NAME_____
CHEM1450/Practice Exam 3/Dr. Dooley/Fall 2018

(3 Points Each)Place the letter corresponding to the correct answer in the blank to the left of the question number.

_____1. What happens to electrons to form a covalent bond?

a. Electrons are formed.
b. Electrons are lost.
c. Electrons are shared.
d. Electrons are gained.
e. Electrons are transferred.

_____2. Using periodic trends, place the following bonds in order of increasing ionic character.

S-F Se-F O-F

a. Se-F < S-F < O-F
b. S-F < Se-F < O-F
c. O-F < Se-F < S-F
d. Se-F < O-F < S-F
e. O-F < S-F < Se-F

_____3. Which molecule or compound below contains a pure covalent bond?

a. Li_2CO_3
b. SCl_6
c. Cl_2
d. PF_3
e. NaCl

_____4. Which of the following represent the Lewis symbol for Cl?

a. 
b. 
c.
d. 
e. 

_____5. How many valence electrons are there (total) in the molecule CH_3Br?

a. 14
b. 12
c. 5
d. 30
e. 38

_____6. How many of the following elements can form compounds with an expanded octet?

H, C, S, Ar, Ne, B, Se

a. 0
b. 1
c. 2
d. 3
e. 4

_____7. In general, for a particular pair of atoms, which type of bond will be the shortest?

a. triple
b. single
c. double
d. there is no trend in bond length

_____8. According to the following balanced reaction, how many moles of water are formed when 4.52 moles of $HClO_4$ reacts completely?

$$Cr(OH)_3 + 3\ HClO_4 \rightarrow Cr(ClO_4)_3 + 3\ H_2O$$

a. 13.6 moles H_2O
b. 9.04 moles H_2O
c. 4.52 moles H_2O
d. 2.26 moles H_2O
e. 1.51 moles H_2O

_____9. What volume of 5.0 M HCl stock solution should be diluted to make 450 mL of .654M HCl solution?

a. 1.47×10^3mL
b. 58.86 mL
c. 3.44×10^3 mL
d. 6.03 mL
e. .00727 mL

_____10. How many moles of Na^+ are contained in a 0.852 L sample of 2.15M Na_2CO_3?

a. 1.83 mol Na^+
b. 0.396 mol Na^+
c. 0.793 mol Na^+
d. 3.66 mol Na^+
e. 7.32 mol Na^+

_____11. What is the molarity of a solution made by dissolving 15.0 g NaCl in 500.0 mL water?

a. 0.625 M NaCl
b. 0.0300 M NaCl
c. 5.13 M NaCl
d. 30.0 M NaCl
e. 0.513 M NaCl

1. (12 Points Total) Fill in the table below with the electron geometries and bond angles associated with each of the following numbers of electron groups.

Number of Electron Groups around Central Atom	Electron Geometry (Name) (2 Points Each)	Bond Angle (or Angles) associated with this Geometry (2 Points Each)
3	Trigonal Planar	120°
4		
5		
6		

2. (12 Points) Draw three resonance structures for OCN^-. Assign formal charges to all of the atoms in the resonance structures below.

   a. (2 Points) Based on what you know about formal charges and stability, circle the resonance structure above that is the MOST likely structure.

3. (6 Points)List the molecular shape associated with the following Lewis structures:

Lewis structure: (Draw the structure for $XeCl_2$. I usually do this box for you.)	VSEPR Sketch
Electron Geometry:	
Molecular Shape:	

4. (6 Points) Draw the Lewis Structure for the following molecule:

BrF_5

5. (5 Points) For the molecule below, draw the VSEPR Shape and include arrows to indicate bond polarities. Is the molecule polar?

NH_4^+
Is the molecule Polar (Circle One)? YES NO

1. (10 Points) The titration of 60.0 mL of an unknown concentration $Ca(OH)_2$ solution requires 425 mL of 0.18 M HF solution. What is the concentration of the $Ca(OH)_2$ solution (in M)? Below is the balanced reaction:

$$Ca(OH)_2(aq) + 2\ HF(aq) \rightarrow 2\ H_2O(l) + CaF_2(aq)$$

1. (8 Points) A 15 mL sample of 1.70 M potassium chloride solution is mixed with 5.25 g barium nitrate solution and the following reaction occurs:

$$2\ KCl\ (aq) + Ba(NO_3)_2\ (aq) \rightarrow BaCl_2(s) + 2\ KNO_3(aq)$$

a. What is the limiting reactant and the theoretical yield of $BaCl_2$ for this reaction?

Theoretical Yield: | Limiting Reactant: