Name ____________________________

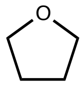
CHEM 0203 (Organic II)

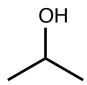
Test 3 (4/8)

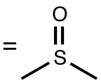
Spring 2013

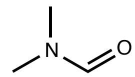
1. ________
2. ________
3. ________
4. ________
5. ________
6. ________
7. ________
8. ________

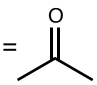
Common solvents used in organic chemistry.

THF = 

2-propanol = 

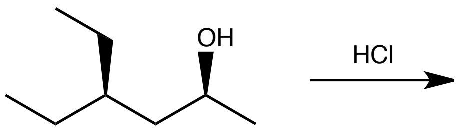
DMSO = 

DMF = 

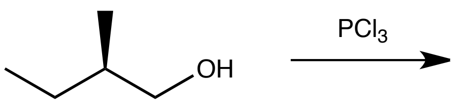
acetone = 

1. (6 pts. ea.) Predict the outcome of the following substitution reactions. Remember to use wedge and dashed bonds to indicate the stereochemical outcome of the reaction where appropriate.

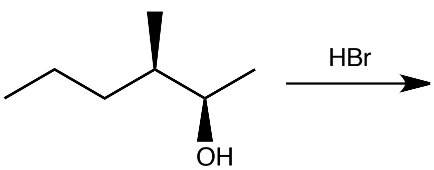
a.



b.

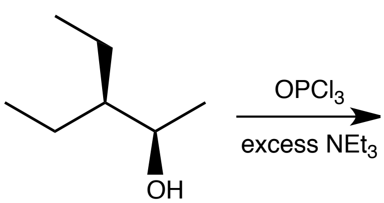


c.

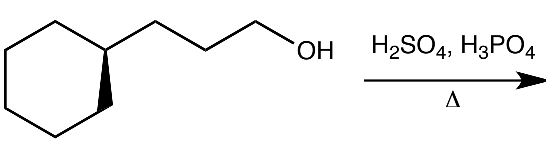


2. (6 pts. ea.) Predict the outcome of the following elimination reactions. List all organic products.

a.

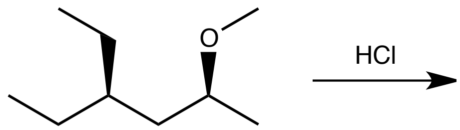


b.

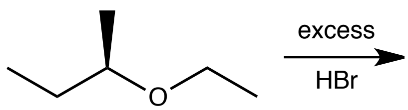


3. (6 pts. ea.) Predict the outcome of the following substitution reactions. Ignore stereochemistry.

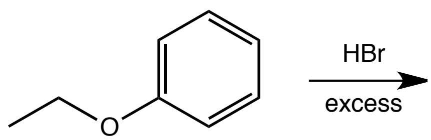
a.



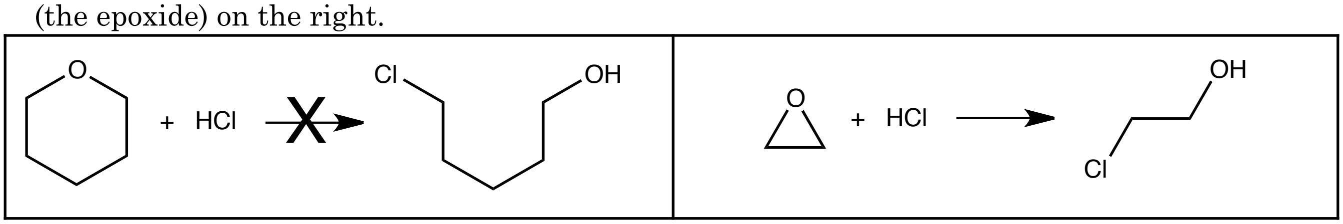
b.



c.



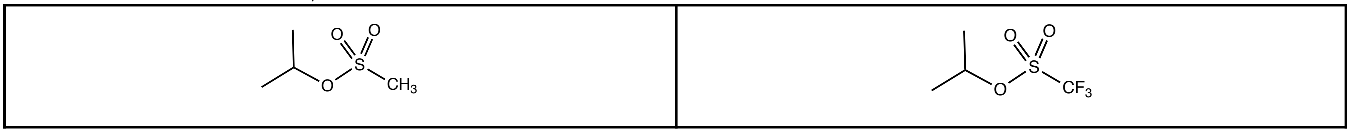
4. The reaction of HCl with the cyclic ether on the left fails, yet it succeeds with the cyclic ether (the epoxide) on the right.



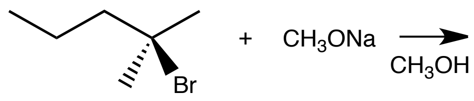
a. (6 pts.) Explain why the lefthand reaction fails.

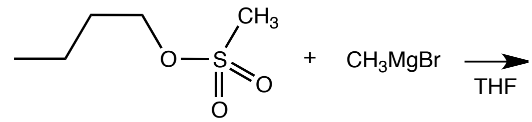
b. (6 pts.) Explain why the righthand reaction succeeds.

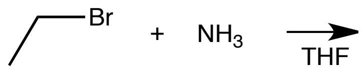
5. a. (4 pts.) Circle the leaving groups on the following molecules.
b. (4 pts.) Determine which of the following molecules has the better leaving group (place a star next to the molecule).

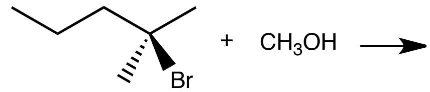


6. (12 pts.) Determine the mechanism that is most likely to predominate (S_N1, E1, S_N2, or E2) under the following reaction conditions.

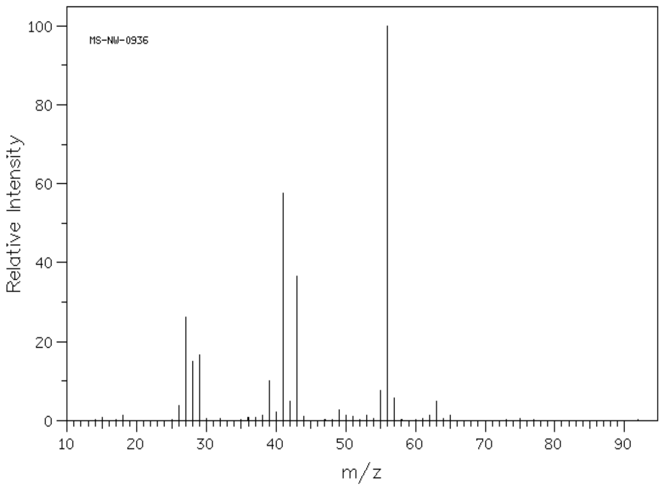




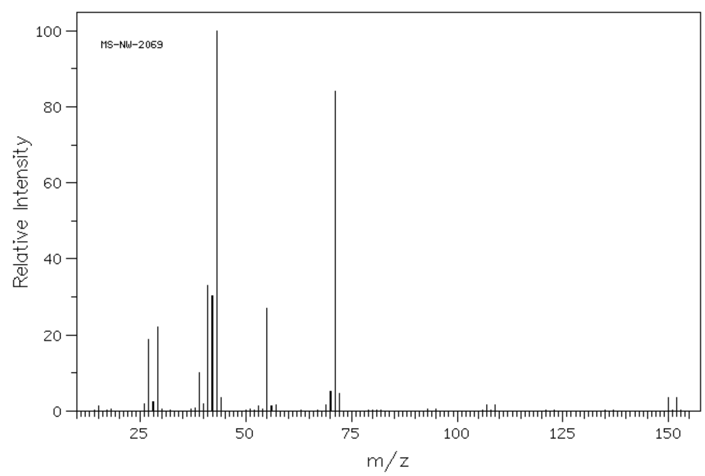




7. (10 pts.) A mass spectrum of $CH_3CH_2CH_2CH_2Cl$ is presented below. Identify (draw) the structures of the fragments that give rise to the peaks at m/z = 43 and 57.



8. (10 pts.) To the right is a mass spectrum of 1-bromopentane. The molar mass of 1-bromopentane is 151.04 g Explain why there isn't a significant peak with an *m*/z = 151, but there are significant peaks with *m*/z = 150 and 152.



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 Ab	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