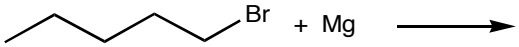
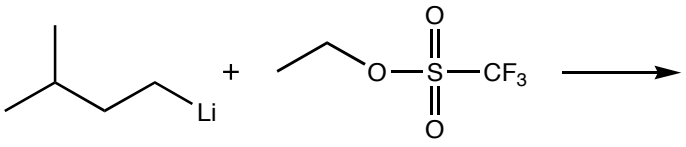
Name _____ Test 4
PHYS 0203 (Organic) Spring 2004

2. Determine the products of the following reactions.

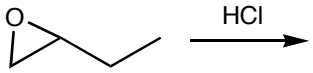
a.



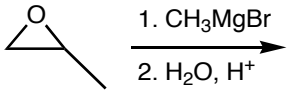
b.



c.



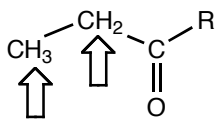
d.



2. Explain why epoxides are more reactive than regular ethers.

3. For each pair of indicated protons, circle the proton that would be shifted farther down field.

a.



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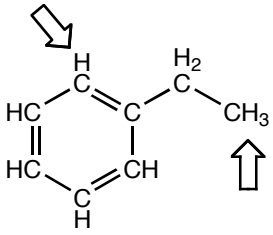
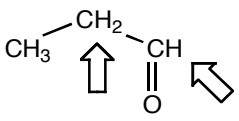
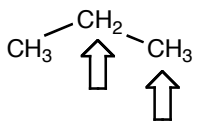


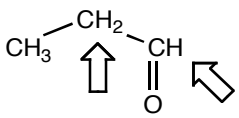
c.



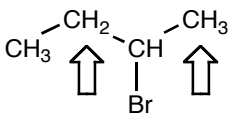
d.



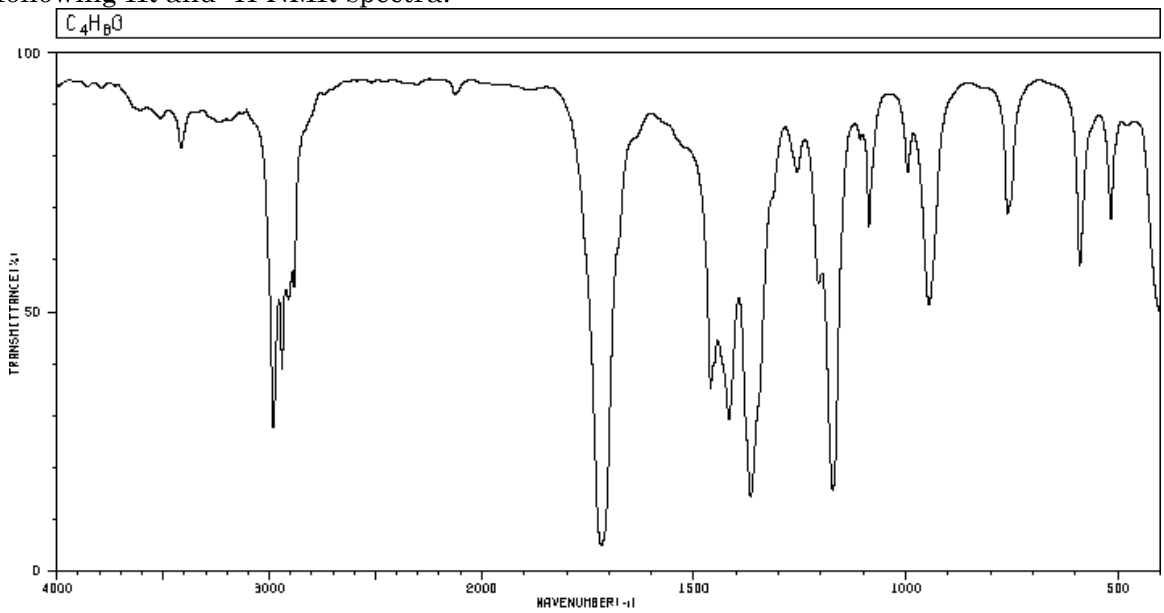
e.



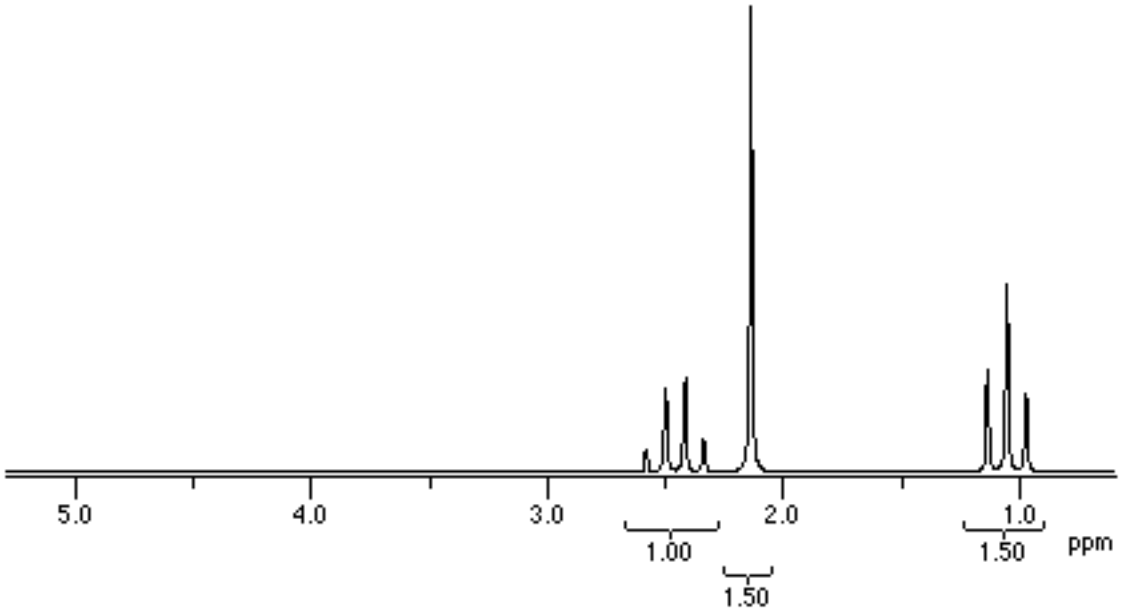
f.



5. Determine the structure of a molecule that has the chemical formula C_4H_8O and has the following IR and ^1H NMR spectra.



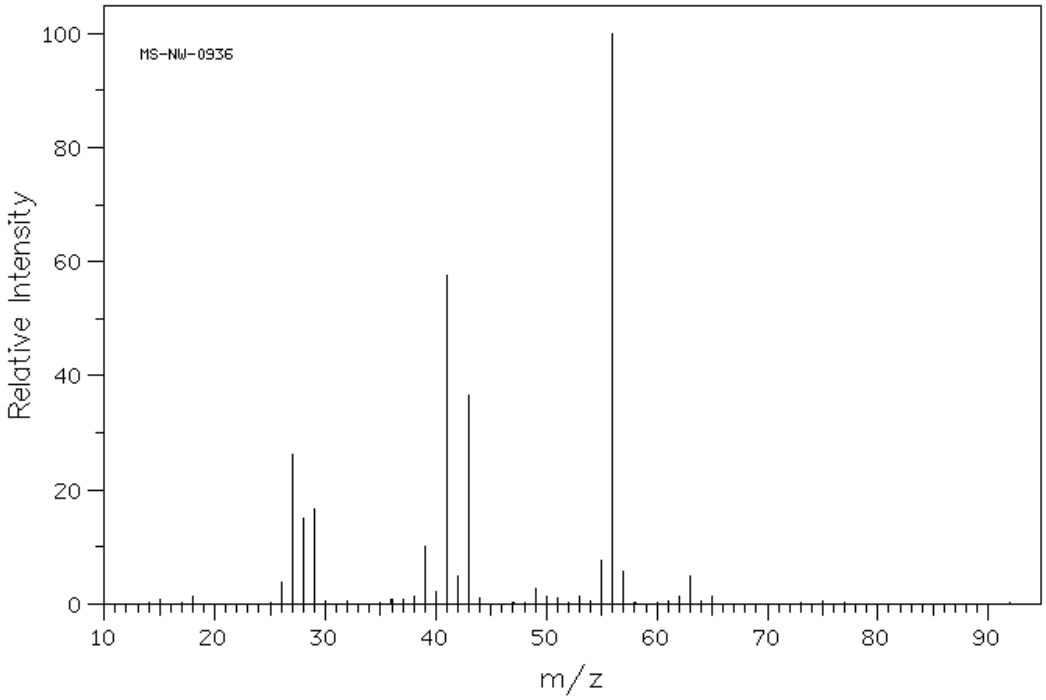
3611	84	1718	4	1173	14
3416	79	1461	34	1087	64
2981	26	1454	38	996	74
2964	44	1417	27	946	49
2940	37	1366	13	761	66
2909	50	1257	74	590	57
2883	62	1206	69	517	66



6. A student examined a mass spectrum and observed that the M+1 peak was 10% the size of the molecular ion peak. Determine the number of carbon atoms in the molecule.

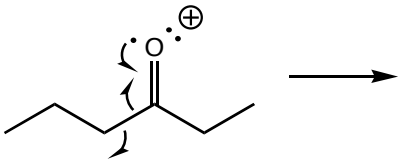
7. A mass spectrum of $CH_3CH_2CH_2CH_2Cl$ is presented below.

m/z	relative abundance
18	1
26	3
27	26
28	15
29	16
38	1
39	10
40	2
41	57
42	5
43	36
44	1
49	2
50	1
51	1
53	1
55	7
56	100
57	5
62	1
63	4
65	1
92	1

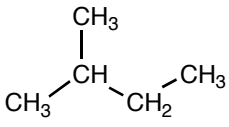


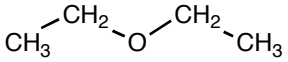
Identify the structures of the fragments that give rise to the peaks at m/z = 43 and 57.

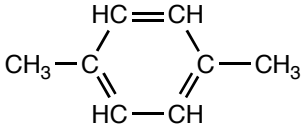
8. Draw the products of the following fragmentation reaction.

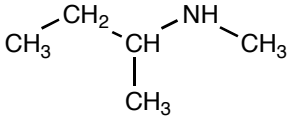


9. Determine the number of chemically inequivalent carbon atoms in the following molecules.

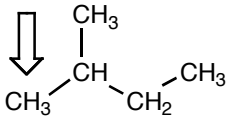
a. 

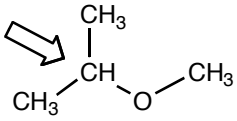
b. 

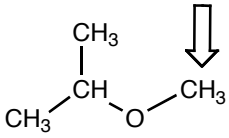
c. 

c. 

10. Determine the multiplicity of the ^{1}H NMR peaks that would result from the indicated hydrogen atoms.

a. 

b. 

c. 

c.