CHEM 8321/4321 **uploaded September 11, 2023**

Problem Set #2 **T. R. Hoye**

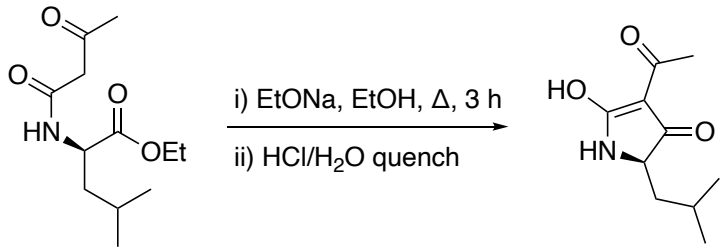
Due in class, Monday September 18, 2023

Detailed Mechanism Provide a detailed mechanism [i.e., explicitly show (using curly arrows) *EVERY* intermediate, formal charge (where relevant), equilibrium, and bond-making and -breaking step, including each proton transfer] to account for reactions **a** and **b**.

In most cases, mechanisms of reactions proceeding under acid (or cationic) conditions involve *only* neutral or positively charged intermediates,* and mechanisms of reactions proceeding under basic (or anionic) conditions involve *only* neutral or negatively charged intermediates.*

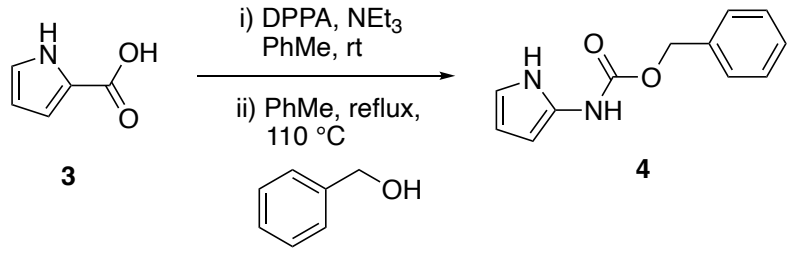
(* those species derived from the organic starting material. Of course, since charge is neither created nor destroyed, there is *always* a counterion of opposite charge present to balance the cationic or anionic charged intermediate.)

(**a**) The Dieckmann condensation of compound **1** to form enone **2**.



1 **2**

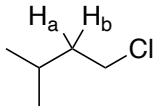
(**b**) The formation of carbamate **4** by first treating carboxylic acid **3** with diphenylphosphoryl azide (DPPA) then phenylmethanol (aka benzyl alcohol) in refluxing toluene. What is the name of the functional group formed after the first step? (Hint: This the Curtius rearrangement K&C pp 116–117.)



3 **4**

Other Problems (*Stereochemistry*)

1. Indicate whether the indicated protons, H_a and H_b, in the following molecules are homotopic, diastereotopic, or enantiotopic.

a) 

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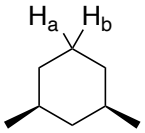
b) 

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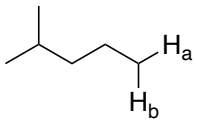
c) 

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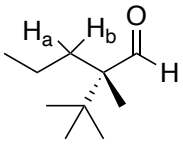
d) 

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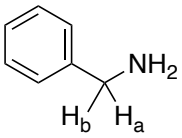
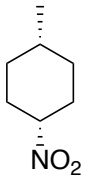
e) 

9

2. Draw the most stable conformer of the following compounds.



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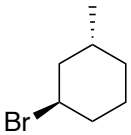

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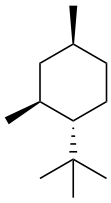

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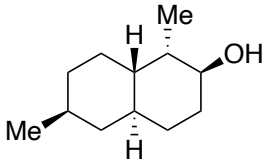
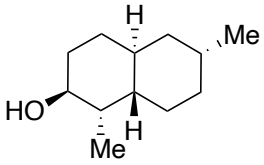
3. Draw a 3D representation of a conformation of 1-phenylhexane that contains one (and only one) syn-pentane (1,7-H,H-) interaction.

4. Indicate (circle the word) whether the two stereoisomers for the following pairs of structures are the *same*, a pair of *enantiomers*, or a pair of *diastereomers*. *If* they are diastereomers, indicate the number of stereogenic centers that are different in the two structures. Ignore differences in conformation.

a)



13a

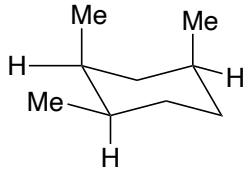


13b

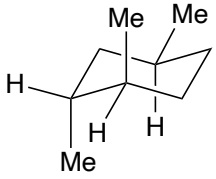
same enantiomers diastereomers

# of diff. stereocenters? _____

b)



14a

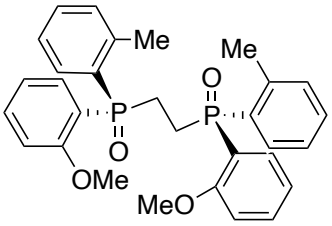


14b

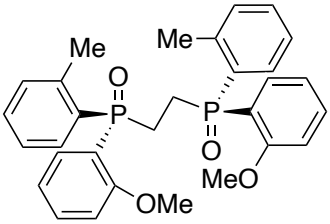
same enantiomers diastereomers

# of diff. stereocenters? _____

c)



15a

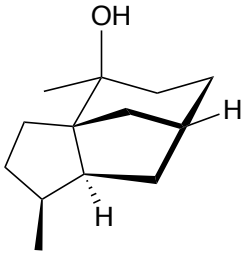


15b

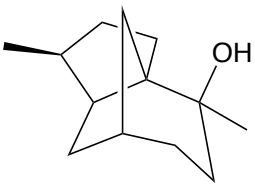
same enantiomers diastereomers

# of diff. stereocenters? _____

d)



16a



16b

same enantiomers diastereomers

# of diff. stereocenters? _____