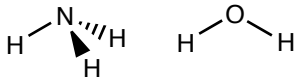
Name _____ Test 2 (4/3)
CHEM 0203 (Organic II) Spring 2015

1. a. (8 pts.) For each of the molecules drawn below circle the nucleophilic atom.

b. (8 pts.) For each pair of molecules drawn below determine which molecule or atom would be the better nucleophile under the stated conditions.

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

i.



dissolved in

ii.

dissolved in

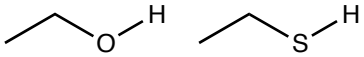
iii.

Cl^- Br^-

dissolved in

H_2O

iv.

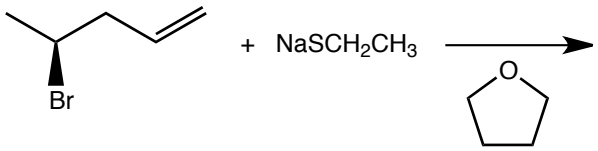


dissolved in

2. (6 pts. ea.) Predict the outcome of the following nucleophilic substitution reactions if the reaction occurs via via the indicated mechanism. Remember to indicate the stereochemistry of the product using wedged (◄) and dashed (⋯) bonds where appropriate.

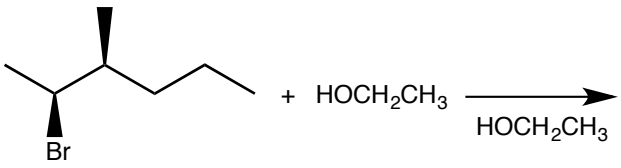
a.

S_N2

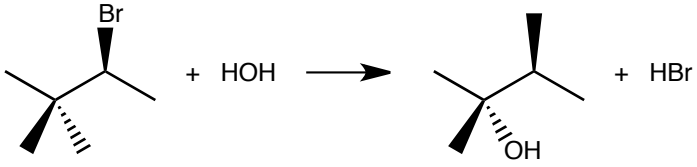


b.

S_N1

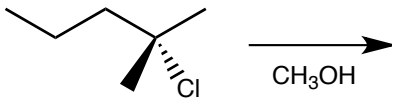


3. (10 ps) Draw a mechanism that explains the outcome of the following substitution reaction. Please remember to include electron movement arrows.

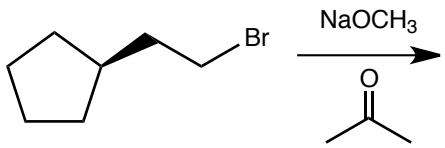


4. (3 pts. ea.) Determine whether the following reactants are likely to react via an S_N1 or an S_N2 mechanism.

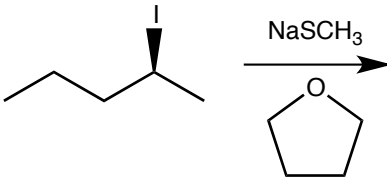
a.



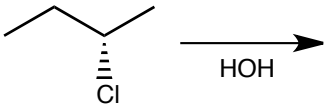
b.



c.



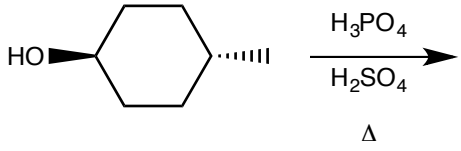
d.



5. (3 pts. ea.)Predict the organic products for the following elimination reactions. Draw all likely structural and stereochemical isomers that are produced by the reactions.

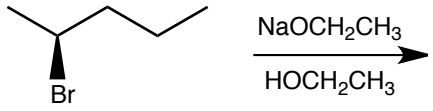
a.

E1



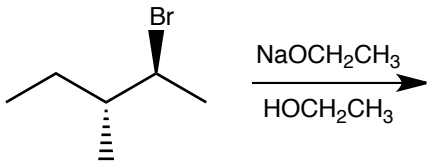
b.

E2



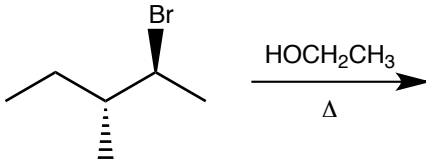
c.

E2



d.

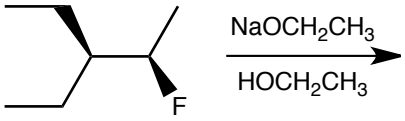
E1



6. (4 pts. ea.) For the following elimination reactions, predict the possible products and indicate which are the major products.

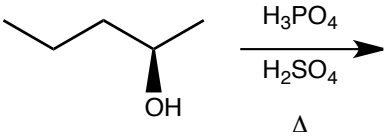
a.

E2

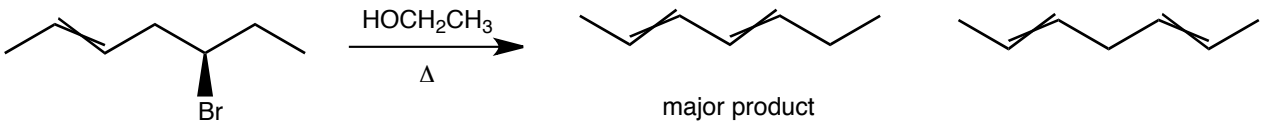


b.

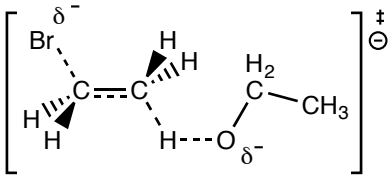
E1

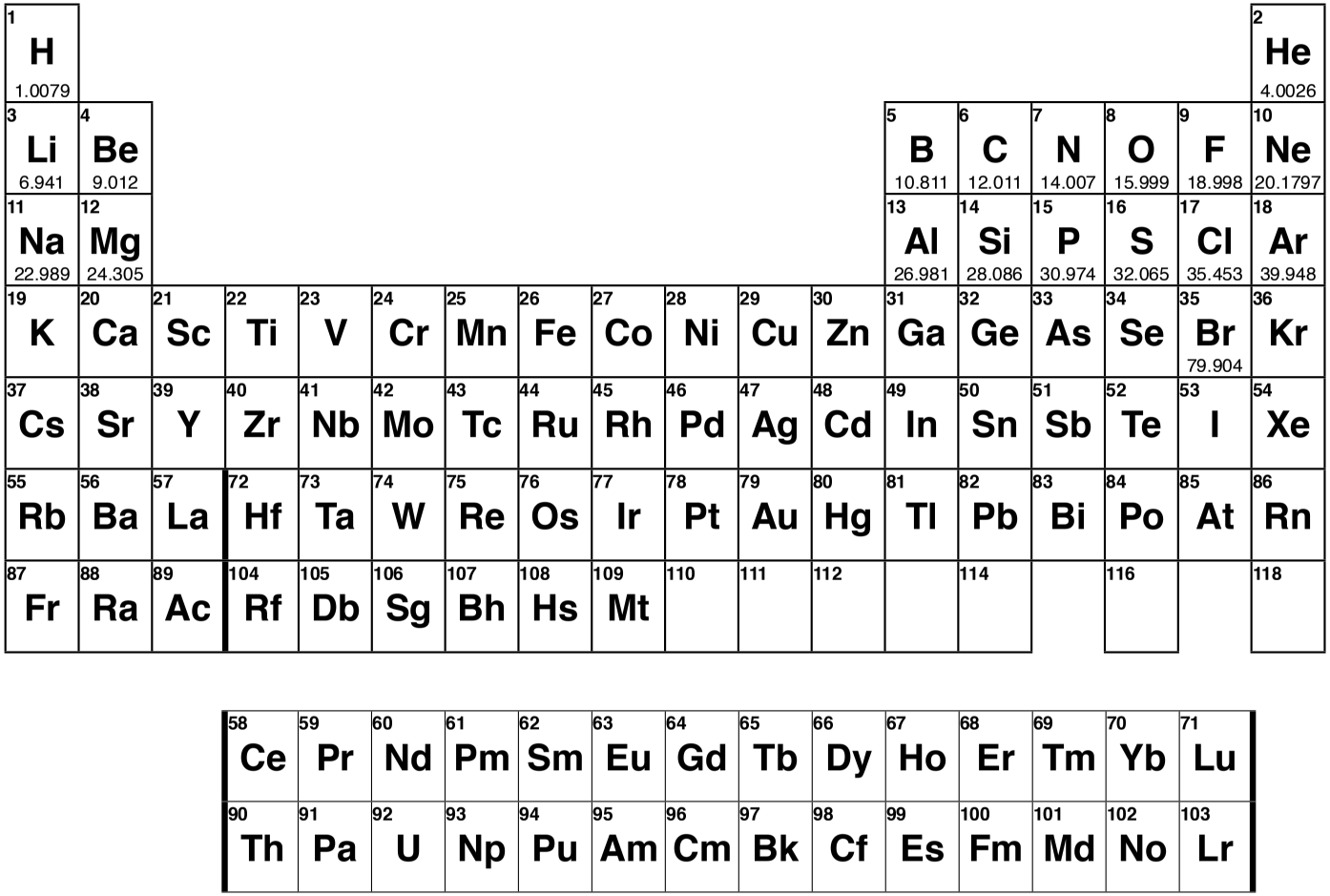


7. (10 pts.) In the following E1 reaction, even though the two products have the same degree of substitution, the major product is one on the left. Explain why this is the expected outcome for this E1 reaction (remember a criss-cross double bond just means all stereoisomers are present).



8. (10 pts.) Below, a transition state for an E2 reaction is drawn. What do the dotted lines mean; respond for each dotted line. Remember to describe what is happening to the bonds.




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