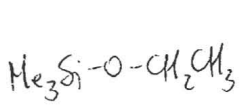
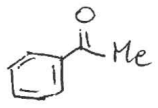
Practice Exam #2

I. General Knowledge & Exam 1 review (40 pts)

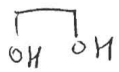
1. (12 pts) Give the structures of the molecules written below and provide the names of any structures shown.



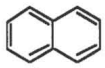
trimethylsilyl ether of ethanol



acetophenone

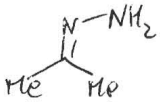


ethylene glycol

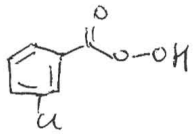


naphthalene

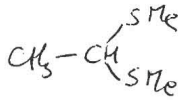
the epoxide of propene



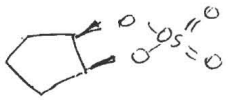
hydrazone of acetone



mCPBA

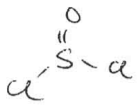


any thioacetal

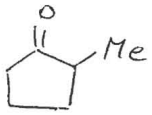


osmate ester of cyclopentene

tetrahydrofurane



thionyl chloride



2-methylcyclopentanone

2. (10 pts) Circle the π electron donating groups and underline the π electron withdrawing groups listed below.

-OCH_3 -CH_3 -CO_2CH_3 -F -$C(=O)CH_3$

-CHO -CH_2-CN -NO_2 -$NHCH_3$ -CN

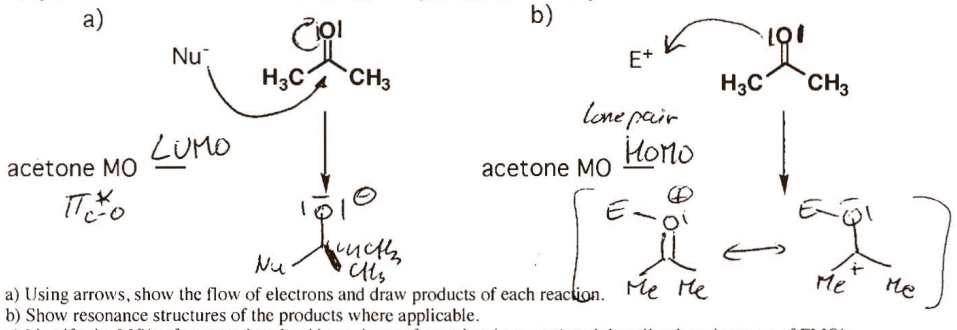
3. (6 pts) True or False. **Read the questions carefully**. (Circle **T** or **F**)

i. Alcohols are less acidic than water. (T) F

ii. $NaBH_4$ does reduce esters to alcohols. T (F)

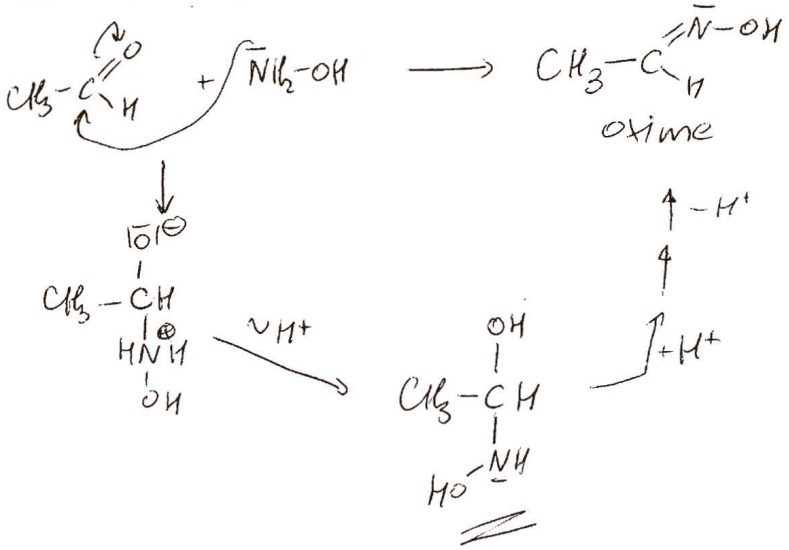
iii. Ketones are more reactive than aldehydes toward nucleophiles. T (F)

4 (7 pts). A molecule of acetone reacts with a) a nuclephile and b) an electrophile.



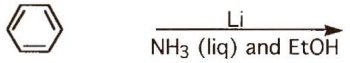
a) Using arrows, show the flow of electrons and draw products of each reaction.
b) Show resonance structures of the products where applicable.
c) Identify the MO's of acetone involved in each transformation (σ, π etc.) and describe them in terms of FMO's

5. (5 pts) Acid catalyzed formation of oxime of acetaldehyde is an example of nucleophilic addition to the carbonyl group. Please write this reaction below and show e- pushing arrows for the nucleophilic addition step and include the intermediate formed.



III. Reactions (35 pts) Draw structures (including stereochemistry) of the expected organic products formed under the following reaction conditions and provide the names of the reactions where requested.

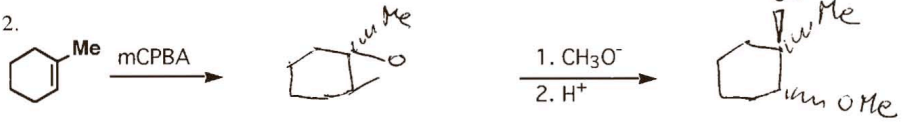
1.



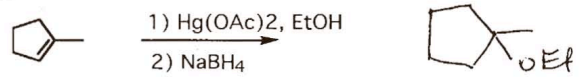
not covered in class

name:_____

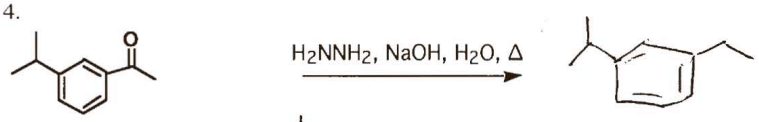
2.



3.

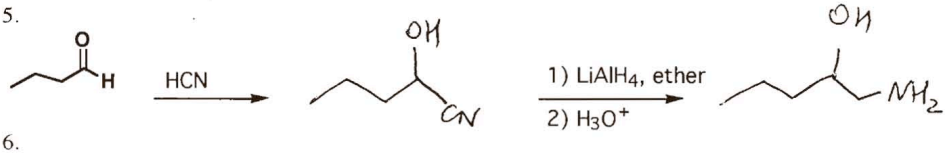


4.

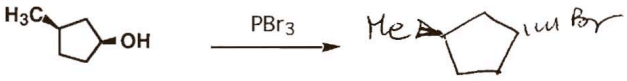


name: Wolff-Kishner

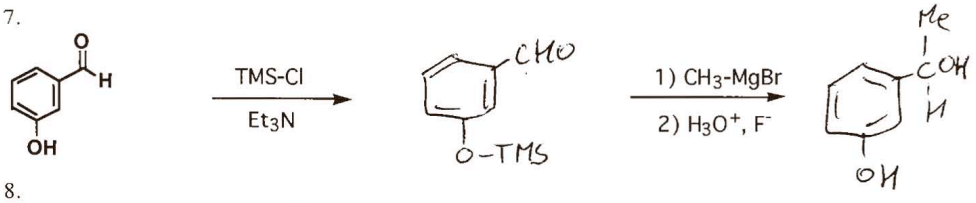
5.



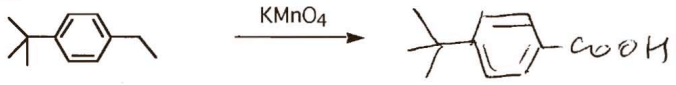
6.



7.



8.



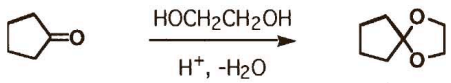
IV. Mechanism (20 pts) Provide detailed mechanisms for the transformations given below, showing every step in the process clearly. Use electron pushing arrows whenever you wish (they are not required but may be helpful to you).

(a) (10 pts) Show also the formation of the ylide from the appropriate bromide.

Wittig rxn

mechanism on pg 707 (see also class notes)

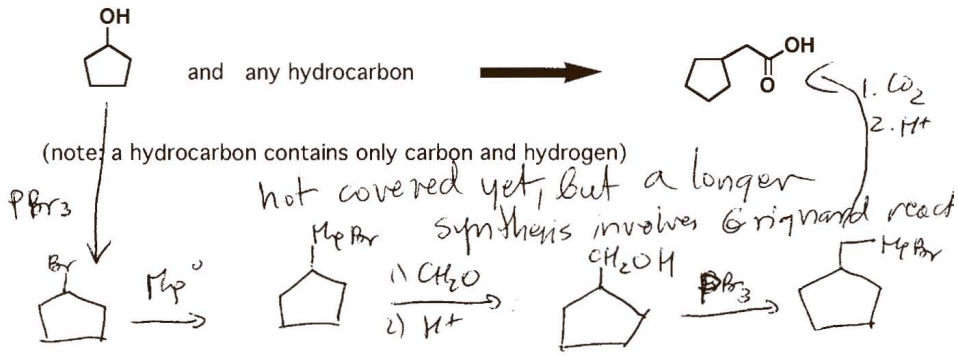
(b) (10 pts)



mechanism on pg 704 (see also class notes)

V. 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. Partially correct answers will receive partial credit.

(1)



(2)