared in a double covalent bond?
- 31. How many covalent bonds are in a covalently bonded molecule containing 1 phosphorus atom and 3 chlorine atoms?
- 32. How many unshared pairs of electrons are in a molecule of hydrogen iodide?

Essay

- 33. Can some atoms exceed the limits of the octet rule in bonding? If so, give an example.
- 34. Explain what a polar molecule is. Provide an example.
- 35. What determines the degree of polarity in a bond? Distinguish between nonpolar covalent, polar covalent, and ionic bonds in terms of relative polarity.
- 36. What are dispersion forces? How is the strength of dispersion forces related to the number of electrons in a molecule? Give an example of molecules that are attracted to each other by dispersion forces.