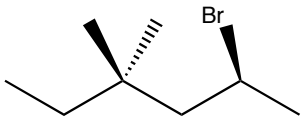
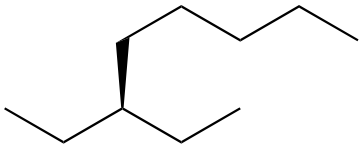
Name _____ Test 2 (11/6)
CHEM 0201 (Organic) Fall 2015

1. (24 pts.) Provide IUPAC names for the following structures.

a. 

2-bromo-4,4-dimethylhexane

b. 

3-ethyloctane

c. 

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2-methyl-1-pentene

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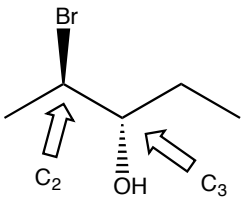
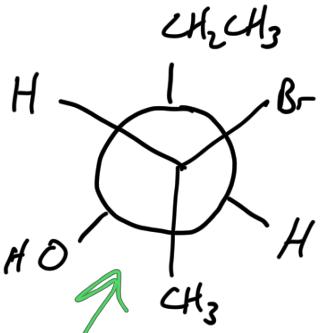
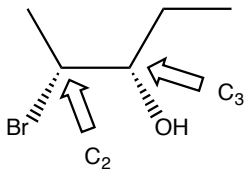
E-4-chloro-2-pentene

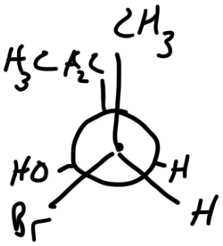
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

2. (8 pts.) a. Draw a Newman projection along the C_2–C_3 bond for the confirmations drawn below.





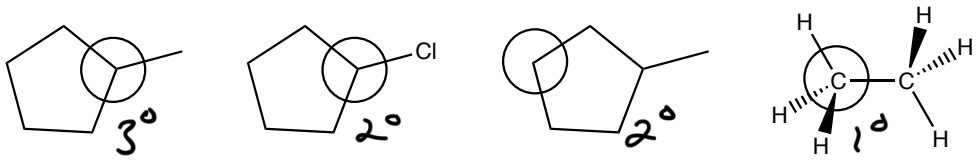




b. (6 pts.) For the molecules drawn above, determine which is the lower energy conformation, and explain the basis for your choice.

lower energy. In the staggered conformation the groups at either end of the bond are not bumping into each other, so the bond angles are closer to ideal. In the eclipsed version the group are bumping causing e⁻-e⁻ repulsion and strained bond angles.

3. (12 pts.) Determine the degree of substitution (1°, 2°, 3°, 4°) for the circled C atoms on the structures drawn below.



3° 2° 2° 1°

4. The reaction of trimethylamine with water is drawn below.

done on test 1 fall 2018

a. (4 pts.) Identify the molecule that is acting as an acid.

H_2O

b. (4 pts.) Identify the molecule that is acting as a base.

NH_3

c. (4 pts.) Explain why trimethylamine is able to play the role it does.

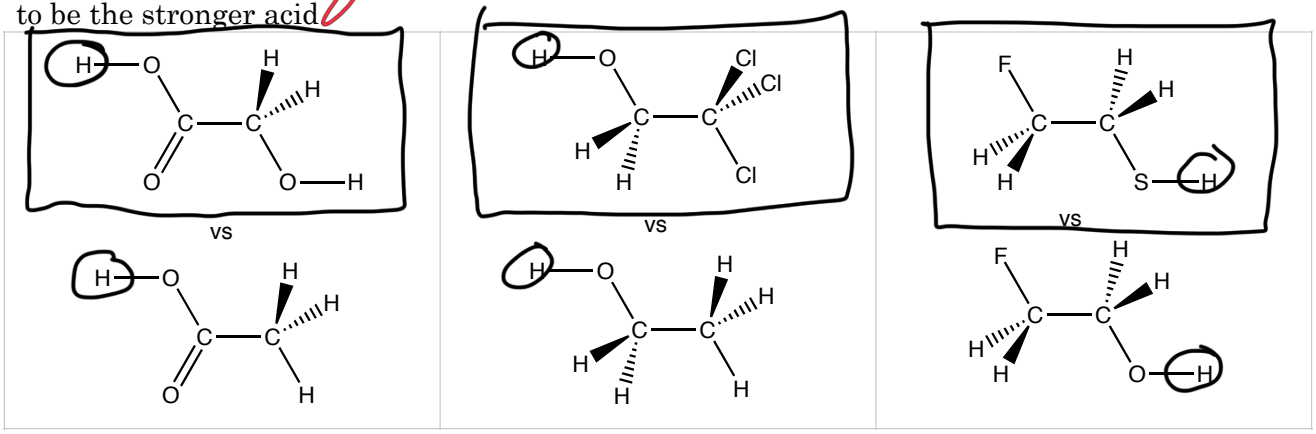
NH_3 has a lone pair of e^-'s in an sp^3 hybrid orbital, and these e^-'s will be attractive to H^+.

5. (10 pts.) Use valence bond theory to explain why alkenes are considered nucleophilic. In your explanation remember to describe which atomic or hybrid orbitals are being used to form the nucleophilic bonds in alkenes.

not on fall 2018 test 2

The double bond of an alkene is formed from a σ + a π bond. The σ bond is made from 2 overlapping sp^2 orbitals. These e^-'s are directly between the nuclei and are not particularly reactive. On the other hand, the π bond is made from two overlapping, parallel, unhybridized p orbitals. Since p orbitals stick out away from the nuclei these e^-'s will be attractive to electrophiles.

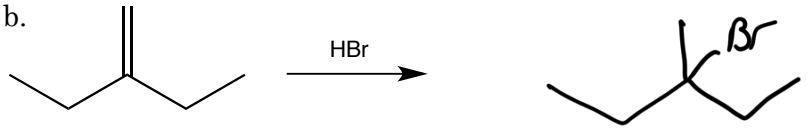
6. For the following molecules, (a. 6 pts.) circle the hydrogen that is most likely to be released as a hydrogen cation, and for each pair of molecules (b. 6 pts.) circle the molecule that is more likely to be the stronger acid.



7. (18 pts) Predict the product(s) for the following reactions. If a mixture of major and minor products are expected, identify the major product.

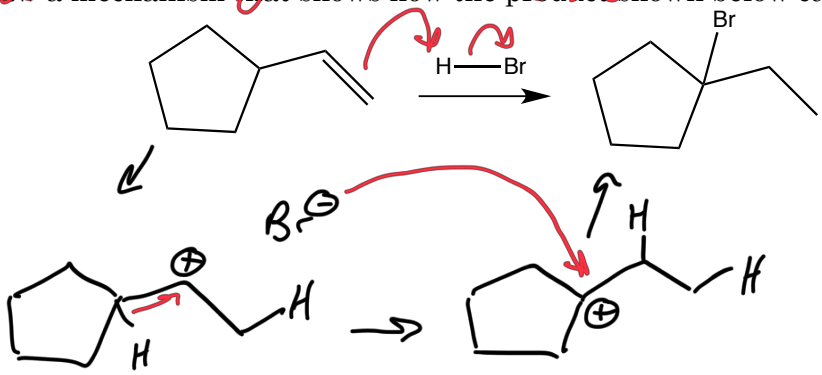
a.

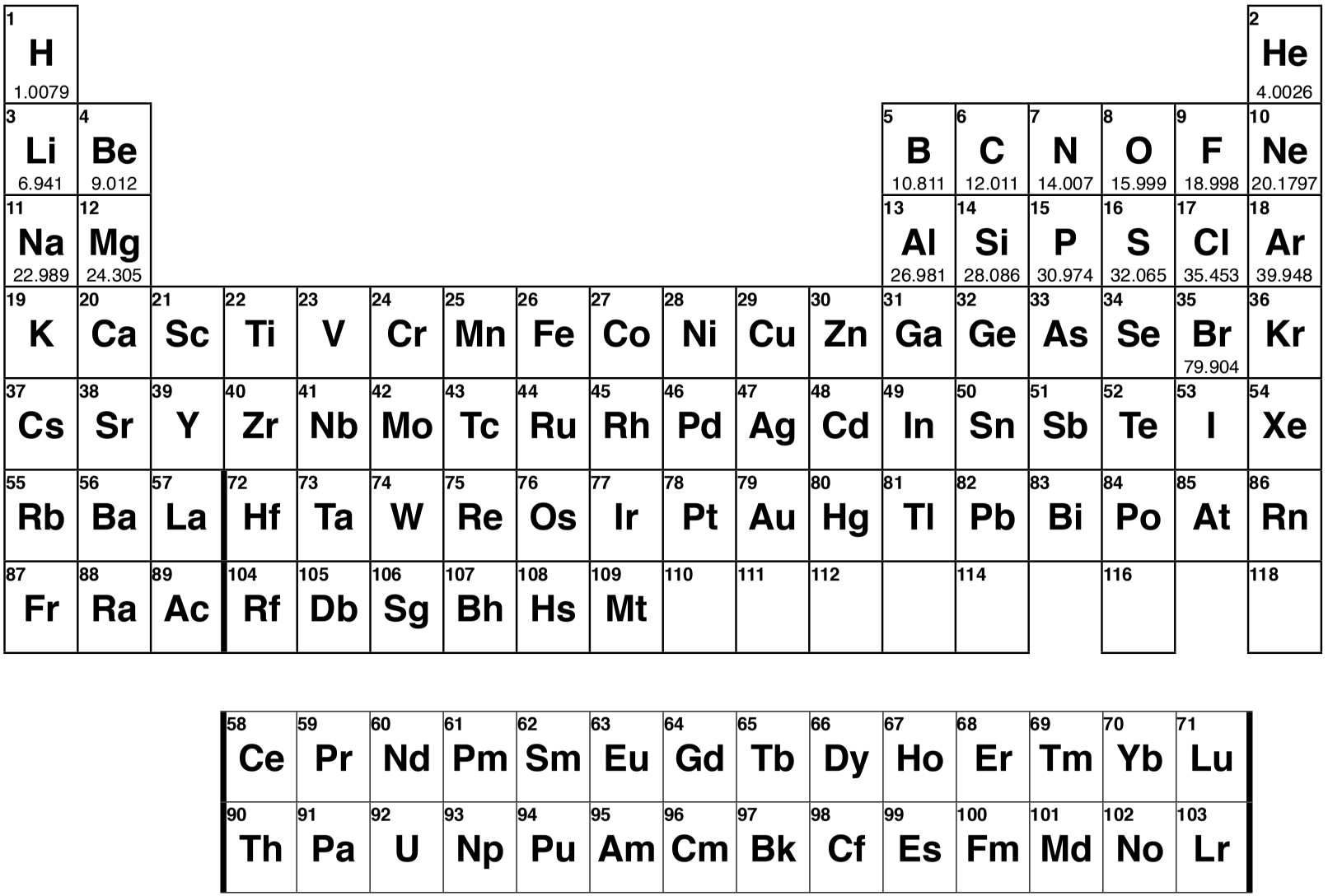
b.



c.

8. (10 pts.) Draw a mechanism that shows how the product shown below can be formed in this reaction.




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