Name _____ Test 1 (10/3)
CHEM 0201 (Organic) Fall 2014

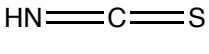
1. (16 pts.) Draw Lewis structures for the following condensed structures.

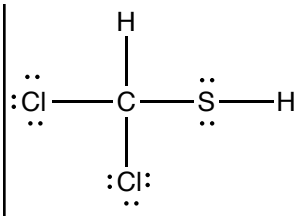
a. CH_2NCH_3

b. $CH_3C(O)SCH_3$

1. _____
2. _____
3. _____
4. _____
5. _____

2. (10 pts.) Using wedge (◄) and dashed (┈┈) bonds where appropriate, draw three-dimensional representations of the following molecules. Remember to draw all of the hydrogen atoms. One condensed structure and one Lewis structure are provided.





6. _____
7. _____
8. _____
9. _____

3. An incomplete MO diagram for the hypothetical molecule CN is drawn below.

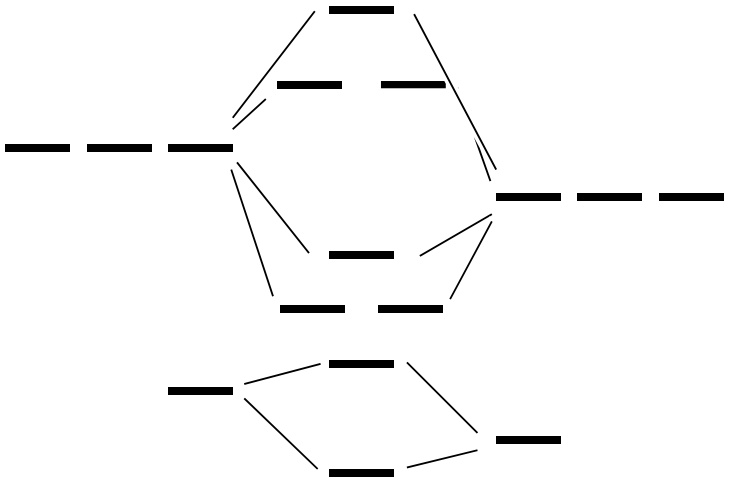
a. (2 pts.) Label the atomic orbitals.

b. (2 pts.) Label the molecular orbitals.

c. (2 pts.) Populate the atomic orbitals with the appropriate number of electrons.

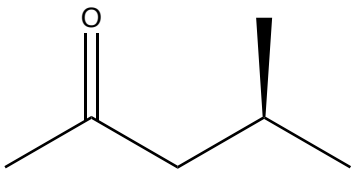
d. (2 pts.) Populate the molecular orbitals with the appropriate number of electrons.

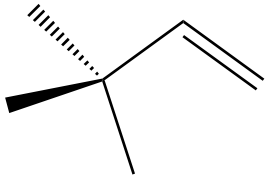
e. (2 pts.) Determine the bond order for CN.



f. (4 pts.) Which would have the stronger bond, CN or CN^-? Explain.

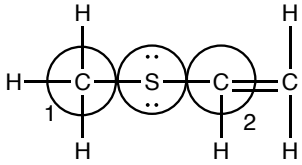
4. (12 pts.) For each C atom in the following skeletal structures draw C, CH, CH_2, and CH_3's where appropriate.





5. (10 pts) Determine the hybridization of the circled atoms in the molecules drawn below. Skeletal, condensed, and Lewis structures have been provided.

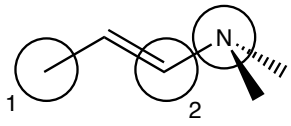
a.



C(1) _____ C(2) _____

S _____

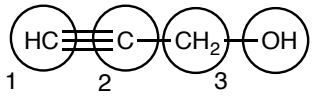
b.



C(1) _____ C(2) _____

N _____

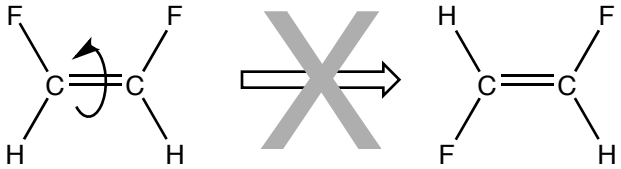
c.



C(1) _____ C(2) _____

C(3) _____ O _____

6. (10 pts.) Using the valence bond model, explain why rotation around a double bond is not possible.

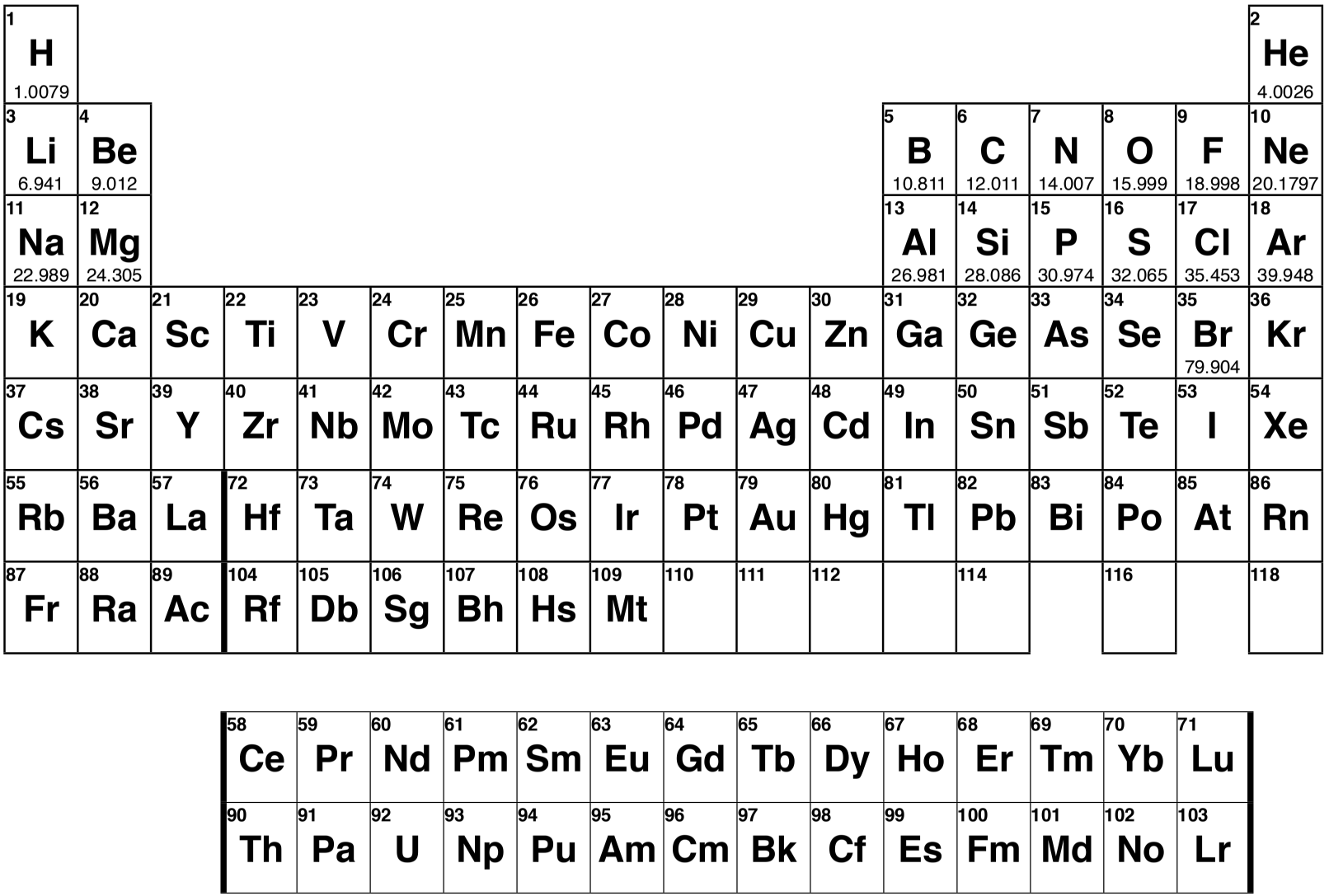


7. (12 pts.) Determine the ground state electron configuration for phosphorus, and draw an energy level diagram for the valence electrons in a phosphorus atom.

8. (10 pts.) Explain why a chlorine atom can become a chloride ion that has a negative one charge (Cl^-) but it is unlikely that a chlorine atom would be able to become a chloride ion with a negative two charge (Cl^{2-}).

9. (12 pts.) Circle all of the ionic compounds in the following list.

NaOH	CH_3OH	$MgSO_4$	C_3H_7Cl	LiF	CH_3CH_2Br


1 H 1.0079
2 He 4.0026
3 Li 6.941
4 Be 9.012
5 B 10.811
6 C 12.011
7 N 14.007
8 O 15.999
9 F 18.998
10 Ne 20.1797
11 Na 22.989
12 Mg 24.305
13 Al 26.981
14 Si 28.086
15 P 30.974
16 S 32.065
17 Cl 35.453
18 Ar 39.948
19 K
20 Ca
21 Sc
22 Ti
23 V
24 Cr
25 Mn
26 Fe
27 Co
28 Ni
29 Cu
30 Zn
31 Ga
32 Ge
33 As
34 Se
35 Br 79.904
36 Kr
37 Cs
38 Sr
39 Y
40 Zr
41 Nb
42 Mo
43 Tc
44 Ru
45 Rh
46 Pd
47 Ag
48 Cd
49 In
50 Sn
51 Sb
52 Te
53 I
54 Xe
55 Rb
56 Ba
57 La
72 Hf
73 Ta
74 W
75 Re
76 Os
77 Ir
78 Pt
79 Au
80 Hg
81 Tl
82 Pb
83 Bi
84 Po
85 At
86 Rn
87 Fr
88 Ra
89 Ac
104 Rf
105 Db
106 Sg
107 Bh
108 Hs
109 Mt
110
111
112
114
116
118
58 Ce
59 Pr
60 Nd
61 Pm
62 Sm
63 Eu
64 Gd
65 Tb
66 Dy
67 Ho
68 Er
69 Tm
70 Yb
71 Lu
90 Th
91 Pa
92 U
93 Np
94 Pu
95 Am
96 Cm
97 Bk
98 Cf
99 Es
100 Fm
101 Md
102 No
103 Lr