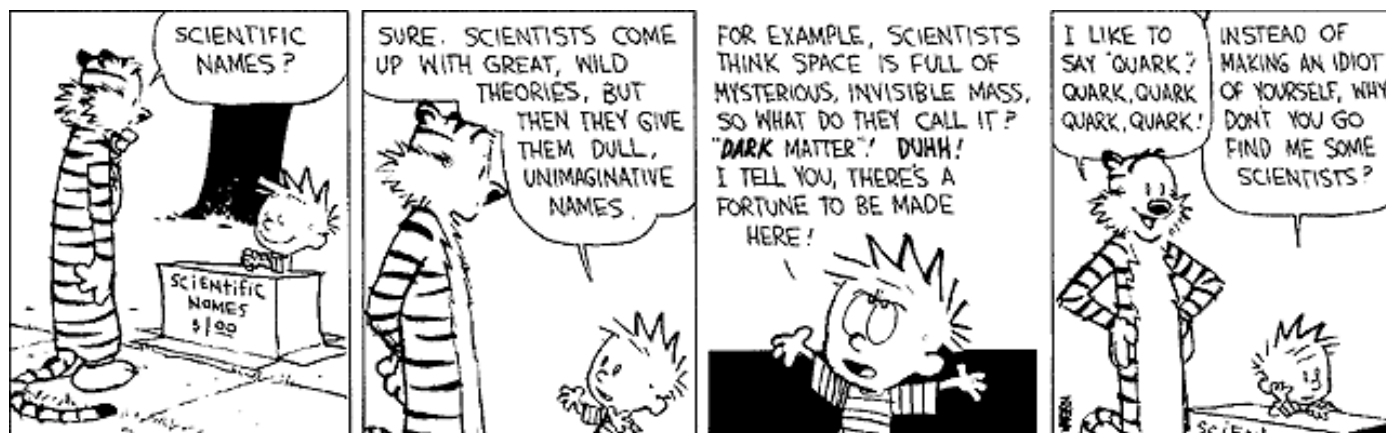


NAME \_\_\_\_\_

KEY \_\_\_\_\_



Please read through each problem carefully. Enter your answers in the spaces provided.

Problem 1 6 pts \_\_\_\_\_

Problem 2 10 pts \_\_\_\_\_

Problem 3 10 pts \_\_\_\_\_

Problem 4 24 pts \_\_\_\_\_

Problem 5 15 pts \_\_\_\_\_

Problem 6 26 pts \_\_\_\_\_

Problem 7 9 pts \_\_\_\_\_

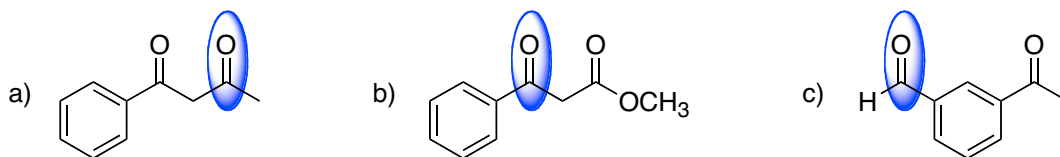
TOTAL 100 pts \_\_\_\_\_

A note about drawing structures: you should make your drawings as clear as possible to understand. Stereochemistry should be indicated unambiguously using conventional drawing techniques (eg. bold wedges and dashes).

The most common mistake on an exam is not reading the question carefully. I suggest you go through the exam and answer the questions that come easily. Then go back and tackle the more challenging problems. Finally, check any work you have done, but remember, your first instinct is usually correct.

If you need scrap paper or more room, use the back of the test pages.

1. On EACH molecule below, circle the carbonyl group that is most reactive. (6 pts)



2. Answer the following true or false questions. (10 pts)

  T   a) Acid catalyzed cleavage of *tert*-butyl cyclohexyl ether will yield cyclohexanol and 2-methylpropene.

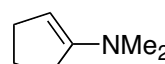
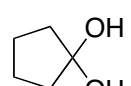
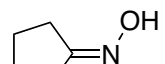
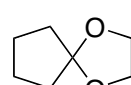
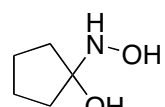
  T   b) The addition of a Grignard reagent to a carbonyl constitutes a reduction of the carbonyl carbon.

  F   c) Epoxides are very stable and can only be opened with HI.

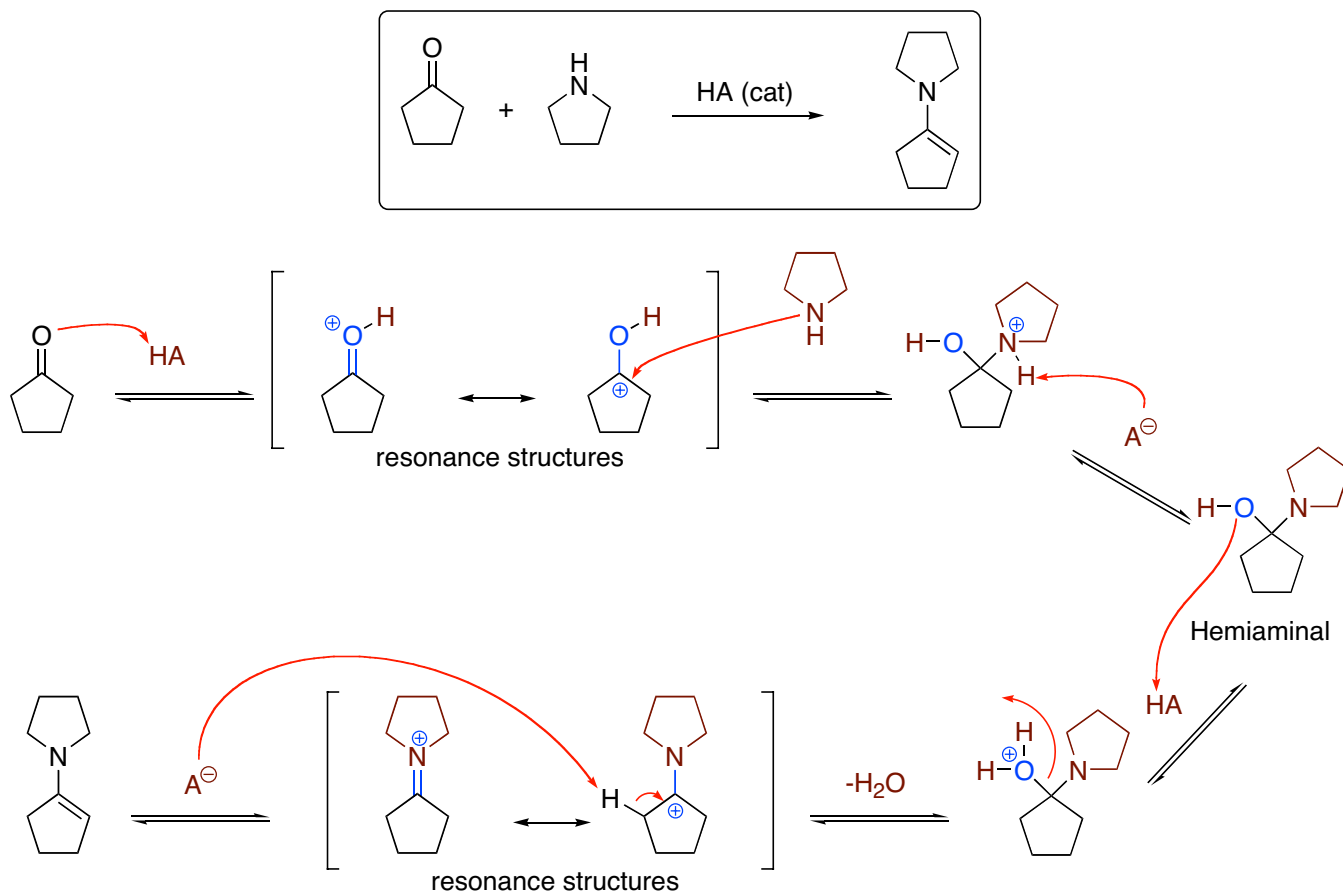
  F   d) The equilibrium of aldehydes and ketones with their hydrate form usually lies on the side of the hydrate.

  T   e) Pyridinium chlorochromate (PCC) will oxidize primary alcohols to an aldehyde.

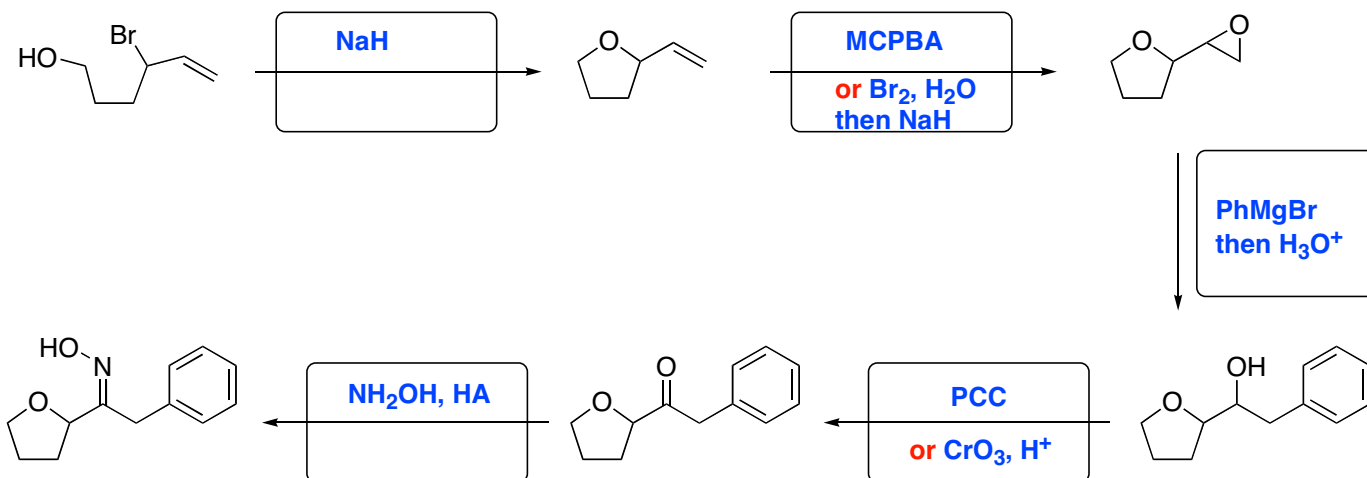
3. Place a check mark in the box that best describes the following molecules. (10 pts)

		ketone hydrate	acetal	hemiaminal	oxime	alcohol	enamine
a)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b)		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d)		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e)		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

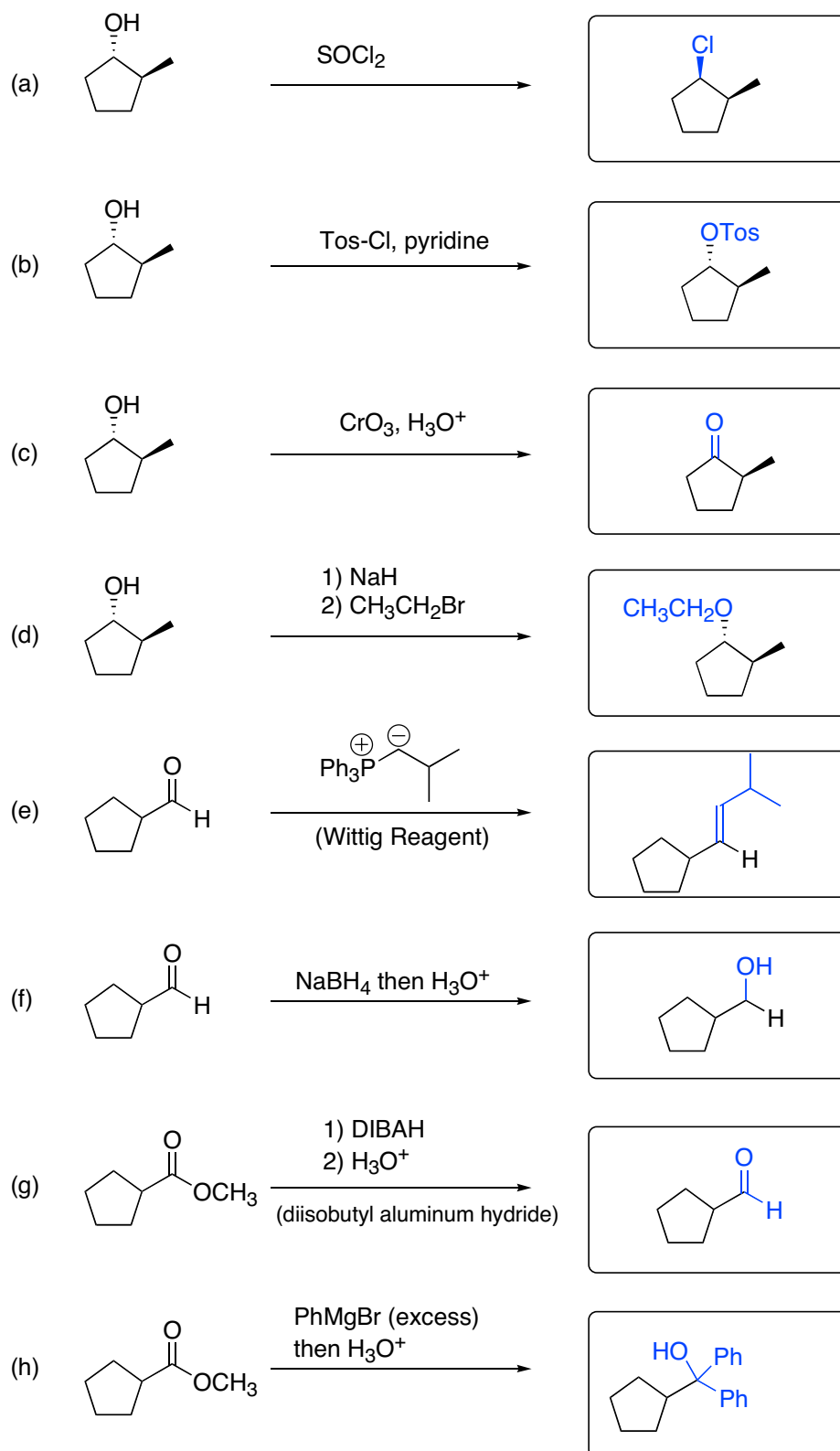
4. Pyrrolidine (a five-membered ring amine) will react with a ketone in the presence of an acid catalyst as in the reaction below. Complete the mechanism for this reaction by showing all arrows for electron movements and filling out the partially drawn structures. Include any additional acid or conjugate base necessary for the mechanism. (24 pts)



5. Provide the reagents necessary for the following sequence of reactions. (15 pts)



6. Draw the major product for the following reactions. (26 pts)



7. Provide the starting material, reagents, or products for the following reactions. (9 pts)

