

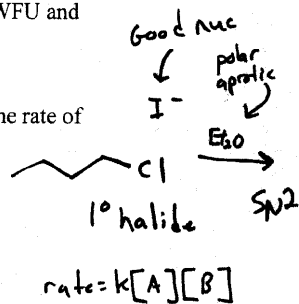
Summer II  
Test 3  
8/4/2008

Name: 112 pts  
By signing I will abide by the WFU and

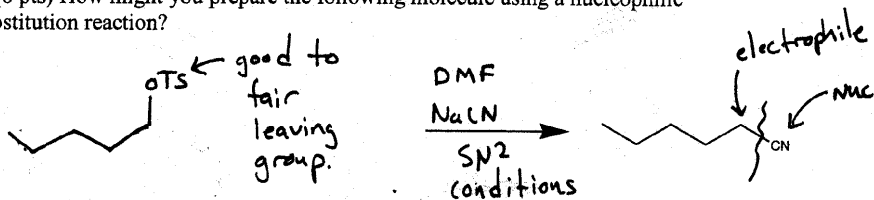
1. (10 pts) What effect would you expect the following changes to have on the rate of reaction on sodium iodide with 1-chlorobutane in diethyl ether?

a. The concentration of the halide is doubled rate doubled

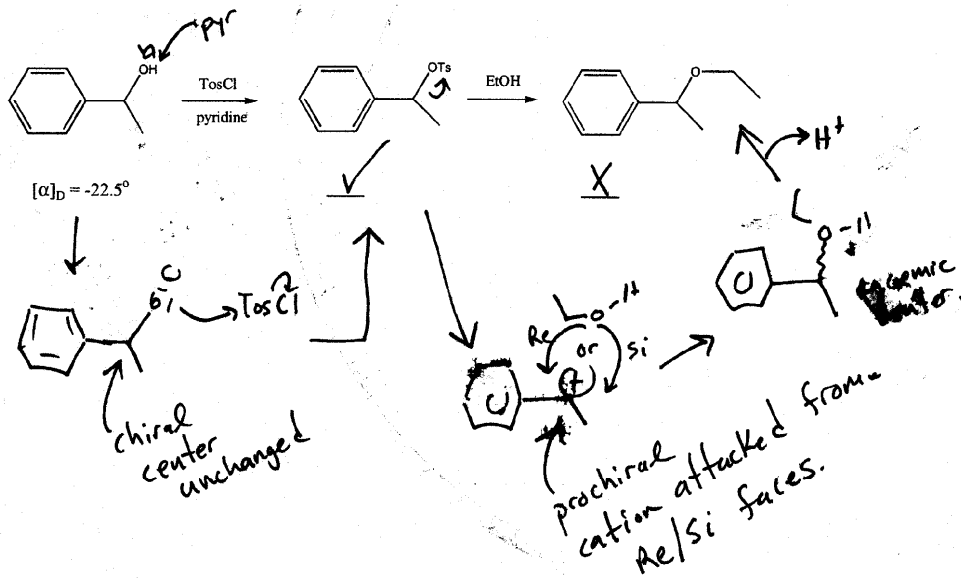
b. The concentration of the iodide is halved. rate halved



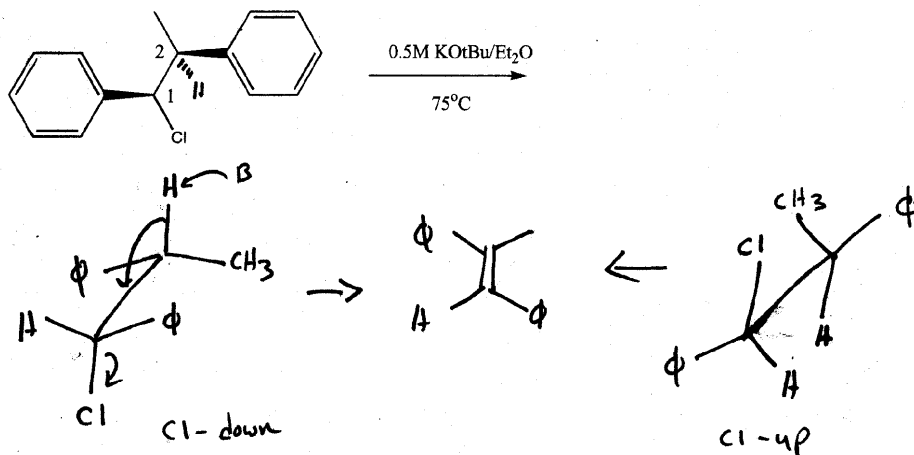
2. (8 pts) How might you prepare the following molecule using a nucleophilic substitution reaction?



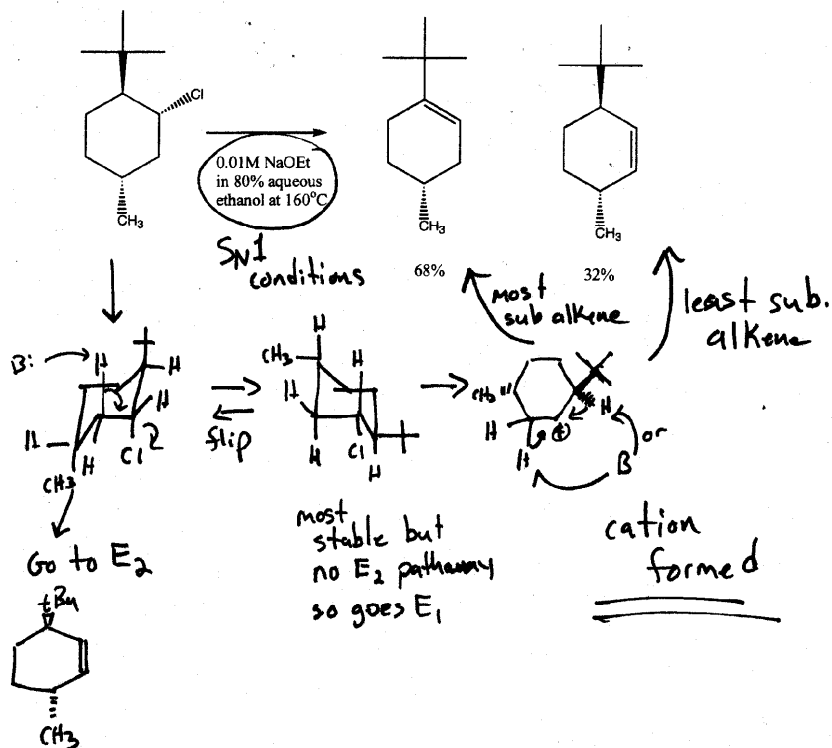
3. (8 pts) Given the following sequence of reactions indicate if the products are optically active by using a check for optical activity and an x for inactivity.



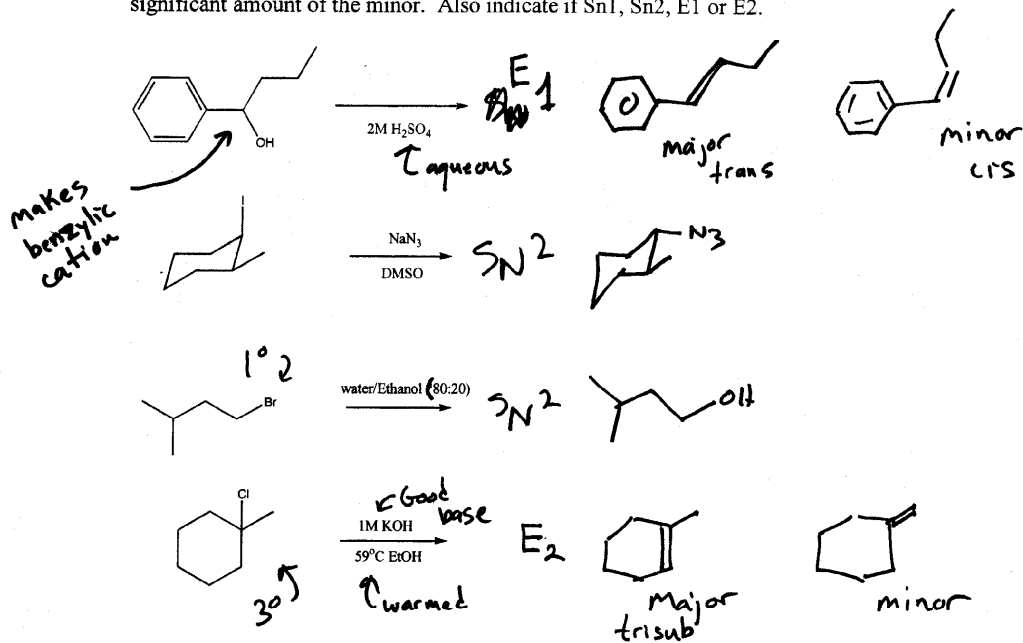
4. (15 pts) Draw the saw-horse projection leading to E2 product. Put the number 1 carbon "in front" and number 2 carbon "in back". Draw the expected product as well.



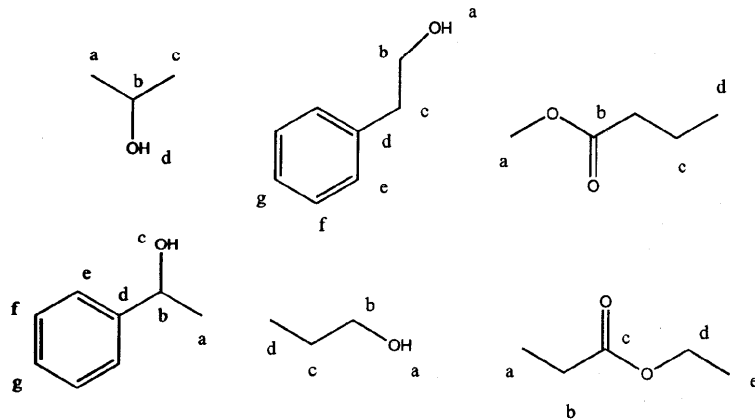
5. (15 pts) Given the following reaction draw the mechanism that leads to the observed products. Indicate if this is  $\text{S}_\text{N}1$ ,  $\text{S}_\text{N}2$ ,  $\text{E}_1$  or  $\text{E}_2$ .



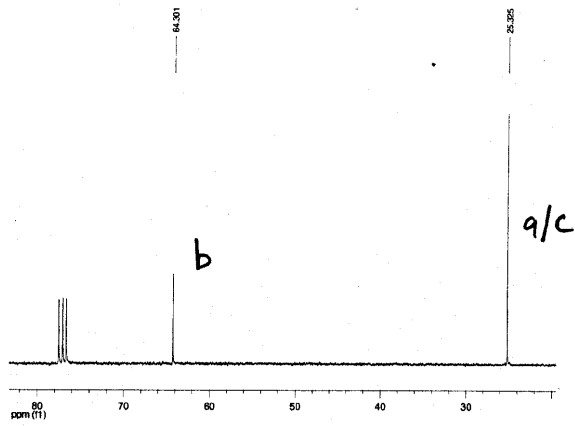
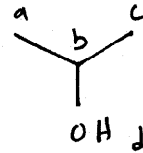
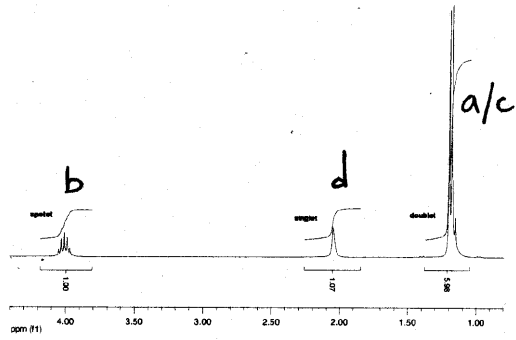
6. (16 pts) Draw the product(s) and indicate major and minor if you expect to observe a significant amount of the minor. Also indicate if Sn1, Sn2, E1 or E2.



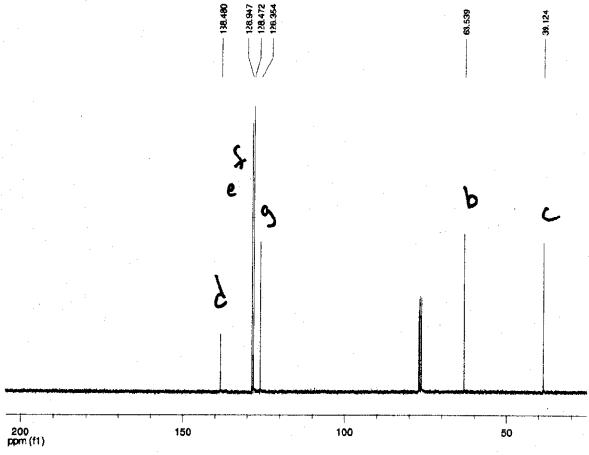
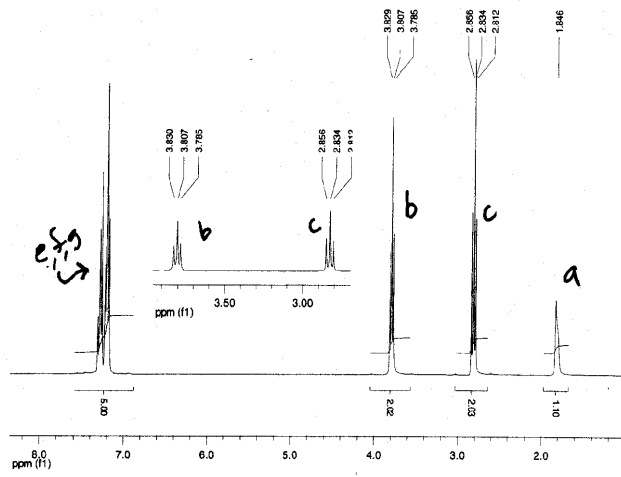
7. (20 pts) Below are three sets of  $^1\text{H}$  and  $^{13}\text{C}$  spectra labeled 1, 2 and 3. Given the following possible structures draw the correct structure beside the spectra. Assign only ONE set of  $^1\text{H}$  and  $^{13}\text{C}$  spectra using the provided labels.



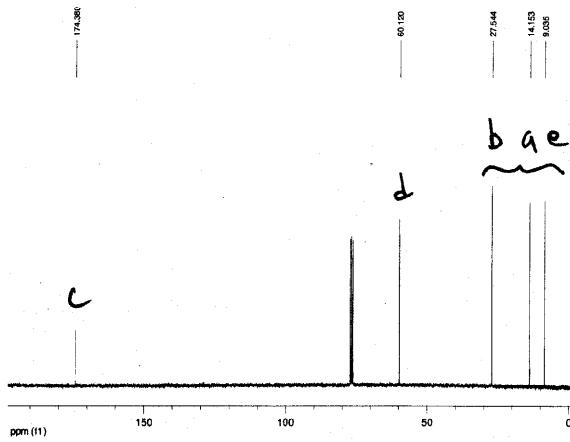
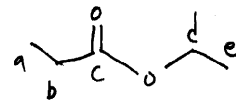
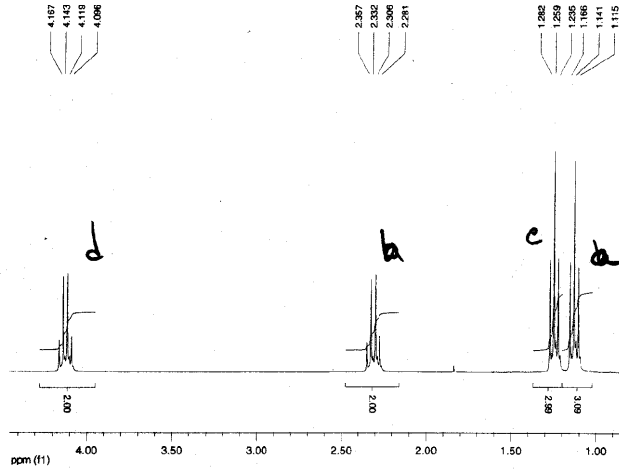
Set 1



Set 2

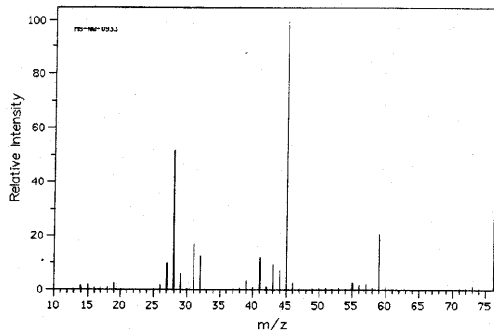


Set 3



Hard to assign  
but order  
is b, a, e

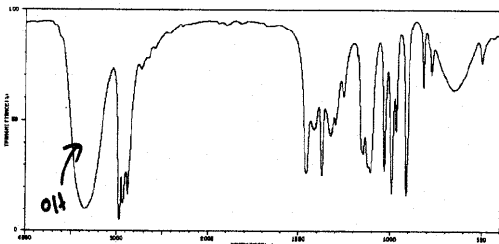
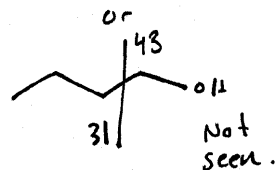
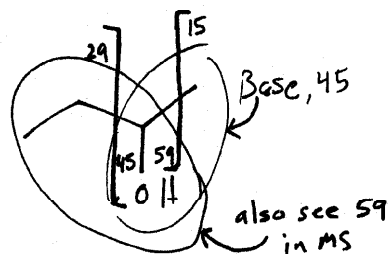
8. (20 pts) Provide a structure for the following unknown yielding a molecular formula of  $C_4H_{10}O$ .



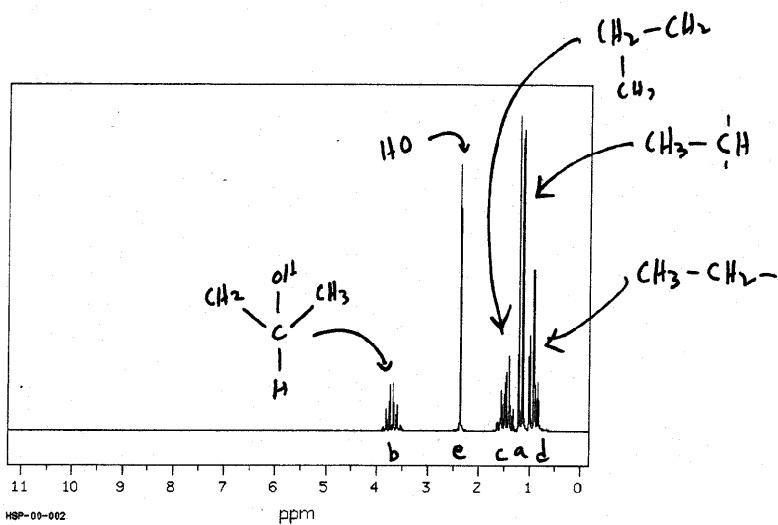
m/e	Int
14.0	1.3
15.0	1.7
19.0	2.5
26.0	1.5
27.0	9.8
28.0	51.5
29.0	6.0
31.0	16.8
32.0	12.3
39.0	3.2
41.0	11.7
42.0	1.0
43.0	9.2
44.0	7.0
45.0	100.0
46.0	2.3
55.0	2.5
56.0	1.5
57.0	1.9
59.0	20.5

$\phi$  sites  $\Rightarrow$  No rings/double bonds  
 F.G.  $R-O-R$   
 $R-O-H$  (IR)  
 chain (No symmetry from  $^{13}C$ )

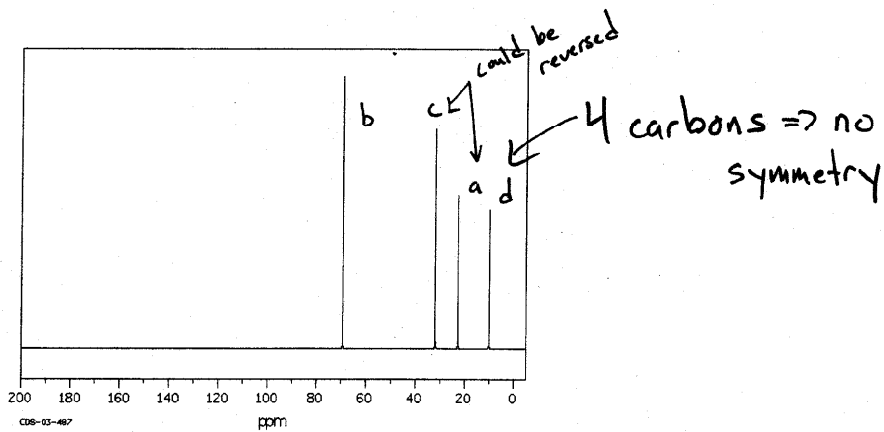
\* Parent not observed



3183	10	1378	24	1110	25	666	60
2988	4	1337	47	1031	26	651	68
2932	12	1290	48	991	10	601	72
2880	16	1226	88	866	43		
2734	70	1154	88	818	18		
1497	28	1148	34	825	82		
1416	44	1122	28	777	88		



0.93ppm 3H triplet, 1.17 3H doublet, 1.46 2H pentet, 2.37 1H s, 3.709 1H sextet



10.01 ppm, 22.83, 32.07, 69.28

