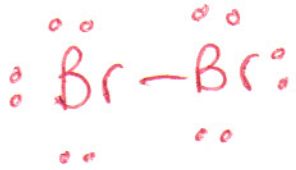
Homework #5
3/12/2016
Name: Scott Beaver

1. Complete the following for each molecule in the space provided:

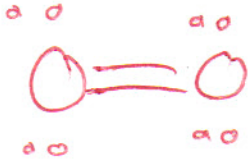
- Draw the Lewis structure(s), including any resonance structures
- Use VSEPR to predict the shape and bond angles
- Indicate as a polar or nonpolar molecule (look for symmetry)

a) Br_2 (Br-Br)



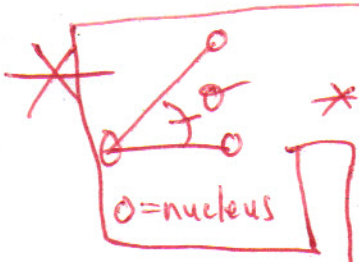
shape: linear
*bond angles: — N/A
molecular polarity: non polar

b) O_2



shape: linear
*bond angles: — N/A
molecular polarity: non polar

c) N_2



* a bond angle is measured between 3 nuclei. Compounds with only 2 atoms lack a true bond angle. The shape is linear because 2 points define a line.

shape: linear
*bond angles: — N/A
molecular polarity: non polar

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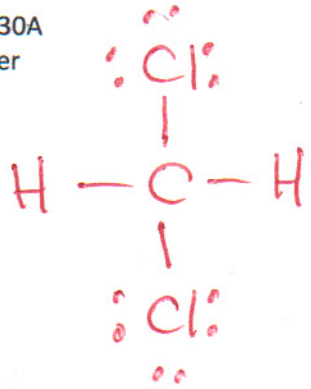
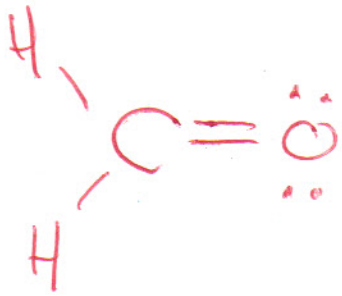
d) **CH_2Cl_2**



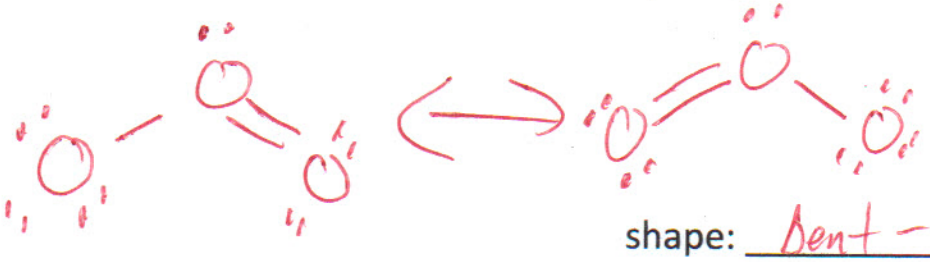
shape: tetrahedral
bond angles: 109.5°
molecular polarity: polar X

e) **CH_2O**



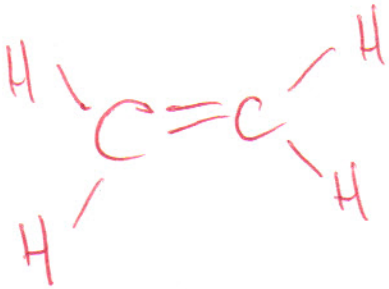
shape: trigonal planar
bond angles: 120°
molecular polarity: polar

f) O_3 (O-**O**-O)



shape: bent - 120°
bond angles: < 120°
molecular polarity: polar

g) **H_2CCH_2**



shape: trigonal planar
bond angles: 120°
molecular polarity: non polar

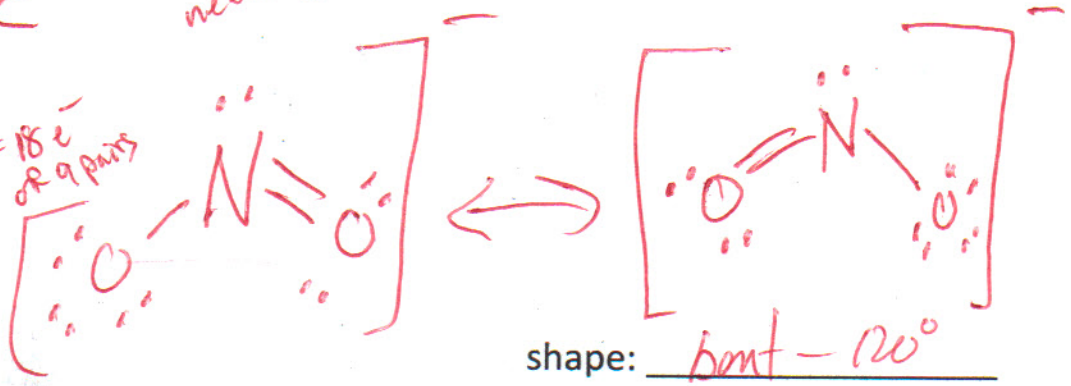
Homework #5
3/12/2016

Name: _____

h) NO_2^- ← nitrite ion - needs even # electrons

(nitrite ion)

$5 + 2(6) + 1 = 18\ e^-$ or 9 pairs



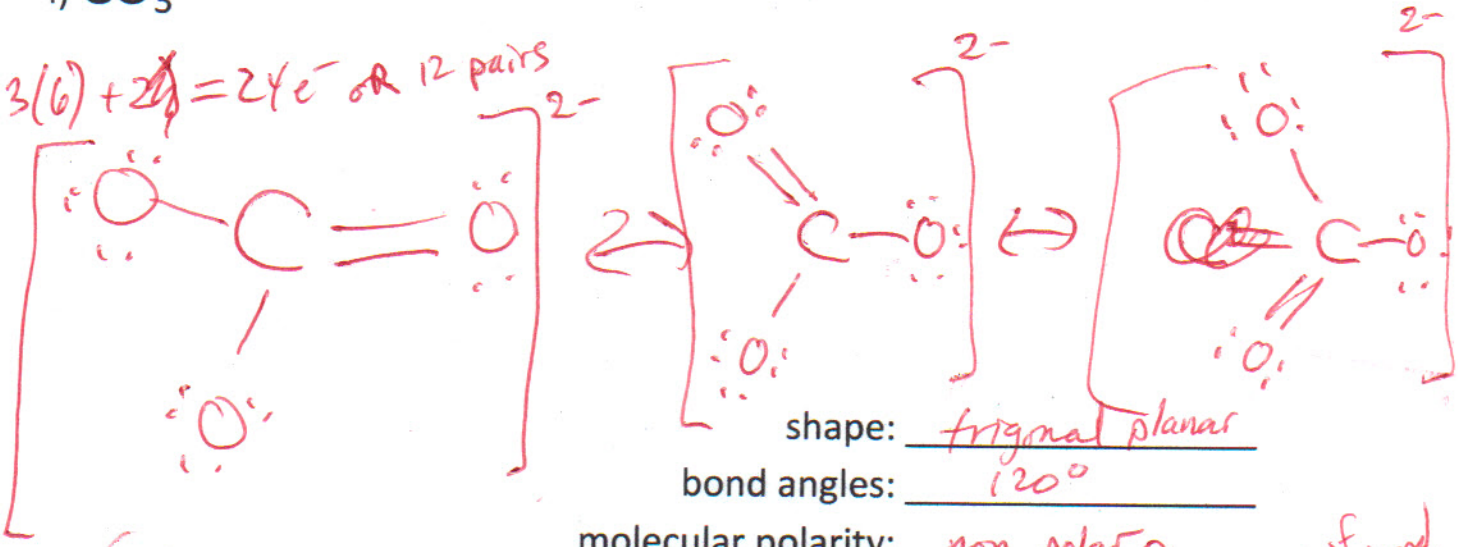
shape: bent - 120°

bond angles: <120°

molecular polarity: polar → Bent must be polar!

i) CO_3^{2-}

$4 + 3(6) + 2 = 24\ e^-$ or 12 pairs



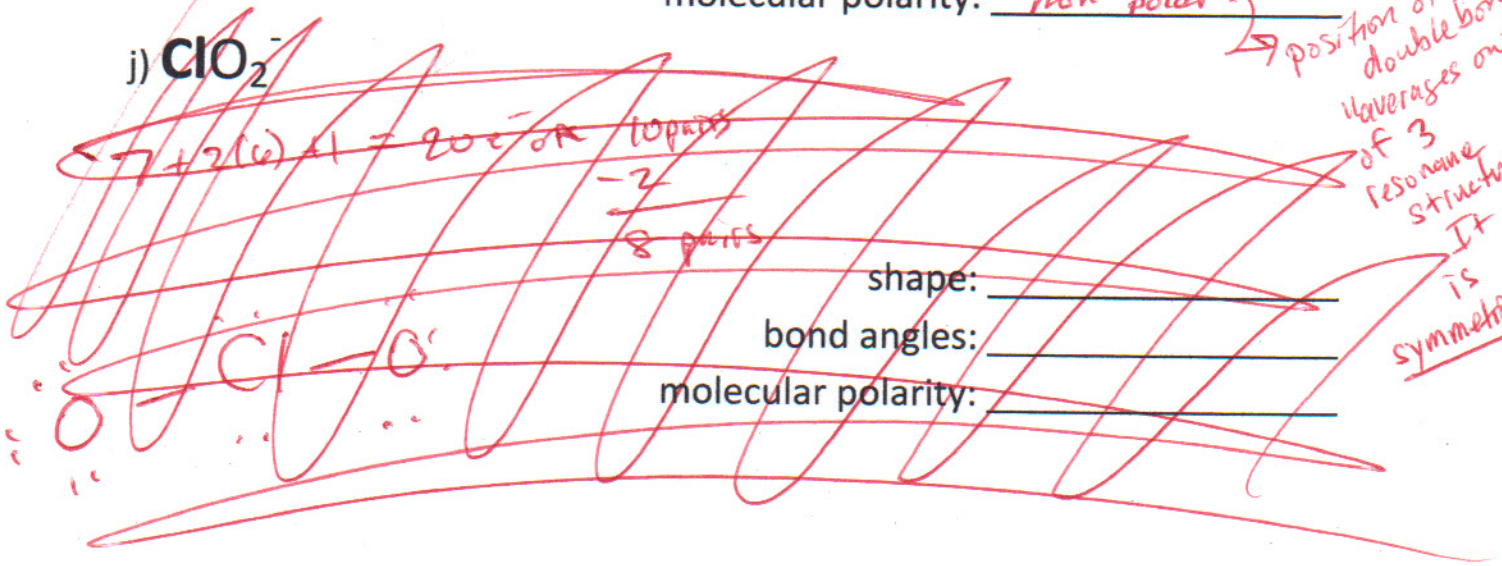
shape: trigonal planar

bond angles: 120°

molecular polarity: non polar → position of double bond leverages out of 3 resonance structures. It is symmetric.

j) ClO_2^-

$7 + 2(6) + 1 = 20\ e^-$ or 10 pairs



shape: _____

bond angles: _____

molecular polarity: _____

Name: _____

2. Print and complete the names/formulas in the table. Indicate as ionic (I) or covalent (C), and use the corresponding nomenclature.

Name	Ionic/covalent	Formula
carbon dioxide	C	CO_2
sodium chloride (Na^+ Cl^-)	I	NaCl
carbon tetrabromide	C	CBr_4
disulfur monoxide	C	S_2O
silver bromide (Ag^+ Br^-)	I	AgBr
sulfur dioxide	C	SO_2
iron (II) oxide (Fe^{2+} O^{2-})	I	FeO
carbon monoxide	C	CO
magnesium bromide (Mg^{2+} Br^-)	I	$MgBr_2$
iron (III) oxide (Fe^{3+} O^{2-})	I	Fe_3O_2
dinitrogen tetroxide	C	N_2O_4
sulfur hexachloride	C	SCl_6
chlorine trifluoride	C	ClF_3
phosphorus pentachloride	C	PCl_5
(aqueous) nitrite ion	(ion name)	NO_2^- (aq)
nitrogen dioxide	C	NO_2 (g)
chlorine dioxide gas	C	Cl_2ClO_2
chlorite ion	(ion name)	ClO_2^- (aq)