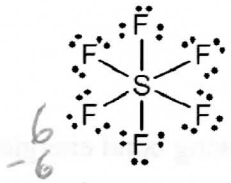
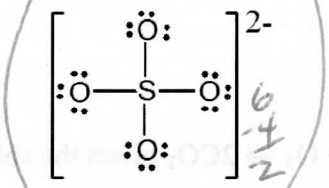
Name_____ **Quiz #8-A** **Date** 11/12/14

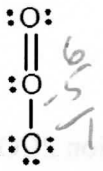
Each question is worth 10 points.

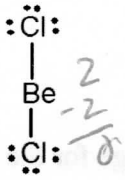
Circle the correct answer:

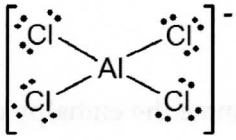
1. In which one of the following structures does the central atom have a formal charge of +2?

a. SF_6 

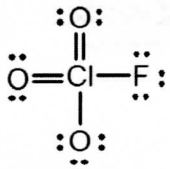
b. SO_4^{2-} 

c. O_3 

d. $BeCl_2$ 

e. $AlCl_4^-$ 

2. In the following Lewis structure for ClO_3F, chlorine has a formal charge of ____ and an oxidation number of ____.



A) 7, 7

B) 7, –1

C) 1, 1

D) 1, –1

E) 1, 7

3. Which of these substances will display an incomplete octet in its Lewis structure?

A) CO_2 B) Cl_2 C) ICl D) NO E) SO_2

4. Which of these elements is most likely to exhibit an expanded octet in its compounds?

A) O

B) S

C) Na

D) C

E) N

5. Estimate the enthalpy change for the reaction $2CO + O_2 \rightarrow 2CO_2$ given the following bond energies.

BE(C≡O) = 1074 kJ/mol;

BE(O=O) = 499 kJ/mol;

BE(C=O) = 802 kJ/mol

$\Delta H = BE_{reactants} - BE_{products}$

$\Delta H = [2(1074\ kJ/mol) + 499\ kJ/mol] - [4(802)\ kJ/mol]$

$= -561\ kJ/mol$

A) +2380 kJ/mol

B) +744 kJ/mol

C) +1949 kJ/mol

D) –561 kJ/mol

E) –744 kJ/mol

Bonds to Break	Bonds formed
C≡O	C=O
C≡O	C=O
O=O	C=O
	C=O
	C=O

(2 O=C=O)

6. According to the VSEPR theory, the molecular shape of $SiCl_4$ is

A) linear.

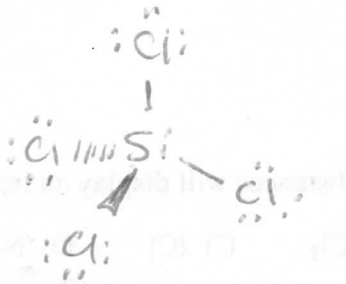
B) trigonal planar.

C) bent.

D) tetrahedral.

E) trigonal pyramidal.

Valence electrons: 4 (Si)
+ 28 (Cl)
32
− 8 (4 Bonds)
24



7. Which one of the following molecules is polar?

A) CH_4

B) $CHBr_3$

C) F_2

D) CBr_4

E) CO_2

all others have symmetry

8. What is the approximate bond angle for CCl_4?

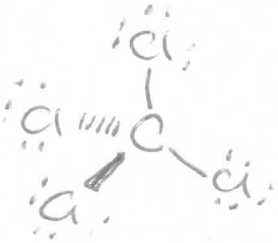
A) 90°

B) 109.5°

C) 120°

D) 145°

E) 180°



Tetrahedral
Bond angles are 109.5°

9. What is the molecular shape of the IBr_3 molecule?

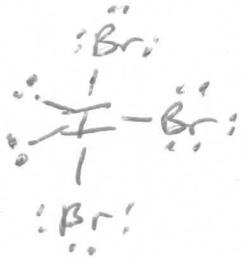
A) tetrahedral

B) T–shaped

C) bent

D) trigonal planar

E) seesaw



Valence e⁻ = 7 (I)
21 (Br)
28
− 6 (3 Bonds)
22

10. What is the molecular shape of NO_2^- as predicted by the VSEPR theory?

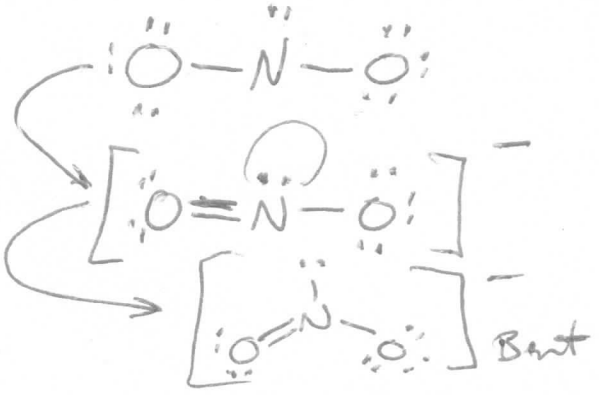
A) linear

B) trigonal planar

C) bent

D) tetrahedral

E) resonant



Valence e⁻ ⇒ 5 (N)
12 (O)
17
+ 1 e⁻ from anion
18
− 4 (two Bonds)
14

Bent