Please print:

Last name: Answer key

First name: _____

Chem 2062 Exam 3, Individual Portion

Spring 2006

Andy Aspaas, Instructor

Monday, April 10, 2006

Instructions:

You have 55 minutes to complete this portion of the exam.

5 questions are included in this portion of the exam, worth a total of 80 points.

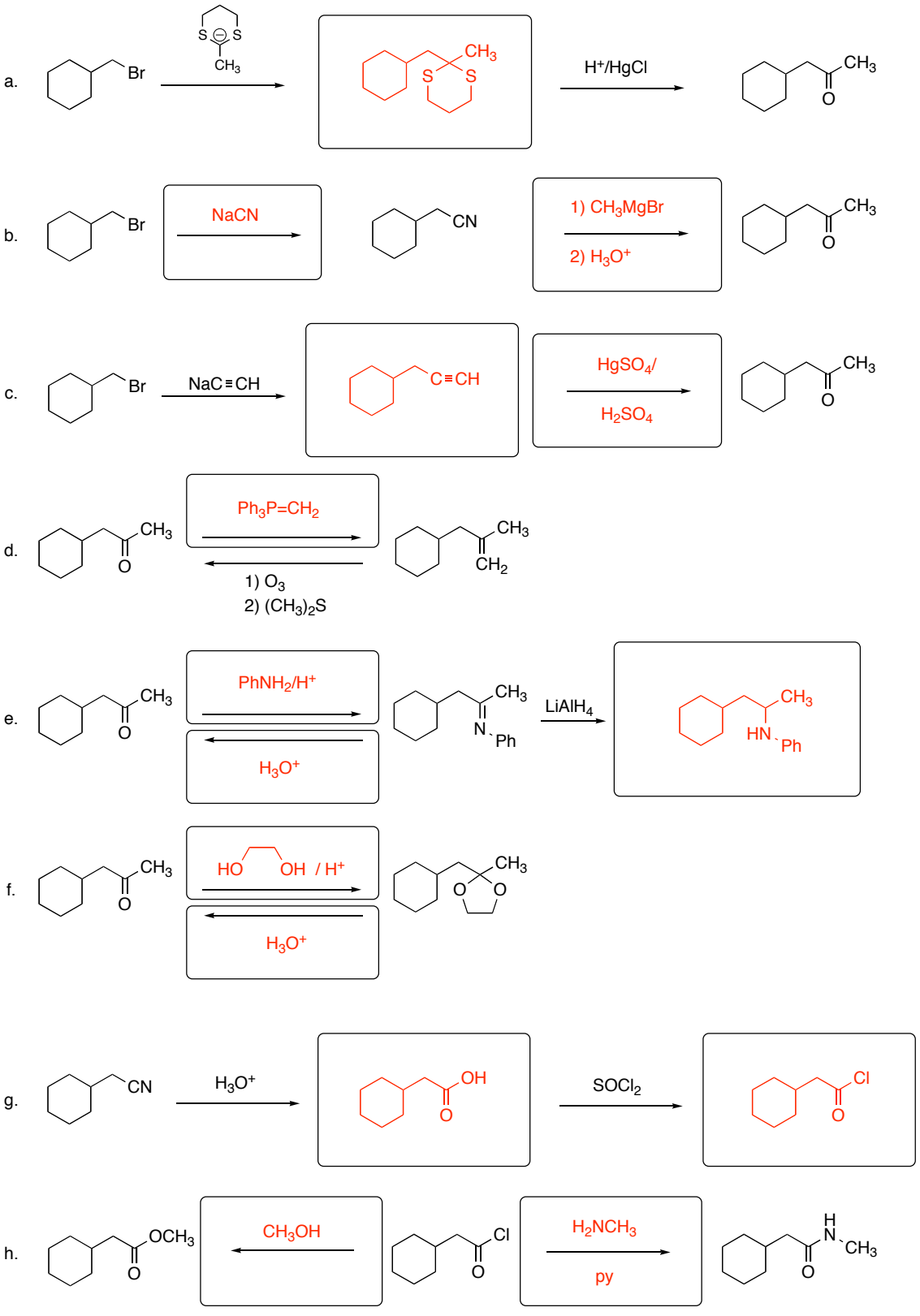
The remaining 20 points of the exam will be completed in groups tomorrow. It will involve organic synthesis and retrosynthesis, so prepare accordingly.

No model kits or calculators may be used.

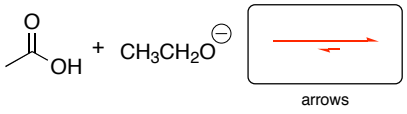
I, _____ have read and understand the directions given above, and pledge that I will follow all regulations with regard to Academic Dishonesty as outlined by this college when taking this exam.

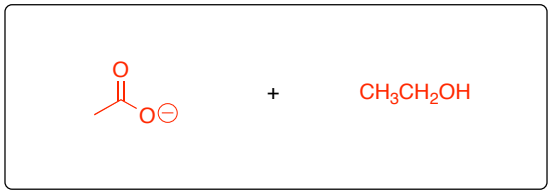
Signature _____ Date and Time _____

1. *(30 pts)* Complete the following reactions by drawing the missing reagents, organic reactants, or organic products in the boxes. ***Count your carbons!***

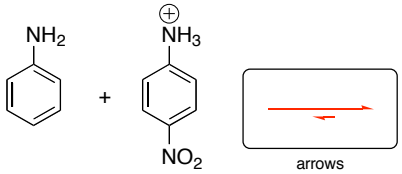


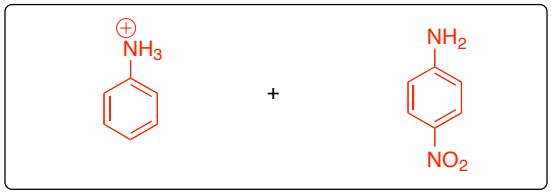
2. *(10 pts)* Predict the most likely products for the following acid/base reactions, and indicate with proper arrows the direction in which the equilibrium lies (*i.e.* to the left or to the right). Briefly explain your rationale.

a. 



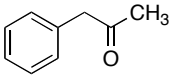
Explanation: carboxylate ion is resonance stabilized, so right is favored

b. 

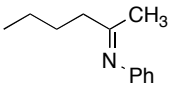


Explanation: nitroaniline's conjugate acid is destabilized (NO_2 is electron withdrawing), so right is favored

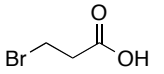
3. *(16 pts)* Name these compounds:

a. 

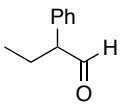
name: 3-phenyl-2-propanone or benzyl methyl ketone

b. 

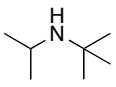
name: 2-hexanone phenyl imine or N-phenylhexan-2-imine

c. 

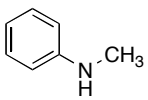
common name: ß-bromopropionic acid
IUPAC name: 3-bromopropanoic acid

d. 

common name: α–phenylbutyraldehyde
IUPAC name: 2-phenylbutanal

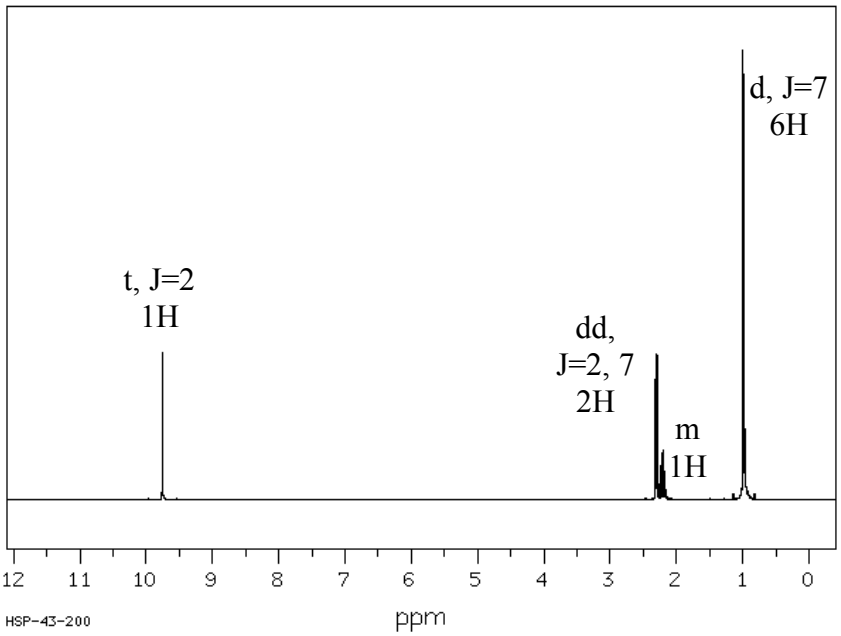
e. 

name: t-butyl isopropyl amine

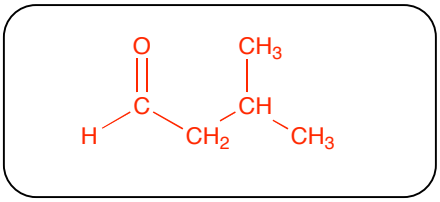
f. 

name: N-methylaniline or methyl phenyl amine

4. *(10 pts)* Identify the compound which has the following ^{1}H NMR spectrum and MS data:

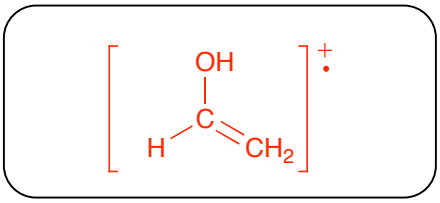


MS molecular ion: 86 m/z. MS base peak: 44 m/z.



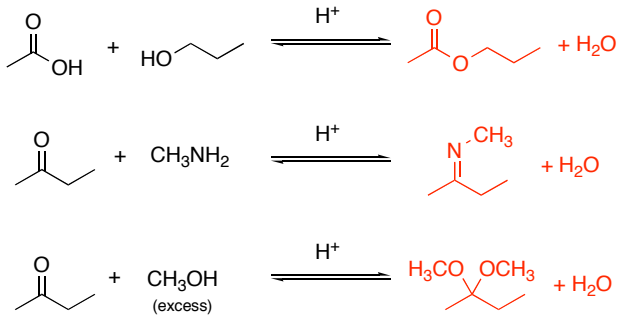
structure

Draw the fragment that accounts for the MS base peak.
(Hint, it comes from a McLafferty rearrangement)

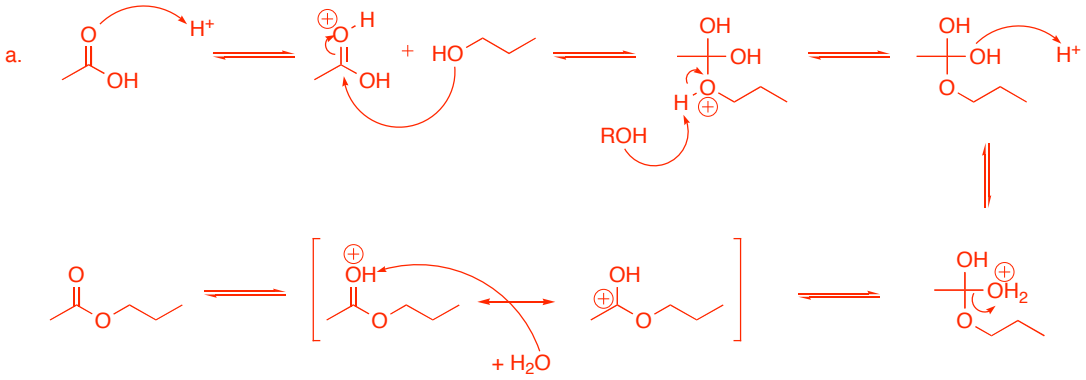


44 m/z fragment

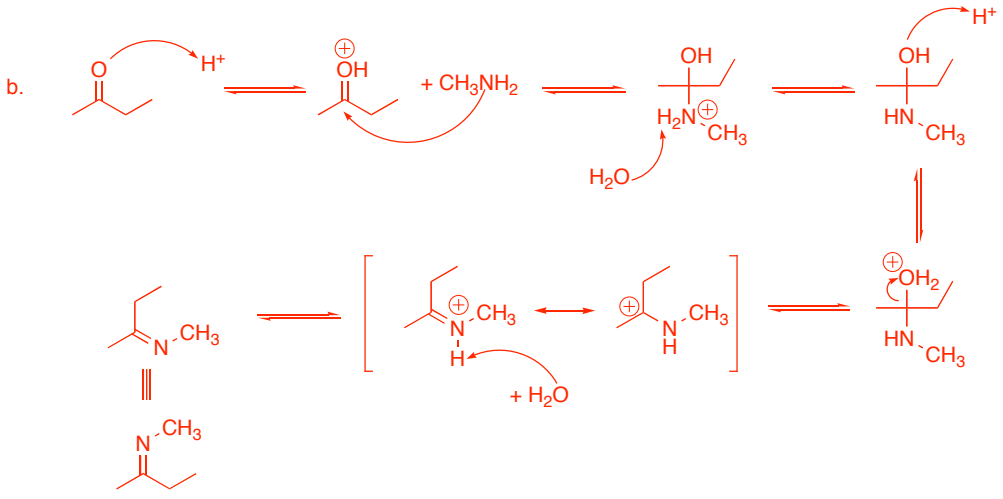
5. *(14 pts)* ***Choose one*** of the following reactions, predict its products and draw its full mechanism.



a.

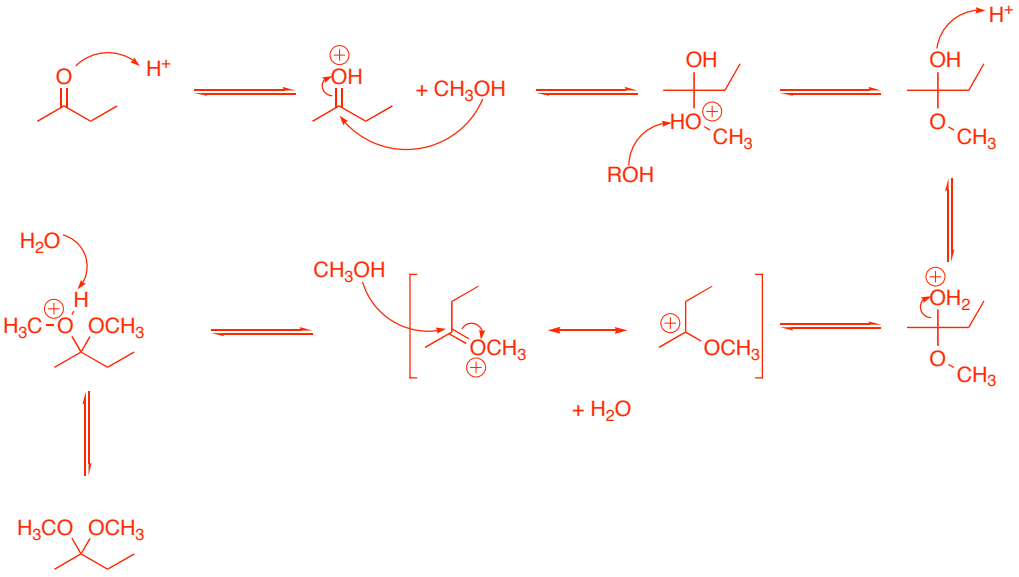


b.



(continued on next page)

c.


O
H+
OH
+ CH3OH
OH
HO
CH3
ROH
OH
O
CH3
H+
H2O
H
H3C
O
OCH3
CH3OH
OCH3
OCH3
+ H2O
OH2
O
CH3
H3CO
OCH3