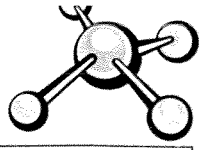
Review: Ionic and Covalent Bonding

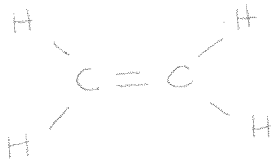


Matching: Match each term to its brief description.

I	1.	A bond in which an electron pair is shared unequally	A. Lone pair
E	2.	A representation of covalent bonding based on Lewis symbols; shared electron pairs are shown as lines and lone pairs are shown as dots	B. Covalent Bond
A	3.	A pair of electrons in the outermost shell that is not involved in bonding	C. Nonelectrolyte
B	4.	A chemical bond in which one or more pairs of electrons are shared by two atoms	D. Ionic bond
K	5.	A measure of an atom's ability to attract electrons in a covalent bond	E. Lewis structure
D	6.	The bond that results from the electrostatic force of attraction between positive and negative ions	F. Octet rule
L	7.	Electrons that are found in the outermost shell of an atom	G. Electrolyte
J	8.	A diagram that is composed of chemical symbol and dots depicting the electrons found in the outermost shell of an atom or ion	H. Cation
F	9.	Atoms gain or lose electrons in their outermost shells in order to attain a noble gas configuration	I. Polar covalent bond
M	10.	An atom that possesses more electrons than protons —	J. Lewis symbol
H	11.	An atom that possesses more protons than electrons +	K. Electronegativity
G	12.	A compound, that when dissolved in water, produces a solution that conducts electricity ionic	L. Valence electrons
C	13.	A compound, that when dissolved in water, does not produce a solution that conducts electricity covalent	M. Anion

Answer the following questions.

14. Draw Lewis structures for O_2, C_2H_4, and Br_2.



15. State whether each of the following compounds contains ionic bonds, pure covalent bonds, or polar covalent bonds. (Hint: calculate ΔEN)

a. LiCl $\Delta EN = 3.16 - 0.98 = 2.18$ ionic

b. MgO $\Delta EN = 3.44 - 1.31 = 2.13$ ionic

c. N_2 $\Delta EN = 0$ pure covalent

d. CO_2 $\Delta EN = 3.44 - 2.55 = 0.89$ polar covalent

e. $CaCl_2$ $\Delta EN = 3.16 - 1.00 = 2.16$ ionic

16. Draw Lewis structures for each of the following **ionic compounds**:

a. CaO

b. NaBr

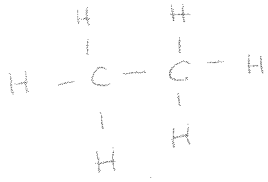
c. $MgCl_2$

d. Al_2O_3

17. Draw Lewis structures for each of the following **covalent compounds**:

a. Cl_2

b. C_2H_6



c. N_2

d. SiO_2

18. List some physical properties that can be used to determine whether or not a substance is ionic or molecular.

Ionic properties	Covalent properties
• conduct electricity when dissolved or melted (electrolyte)	• do not conduct electricity (nonelectrolyte)
• high mp and bp	• lower mp & bp
• brittle	• softer

19. Write a general rule that may be used to determine whether or not a solid is molecular or ionic, based on the elements that comprise it.

ionic – nonmetal & metal

covalent – nonmetal & nonmetal