

Student Name: Key (please print)

Honor Pledge: _____ (signature)

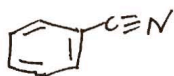
You have 50 minutes to complete this exam. Exams are due promptly at 10:50. Partial credit will be given for partially correct answers in most cases, so be sure to show your work.

I. General Knowledge & Exam 3 review (44 pts)

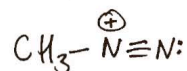
1. (9 pts) Give the structures of the molecules indicated below and provide the names of any structures shown.



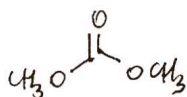
methyl propionate



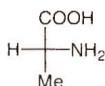
benzonitrile



methyldiazonium cation
(show the Lewis structure!)



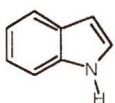
dimethyl carbonate



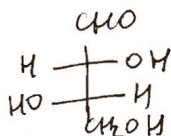
D-Alanine



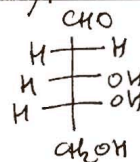
Pyrrolidine



indole



any L-aldotetrose



D-2-deoxyrybose (Fischer projection)

2. (6 pts) True or False. Read the questions carefully. (Circle T or F)

i. More basic amines have lower electron density on the nitrogen atom.

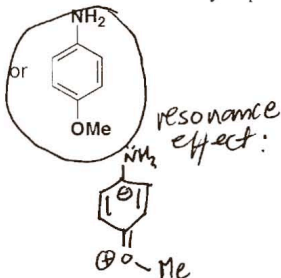
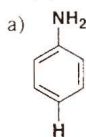
T F

ii. Naturally occurring sugars belong to the D family.

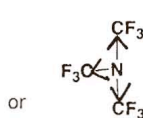
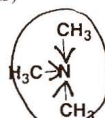
T F

iii. Alkyldiazonium salts are unstable.

T F

3. (6) Circle the **more basic amine** and briefly explain why (you may use resonance structures):

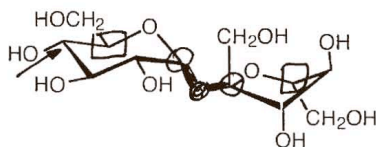
b)



inductive effect of CH_3 vrs CF_3

problem	points	name: _____
I. general knowledge (page 1)	_____ (21 pts)	
	(page 2) _____ (23 pts)	
II. reactions	_____ (32 pts)	
III. mechanisms	_____ (20 pts)	
IV. synthesis	_____ (10 pts)	
TOTAL	_____ (106 pts) (6 pts extra credit)	

4. (12) In the shown below structure of a disaccharide
- Circle the anomeric carbons
 - Box-in the family carbons
 - Point an arrow at carbon atom(s) which differ in stereochemistry from that in galactose
 - Outline the glycoside link(s).
 - Identify individual sugars and rings (below) 6
 - Is it a reducing sugar? (Yes/No) circle one



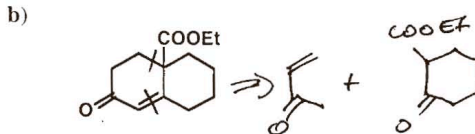
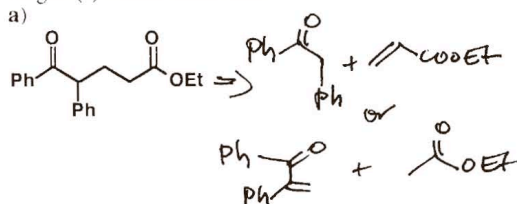
Provide **full** name for this structure:

(sucrose)

2-O- α -D-glucopyranosyl- β -D-fructofuranoside

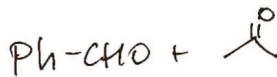
sugar 1 glucose 2 fructose
 ring pyranose furanose

5. (6 pts) Write the organic reactant(s) needed to prepare the products below in one step and provide the needed reagent(s) and/or conditions.

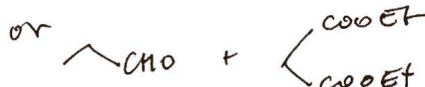


6. (5 pts) List **two** requirements for molecules participating in successful **mixed** aldol condensation reactions and show an example for such a reaction.

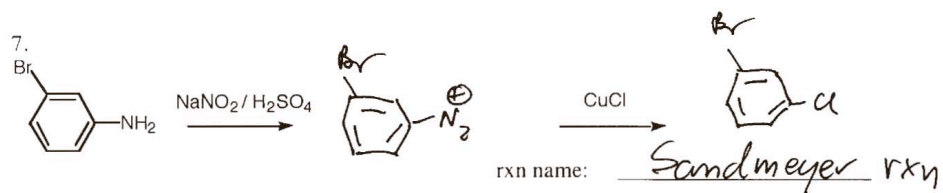
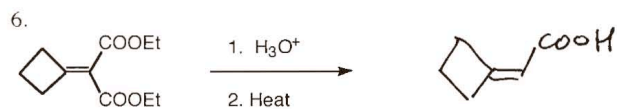
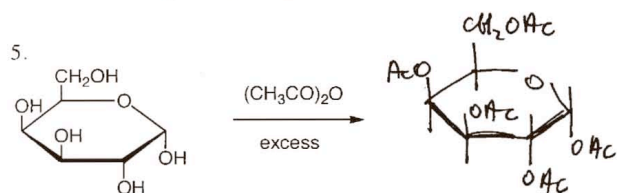
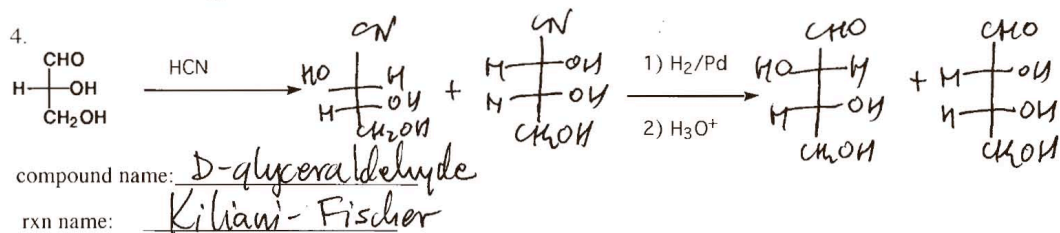
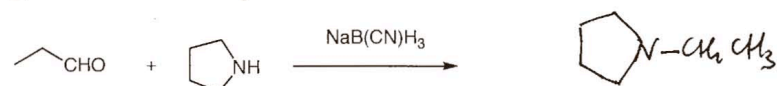
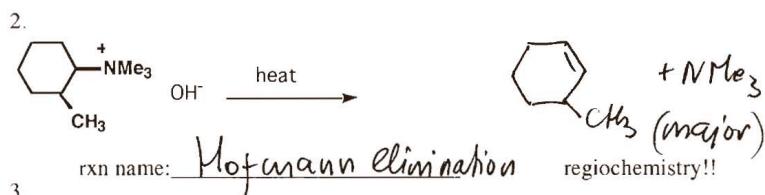
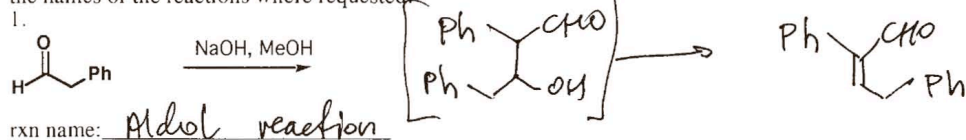
a) only one enolizable Example



or
 b) very different pKa

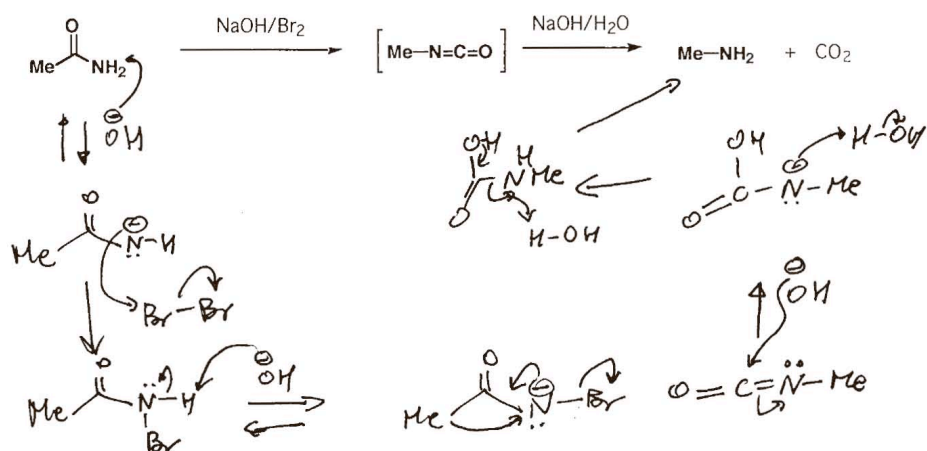


II. Reactions (32 pts, 3 pts each reaction reaction, + 1 pt for each name) Draw structures (including stereochemistry) of the expected organic products formed under the following reaction conditions and provide the names of the reactions where requested.

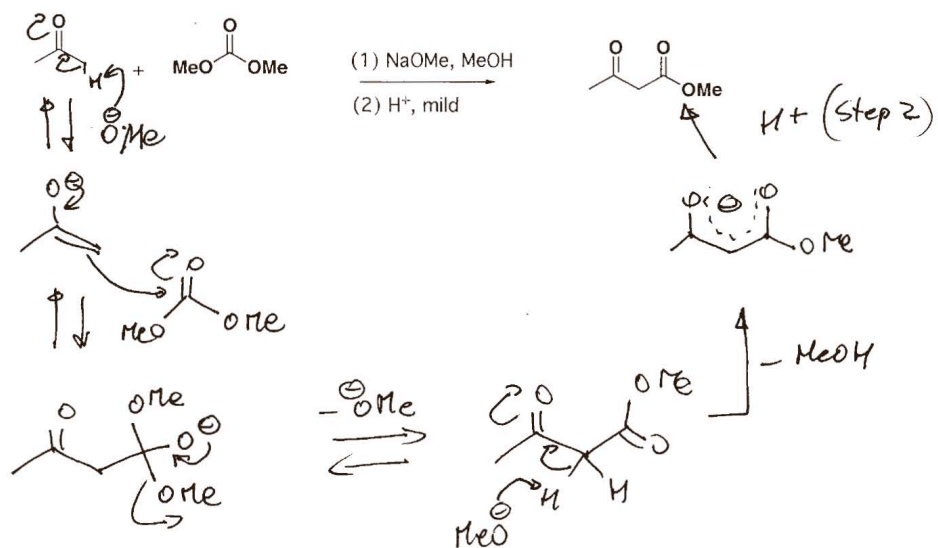


III. Mechanism (20 pts) Provide detailed mechanisms for the transformations given below, showing every step in the process clearly. Use electron-pushing arrows to indicate the flow of electrons.

(a) (10 pts)

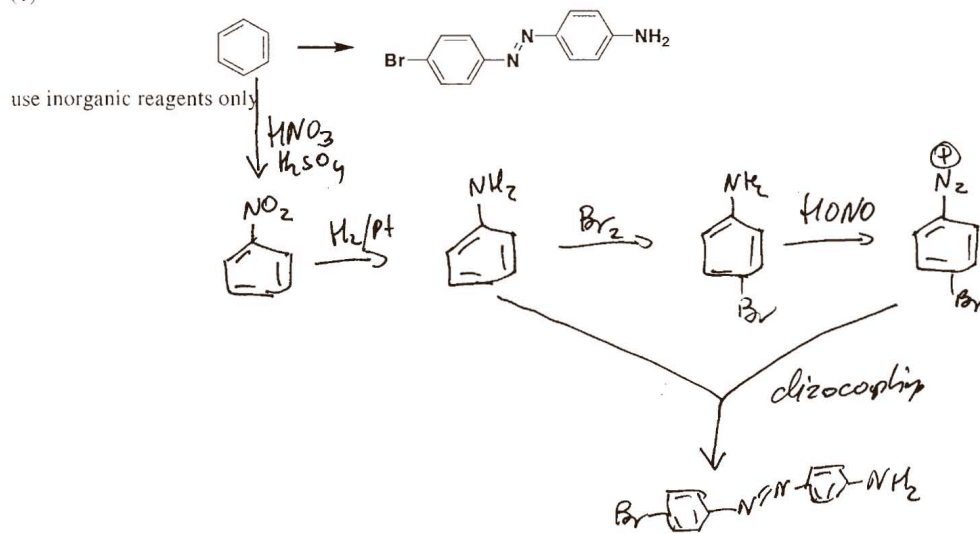


(b) (10 pts)



IV. Synthesis (10 pts) Provide a reaction sequence to accomplish *one of the two* following conversions (left to right) using any reagents needed to convert the carbons of the starting material into the product structure. Show reactants, products, and necessary reagents for each step in the sequence, but do not show mechanisms here. **Mark clearly** the problem that you want us to grade. Each synthesis requires a minimum of 4 steps.

(1)



(2)

