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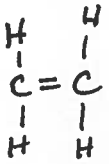
Chapter 8 Review for Test – Chemical Bonds

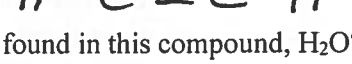
1. Covalent — Type of bond that results from electrons being shared between atoms. If one pair of electrons (total of 2 electrons) are shared, a single bond is formed. If two pairs of electrons (total of 4 electrons) are shared, a double bond is formed. If three pairs of electrons (total of 6 electrons) are shared, a triple bond is formed.

2. triple ; 3 — What type of bond is formed between these elements? How many bonds are there?

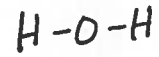
3. single + double — What type of bonds are found in this compound, C_2H_4?



4. single + triple — What type of bonds are found in this compound, C_2H_2?



5. Single — What type of bonds are found in this compound, H_2O?



6. Valence electrons — Outer electrons that are able to be gained, lost, or shared to form compounds.

7. Lewis dot structures — These structures utilize dots to represent the valence electrons of the atoms involved in a covalent bond.

8. electronegativity difference — The _____ between two atoms determines the type of bond that will form between them.

9. nonpolar covalent — If the electronegativity difference is between 0.0 and 0.39, this type of bond forms. It is the result of two atoms that have an almost equal attraction on the electrons. The two atoms involved in this type of bond have a very small electronegativity difference.

10. polar covalent — If the electronegativity difference is between 0.4 and 1.99, this type of bond forms. It is the result of two atoms unequally attracting a shared pair of electrons. The two atoms involved in this type of bond have an unequal sharing of electrons.

11. ionic — If the electronegativity difference is between 2.0 and 3.30, this type of bond forms.

12. polyatomic ion — A tightly bound group of atoms, held together with covalent bonds that behaves as a unit and carries either a positive or negative charge. It has a positive charge when it loses one or more electrons to meet the octet rule and it has a negative charge when it gains one or more electrons to meet the octet rule. Examples include $(NH_4)^{+1}$, $(SO_4)^{-2}$, and $(H_3O)^{+1}$

13. molecule — A tightly connected group of two or more atoms of nonmetallic elements that behave as an electrically neutral unit. Formed when atoms share electrons and create covalent bonds.

14. ionic — This type of compound has an overall neutral charge. It is composed of anions and cations, which are oppositely charged. It is held together by ionic bonds. The resulting compounds are held together in a crystal lattice structure.

15. formula unit — The lowest whole number ratio of cations to anions in an ionic bond. It becomes the chemical formula for an ionic compound.

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16. octet rule — This rule states that when forming compounds, atoms tend to react so as to acquire the stable electron configuration of the nearest noble gas. Atoms react (gain, lose, or share electrons) so that they have access to a total of 8 valence electrons.

17. metallic bond — This type of bond occurs when electrons are freely moving between many positive ions. These electrons are mobile and can be referred to as a "sea of electrons."

18. ionic compounds — These compounds are represented by formula units; transfer electrons between atoms; are typically formed from metallic and nonmetallic elements; are usually solid at room temperature; have high melting points (usually above 300° C); can be described as a crystal lattice; and are good conductors of electricity when melted or dissolved in water.

19. covalent compounds — These compounds are represented by molecular formulas; share electrons (either equally or unequally) to form bonds; are typically formed from nonmetallic elements; can be solids, liquids, or gases at room temperature; have melting points usually below 300° C; and are not good conductors of electricity. (polar or Nonpolar

20. VSEPR — This theory stands for Valence Shell Electron Pair Repulsion Theory. It is used to predict the shapes of molecules. This theory states that atoms in a molecule will be located so that there is a ***minimal amount*** of repulsion between the valence electron pairs of the atoms. Can also be described as molecules adjust their shapes to that valence electron pairs are as far apart as possible because electron pairs repel.

21. Coordinate Covalent bond — A bond in which one atom contributes both bonding electrons to a covalent bond

22. noble gases — Atoms share electrons in order to acquire the electron configuration of these types of elements.

23. bond dissociation — The total energy required to break the bond between two covalently bonded atoms.

24. hybridization — A process in which several atomic orbitals mix to form the same number of equivalent hybrid orbitals. Examples include sp^3, sp^2, and sp orbitals

25. sp^3 — Type of hybrid orbital that is created when one atom combines with three other atoms. One 2s and three 2p orbitals will form a total of four of these orbitals.

26. sp^2 — Type of hybrid orbital that is created when one atom combines with two other atoms. One 2s and two 2p orbitals will form a total of three of these orbitals

27. sp — Type of hybrid orbital that is created when one atom combines with one other atom. One 2s and one 2p orbitals will form a total of two of these orbitals.

28. monatomic — These elements are able to exist in nature as single atoms and are referred to by this term. Examples include all the noble gases.

29. Van Der Waals — A term that collectively refers to dispersion forces and dipole interactions. Dispersion forces are the weakest of all molecular forces and are caused by the motion of electrons. Dipole interactions occur when polar molecules are attracted to one another.

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30. hydrogen bonding — A relatively strong intermolecular attraction in which a hydrogen that is covalently bonded to a very electronegative atom is also weakly bonded to an unshared pair of electrons of another electronegative atom. This gives water many of its unique properties (surface tension, ability to form droplets, capillarity, snowflake shapes). These are the strongest of the intermolecular forces (dipole interactions and dispersion forces)

31. diatomic molecules — These elements exist as a molecule consisting of two atoms, typically when an atom bonds to another atom from the same element. Examples include H_2, N_2, F_2, Cl_2, Br_2, I_2 and At2

32. molecular formula — Molecular compounds are represented by this. It shows the actual kinds and number of atoms in each molecule of a compound.

33. resonance structures — Structures that occur when it is possible to draw two or more valid electron dot structures that have the same number of electron pairs for a molecule. Ozone, O_3, is a molecule that exhibits this type of structure.

34. sigma bond — Type of bond that forms when two atomic orbitals combine to form a molecular orbital that is symmetrical around the axis connecting two atomic nuclei. It can be produced by an overlap of atomic *s* orbitals.

35. pi bond — Type of bond in which the bonding electrons are most likely to be found in regions above and below the nuclei of the bonded atoms.

36. lower than — The melting and boiling points of most molecular compounds are ***higher than / lower than / about the same as*** most ionic compounds.

37. Which of the following are atoms, molecules, diatomic molecules?

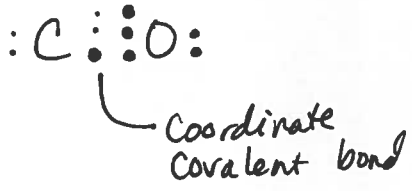
		atom	*molecule*	*diatomic molecule*
a.	Be	*atom*	*molecule*	*diatomic molecule*
b.	N_2	*atom*	*molecule*	*diatomic molecule*
c.	CO_2	*atom*	*molecule*	*diatomic molecule*
d.	H_2O	*atom*	*molecule*	*diatomic molecule*
e.	O_2	*atom*	*molecule*	*diatomic molecule*
f.	CO	*atom*	*molecule*	*diatomic molecule*
g.	N_2	*atom*	*molecule*	*diatomic molecule*
h.	F_2	*atom*	*molecule*	*diatomic molecule*

38. Draw the electron dot structure for the following covalent molecules:

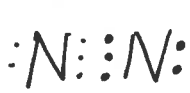
a. H_2

c. H_2O

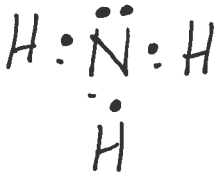
e. CO



b. N_2



d. NH_3



f. CO_2