Laude's CH301 Worksheet 4: Advanced Lewis Structures (Sections 2.8-2.17)
(The textbook referenced is Atkins & Jones's *Chemical Principle, 3rd edition*)

1. Draw the different resonance structures: (feel free to work on similar problems in the text: 2.41-2.44, pg 80)

Compound	Total number of electrons	Resonance structures (Lewis dots structures)
SO_2	18	
NO_3^-	24	
CO_3^{2-}	24	
Benzene		don't do
CH_3COO^-	24	

2. Calculate formal charge: (feel free to work similar problems in the text: 2.45-2.48 pg 80)

Compounds	Total number of e	Lewis structures	Formal charge of each atom	Most stable?
HCOH and	12		H: 0 C: 0 O: 0	
HCHO	12		H: 0 C: -1 O: +1	
HCN and	10	H – C ≡ N:	H: 0 C: 0 N: 0	H C N
HNC	10	H – N ≡ C:	H: 0 N: +1 C: -1	
COO and	16	:C = O = O:	C: -2 O: +1 O: 0	CO_2
OCO	16	O: = C = O:	C: 0 O: 0	O=C=O
OClH and	14	:O: Cl: H	O: -1 Cl: +1 H: 0	Cl -O-H
ClOH	14	:Cl: O: H	Cl: 0 O: 0 H: 0	
ONF and	18	O = N:F:	O: 0 O: 0 O: 0	O N F
NFO and	18	N = F-O:	-1 +2 -1	
NOF	18	N = O: F:	O	

3. Exceptions to the octet rule: (feel free to work similar problem from text: 2.49-58 pg. 81)

Compounds	Total number of electrons	Lewis dot structure	What is strange about this structure?
XeO_4	32		~~Involves~~ a noble gas
ICl_2^-	22		hypervalent
SF_4	34		hypervalent
ClO_3^-	32	don't do	hypervalent
BrO	13		odd # of e^-s
BCl_3	24		too few e^-s

4. Rank the following in increasing order according to the property listed:

Electron affinity

most
important
to know

$C > N$

Cl, N, Mg and He

$Cl > N > Mg > He$

S, H, Sn and Ba

$S > Sn > H > Ba$

Bond polarity

$C-F > O-H > C-F$

Polarizing power

don't do

Bond strength

Bond length

Br, I, P and K

$Br > I > P > K$

Si, Ca, Ga and O

$O \sim Si > Ga \sim Ca$

O-H, C-F and O-O

Si-Cl, Se-S and K-I

$K-I > SiCl > Se S$

Br-, Be2+ and Ca2+

$Be^{++} > Ca^{+2} > Br^-$

Cr4+, Na+ and Al3+

$Cr^{+4} > Al^{+3} > Na^+$

C=O, N≡N and NaCl

$N \equiv N > C=O > NaCl$

O-O, N-O and C-O

$C-O > N-O > O-O$

C-H, C=O and C≡N

$C \equiv N > C=O > C-H$