WODSS SCIENCE Name: _____

SCH 3UI Date: _____

Review 3: Ionic and Covalent Bonding

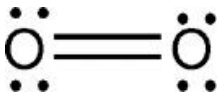
Matching: Match each term to its brief description.

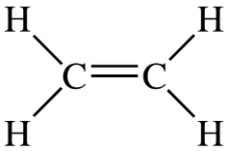
I	1.	A bond in which an electron pair is shared unequally	A.	Lone pair
E	2.	A representation of covalent bonding based on Lewis symbols; shared electron pairs are shown as lines and lone pairs are shown as dots	B.	Covalent Bond
A	3.	A pair of electrons in the outermost shell that is not involved in bonding	C.	Non-electrolyte
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	L.	Valence electrons
C	13.	A compound, that when dissolved in water, does not produce a solution that conducts electricity	M.	Anion

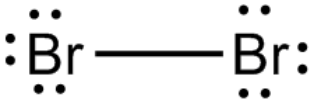
Answer the following questions.

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

O_2 C_2H_4 Br_2







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

a. LiCl EN = 3.16-0.98 = 2.18
Ionic bond

b. MgO EN = 3.44-1.31 = 2.13
Ionic bond

c. N_2 EN=3.04-3.04= 0
pure covalent bond

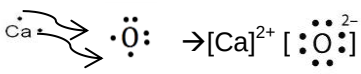
d. CO_2 EN = 3.44-2.55 = 0.89
polar covalent bond

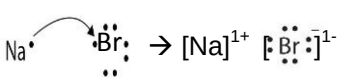
e. $CaCl_2$ EN = 3.16-1.00= 2.16
Ionic bond

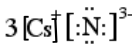
f. HCl EN = 3.16-2.20 = 0.96
polar covalent bond

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

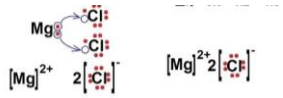
a. CaO b. NaBr c. Cs_3N



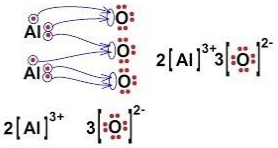




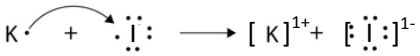
d. $MgCl_2$



e. Al_2O_3

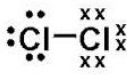


f. KI

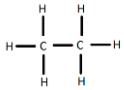


17. Draw Lewis structures for each of the following **covalent compounds**:

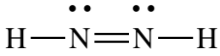
a. Cl_2



b. C_2H_6

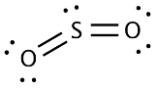


c. N_2H_2

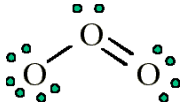


d. N_2

e. SiO_2



f. O_3



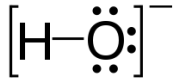
18. List some physical properties that can be used to determine whether or not a substance is ionic or molecular.

	Ionic properties	Covalent properties
1.	Conduct electricity when dissolved or melted (electrolyte)	1. Do not conduct electricity (non-electrolyte)
2.	High MP and BP	2. Lower MP and BP
3.	Brittle	3. Soft

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 – one metal and one non-metal

Covalent – two non-metals

20. Draw a Lewis structure for the following polyatomic ion: OH- (aq)



21. Is it correct for the structural diagram of H_2S to be written H-H-S? Explain using a diagram.
No. Because Hydrogen can make only one covalent bond as it only has one electron. In H-H-S the second hydrogen has two single bonds which is not possible and S needs two electrons for a stable octet, in other words has to share two pairs of electrons.

22. Distinguish between bonding electrons and lone pairs.

The lone pair is a pair of electrons that are not shared with another atom. “Bonding pairs” are pairs of electrons that are shared between two atoms in a Lewis diagram.

23. Are the following pairs of atoms more likely to form ionic compounds or covalent bonds?
a. sulfur and oxygen - Covalent
b. iodine and iodine - covalent
c. calcium and chlorine - Ionic
d. potassium and bromine - Ionic