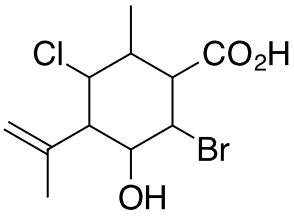
CHM 3342 Exam 3

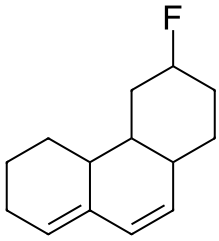
25 pts 1):

The table below lists several simple chemical tests in the rows and some organic compounds in the columns. Place a "+" in the table to indicate a positive result for the test and a "0" to indicate a negative test. (Consider solubility a positive test and insolubility a negative test for H_2O, H_2SO_4, HCl, and NaOH. A positive test for $NaHCO_3$ is evolution of CO_2 bubbles).

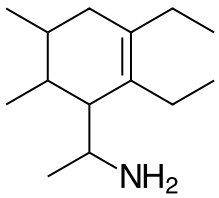
	ethanol	B	C	D	E
H_2O solubility	+	0	0	0	0
aq HCl solubility	+	0	0	+	0
aq NaOH solubility	+	+	0	0	+
conc H_2SO_4 solubility	+	+	+	+	+
$NaHCO_3$	0	+	0	0	0
Decolorizes Br_2/ CCl_4	0	+	+	+	0



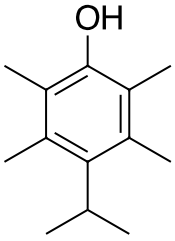
B



C



D



E

30pts 2) For each statement below, write S_N1, S_N2, E1, or E2 if the statement applies to that mechanism.(Some statements are applicable to more than one mechanism)

a) Does not involve a carbocation intermediate S_N2 E2

b) Is first order in haloalkane and zero order in nucleophile S_N1 E1

c) Involves inversion of configuration at site of substitution S_N2

d) Is first order in haloalkane and first order in base S_N2 E2

e) Rearrangements may occur S_N1 E1

f) Order of reactivity of haloalkanes is $3^o > 2^o > 1^o$ S_N1 E1

25 pts 3) Circle the compound in each pair that you would expect to react more rapidly as a substrate via S_N2 mechanism:

a) $CH_3CH_2CH_2Br$ or $(CH_3)_2CHBr$

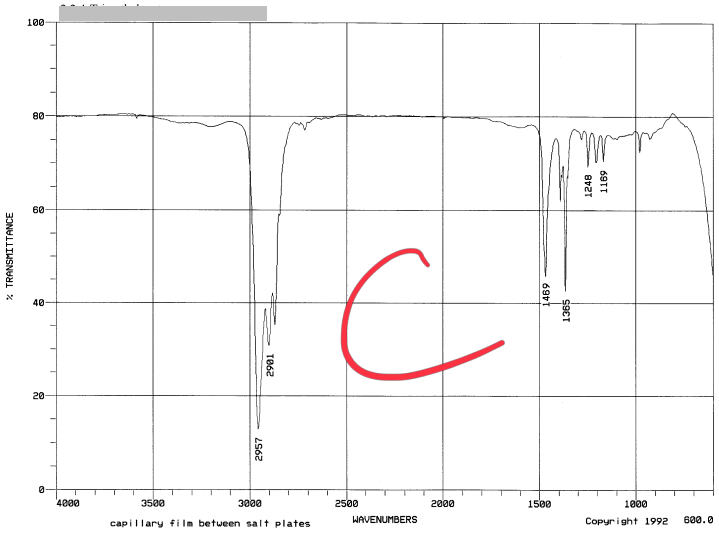
b) $CH_3CH_2CH_2CH_2F$ or $CH_3CH_2CH_2CH_2Br$

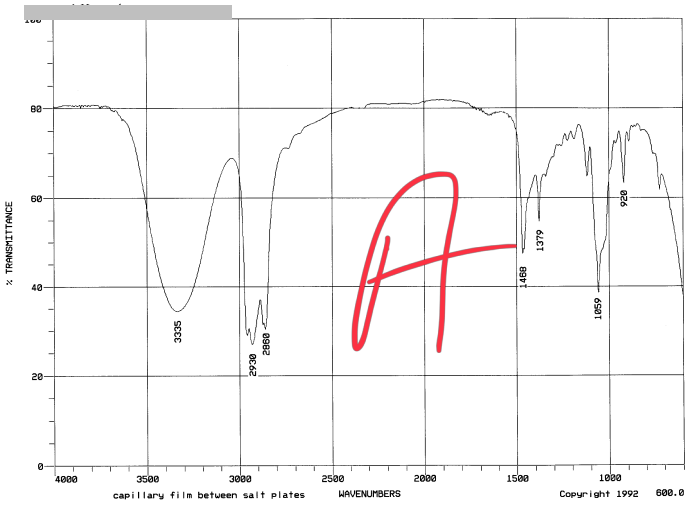
c) $(CH_3)_2CHNH_2$ or $CH_3CH_2CH_2Cl$

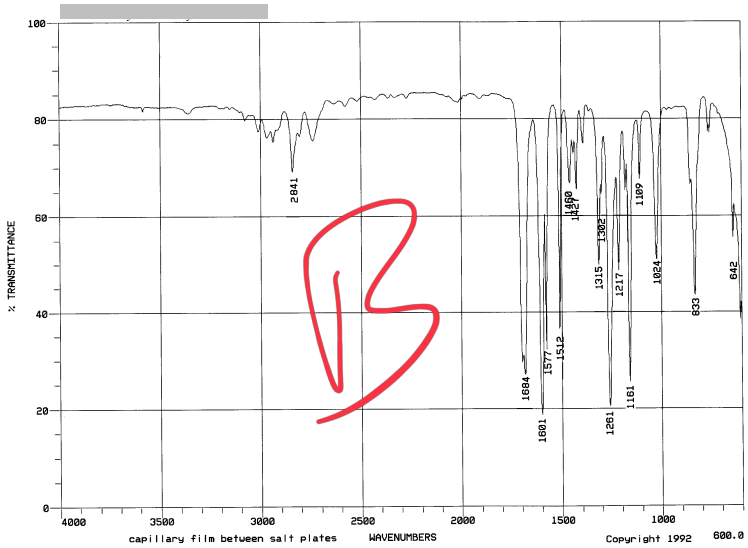
d) $(CH_3CH_2)_2CHOH$ or $(CH_3CH_2)_2CHOCOCH_3$

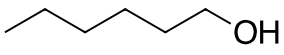
e) CH_3CH_2I or CH_3CH_2OH

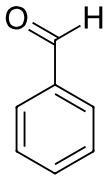
30 pts 4) For the structures below, associate the structure with its IR spectrum (place the correct letter prominently on the spectrum).

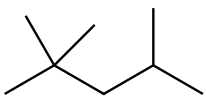




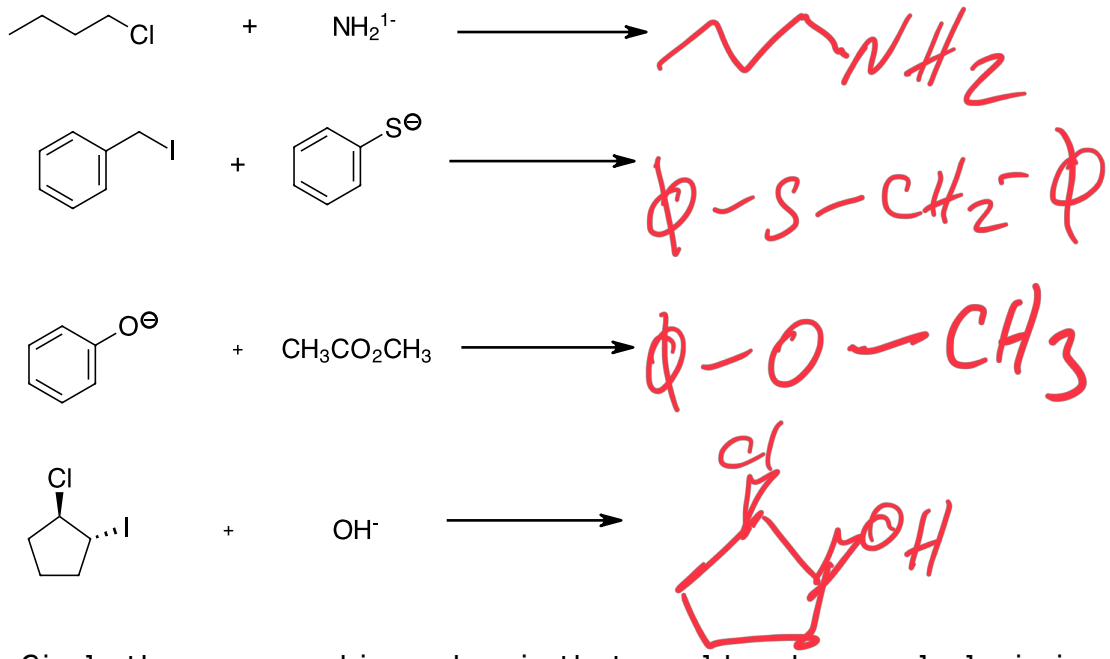


A 

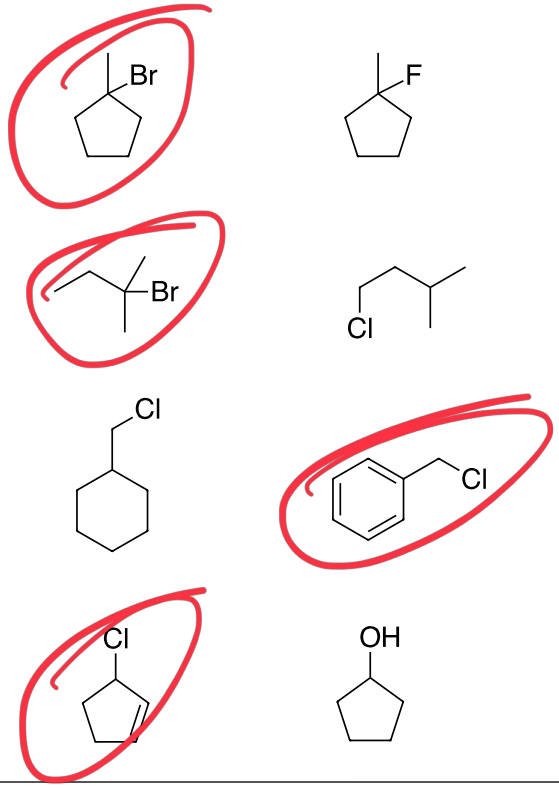
B 

C 

20 pts 5) Show the expected major product for the following S_N2 reactions:

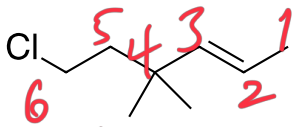


20 pts 6) Circle the compound in each pair that would undergo solvolysis in aqueous methanol more rapidly:

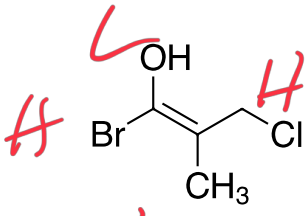


20 pts 7) a) Draw the structure of 2,3,5,5-tetramethyl-2-hexene:

b) Give the IUPAC names for the compound on the left and state whether the compound on the right is (Z)- or (E)-



6-Chloro-4,4-dimethyl-2-hexene



(E)-

30 pts 8) Show the expected major products of the reactions below: