Name _____ Test 3 (12/1)
CHEM 0201 (Organic) Fall 2021

1. (12 pts.) Using valence bond theory (hybridization) explain why alkenes are nucleophilic.

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

2. (2 pts. ea.) The questions below refer to the reaction coordinate diagram draw to the right.

a. Label the reactants with an "a".

b. Label the products with a "b".

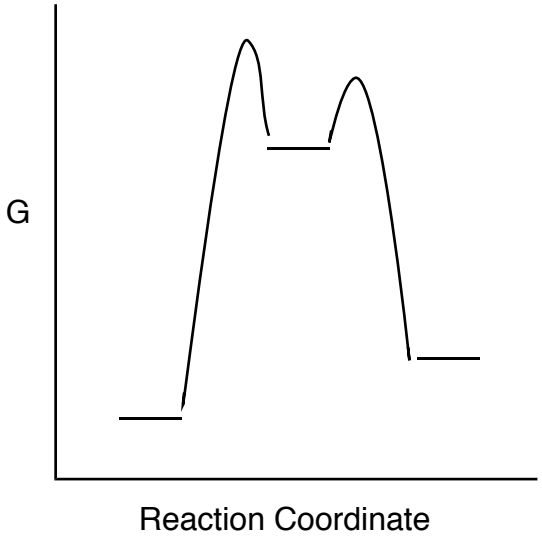
c. Label the intermediates with a "c".

d. Label the transition state(s) with a "d".

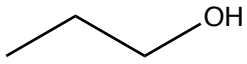
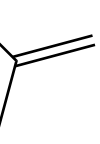
e. Does this reaction absorb or release energy?

f. Would this reaction have a positive or negative ΔG?

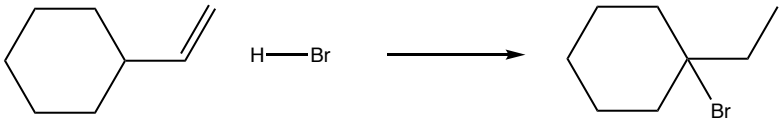
g. Does the equilibrium favor the reactants or products.



3. (16 pts.) Determine whether the following are nucleophiles, electrophiles, or neither.

H^+	CH_3CHCH_2	$CH_3CH_2CH_2CH_2CH_3$	
HNO_3	Br^-	CH_3CH_2OH	

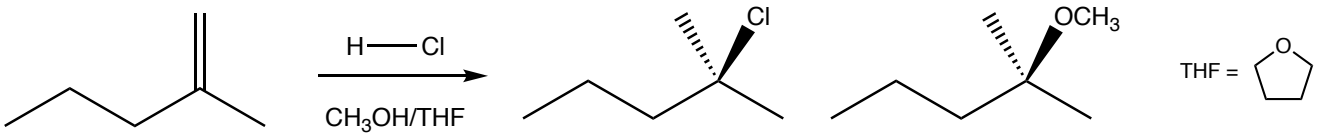
4. (12 pts.) Draw a mechanism for the reaction shown below. Include electron movement arrows with the mechanism.



5. a. (6 pts.) Draw a skeletal structure of a molecule that has a 3° carbocation. (b. 6 pts.) Briefly, explain why a 3° carbocation is more stable than a 2° carbocation.

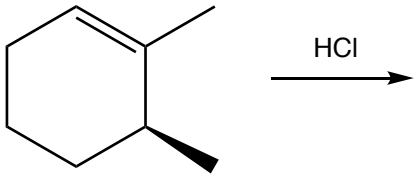
6. (6 pts.) (a.) Do Br_2 and Cl_2 initiated electrophilic addition reactions occur in a syn, an anti, or both a syn and anti fashion? (b. 6 pts.) Draw the an example of the expected intermediate in the reaction and explain your choice.

7. (12 pts.) In the electrophilic addition reaction below, the HCl and 2-methyl-1-pentene are dissolved in a mixture of THF and methanol. Explain why 2-methoxy-2-methylpentane will be produced.

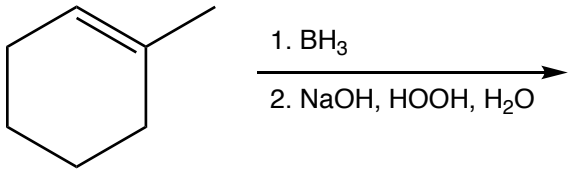


8. (8 pts. ea.) Predict the major organic products for the following reactions. Remember to indicate the stereochemistry of the products using wedge (◀), dashed (⋯), or squiggly (∿) bonds where appropriate (If you don't know/remember what squiggly bonds are, just use the wedge and dashed bonds where appropriate).

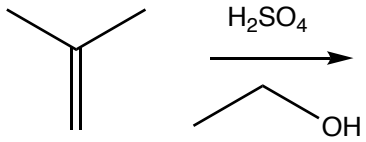
a.

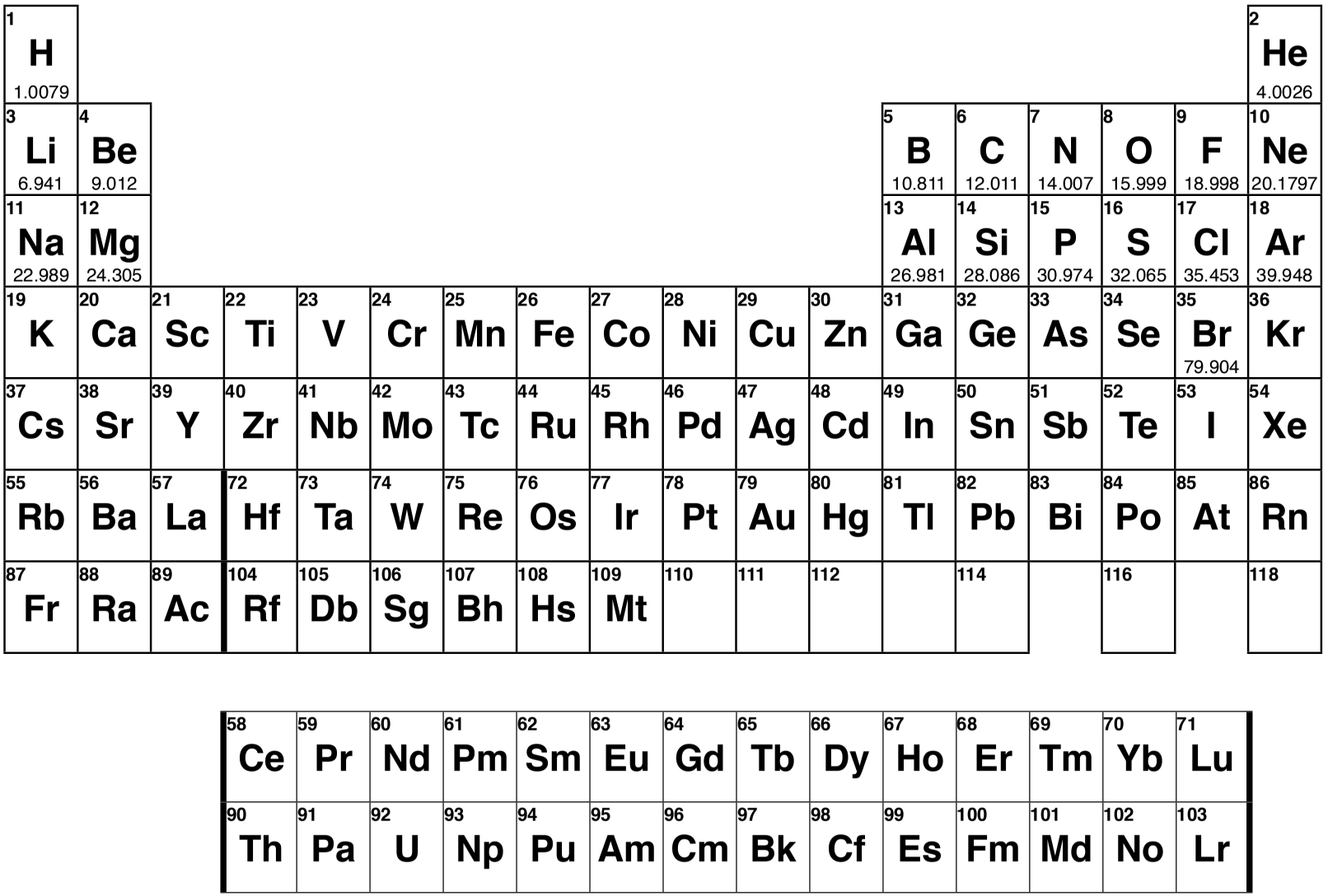


b.



c.




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