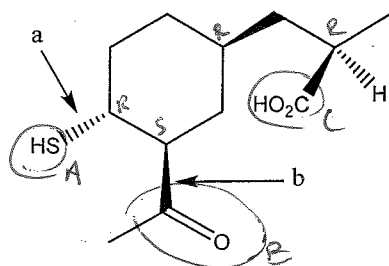


I. Structure/Reactivity

- a. Assign configuration to all stereocenters using (R,S)-notation.



- b. Circle the functional groups, label them (A, B, etc.) and name them.

A: thiol
 B: ketone
 C: carboxylic acid

- c. For the bonds labeled a and b, write the type of bond
- σ
- or
- π
- , and the orbitals that overlap to make those bonds.

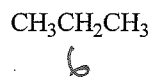
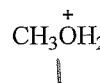
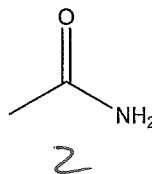
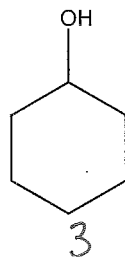
a: σ , $S_{sp^3} - C_{sp^3}$

b: σ , $C_{sp^2} - C_{sp^3}$

- d. What can you tell me in general about bond lengths/strengths? Where is the shortest bond on this molecule? Do you remember bond angles/geometries?

If not, study this...

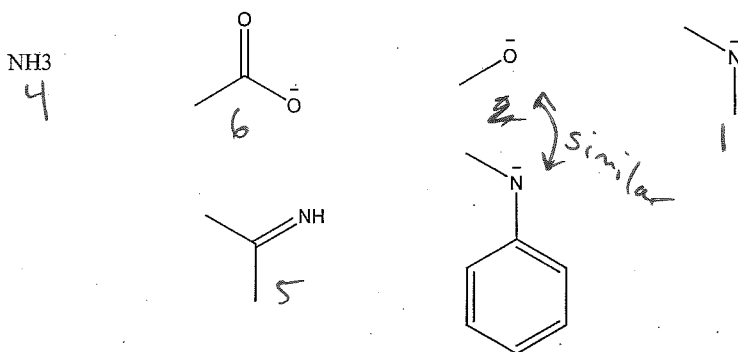
- e. Rank in order of decreasing acidity (1= strongest acid).



- f. Do you remember how element effect works for ranking acidity, leaving group strength, etc.? Can you summarize the important periodic trends?

Well, can you?

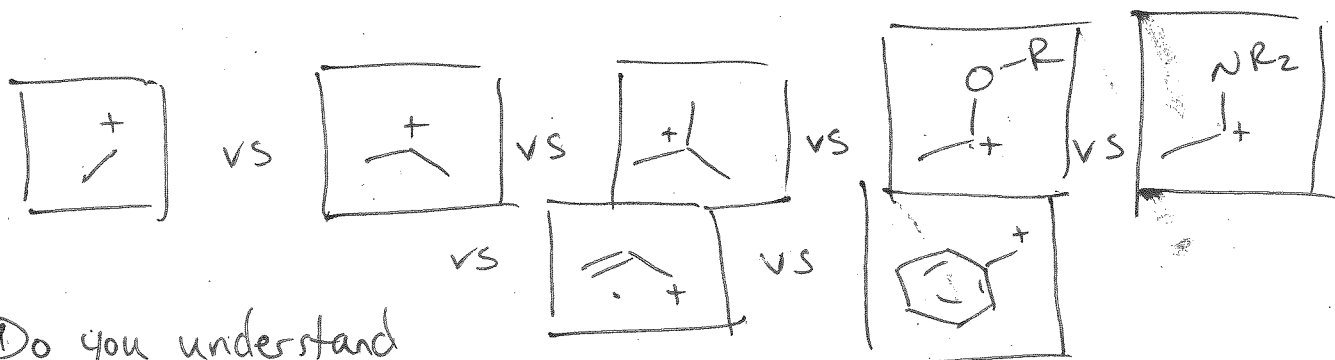
- g. Rank in order of decreasing basicity (1= strongest base).



- h. Can you convert between K_a and pK_a ? Can you look at pK_a and say which is the stronger acid/base? Can you write out a balanced acid/base equilibrium and put the correct pK_a under the correct structures?

Look back at the example on the early quiz.

- i. Explain carbocation stability. Use drawings if needed.



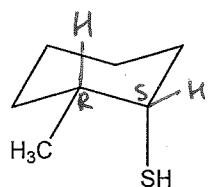
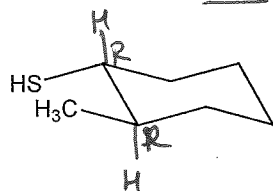
Do you understand hyperconjugation?

j. For each pair of structures, indicate whether they represent enantiomers, diastereomers, identical structures, resonance structures, or constitutional isomers, or none of the above.

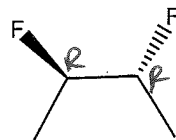
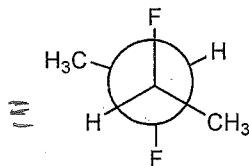
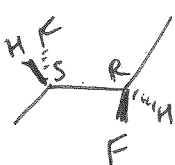
(2S,3S)-2,3-dichloropentane and (2R,3R)-2,3-dichlorohexane

none of the above

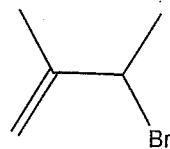
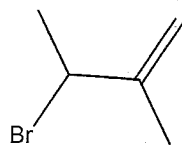
Are you comfortable with chairs? →



Diastereomers



Diastereomers (is one meso?)

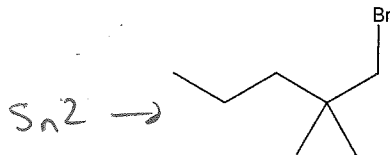
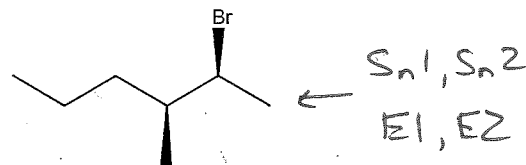
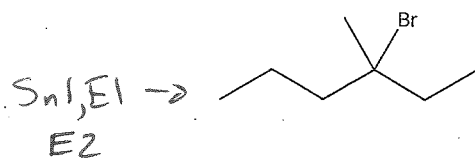
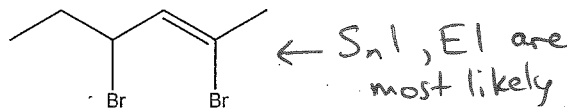
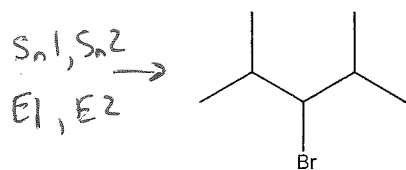


Same structure

k. If several compounds are drawn, can you find a pair of enantiomers, diastereomers, and a meso compound? Are you prepared to explain optical rotation for a pure compound/mixture?

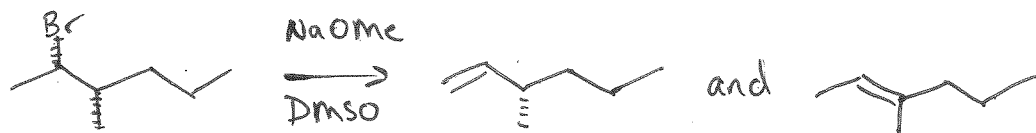
Practice.

l. For the compounds below, can you identify which can/cannot undergo S_N1 , S_N2 , E1, E2? Can you draw, label, and explain energy diagrams for all four types of reactions?



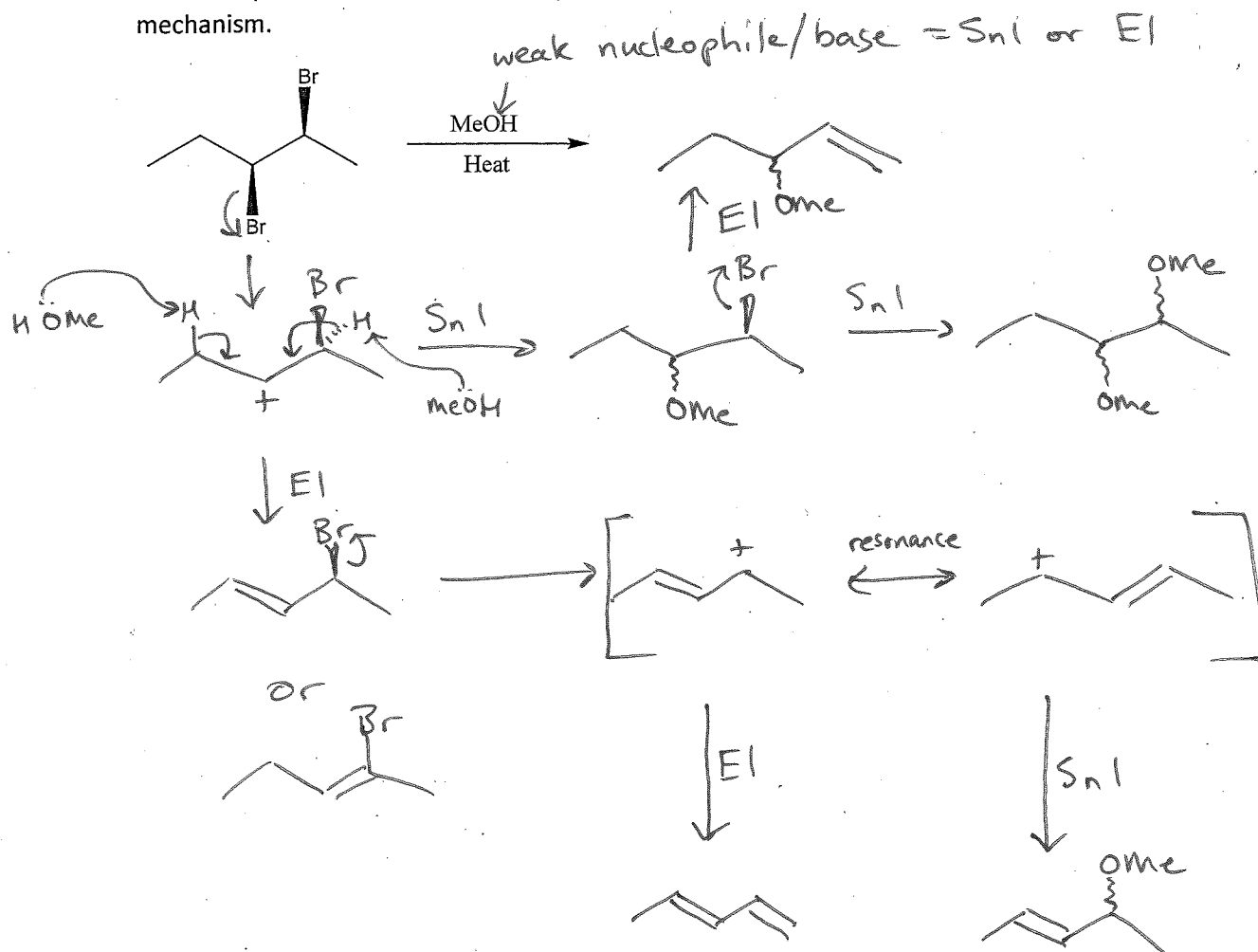
II. Organic Reactions/Synthesis

1. Using 2S-bromo-3S-methylhexane, draw all possible E2 products that could be formed and list specific conditions that would favor the E2 mechanism.



Conditions: strong base, polar aprotic solvent
less important

2. Draw the products that would be formed from the reaction shown below. Draw the mechanism.



There is a lot going on here. If you are having trouble seeing it all, feel free to ask. This is supposed to be a challenge problem.