Chem 1315-100 points Name: _____
Exam 6 Practice Test 3

I. Circle the correct answer to the following questions: (30 points)

1. What is another acceptable name for diethylketone?
A. 2-pentanone B. 3-pentanone C. 5-butanone D. 1-ethylpropanone

2. Which of the following best describes the mechanism for the reaction of acetophenone with NH_2NH_2 (hydrazine)?

E. bimolecular nucleophilic substitution F. nucleophilic addition followed by elimination
G. aromatic electrophilic substitution H. anti electrophilic addition

3. Which of the following undergoes the most rapid hydrolysis (reaction with water to form a carboxylic acid)?
I. ethyl acetate J. *N*,*N*-dimethyl acetamide K. acetyl chloride L. acetic anhydride

4. Which of the following reagents could be used to convert acetamide to acetonitrile?
M. P_2O_5 N. LAH O. H_3O^+ P. NaCN

5. Which of the following best describes the mechanism of an acyl substitution reaction?
Q. Addition followed by elimination R. Bimolecular nucleophilic substitution
S. Elimination followed by addition T. Substitution followed by elimination

6. Which of the following is the correct order of decreasing reactivity (most reactive > less reactive)
U. acyl chloride > acyl anhydride > ester > amide V. ester > acyl anhydride > acyl chloride > amide
W. acyl anhydride > acyl chloride> amide > ester X. acyl chloride > ester > amide > acyl anhydride

7. What is the purpose of the acid catalyst in an acid-catalyzed addition to a carbonyl?
Y. help the carbonyl compound dissolve in the solvent Z. make the nucleophile stronger
AA. make the carbonyl more electrophilic BB. protonate the nucleophile

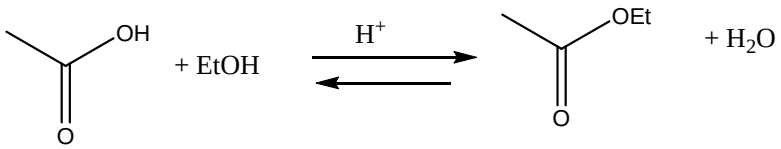
8. Which of the following has the lowest pK_a?
CC. methanol DD. 2,4-pentanedione
EE. ethyl acetate FF. ammonia

9. Which of the following acts as a nucleophile in the base-catalyzed aldol reaction of butanal?
GG. an enolate HH. an alkoxide
II. an enol JJ. an aldol

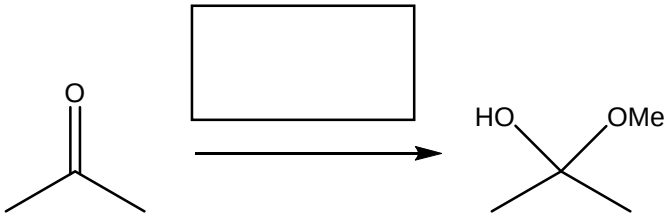
10. Which of the following pairs of compounds would produce a high yield of a single compound in a Claisen condensation.?
KK. ethyl acetate and propyl acetate LL. ethyl acetate and ethyl propionate
MM. ethyl benzoate and ethyl formate NN. ethyl acetate and ethyl benzoate

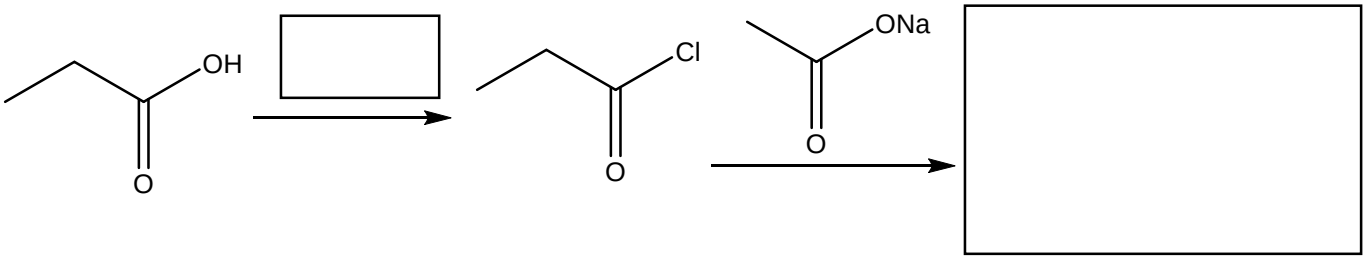
Short Answer:

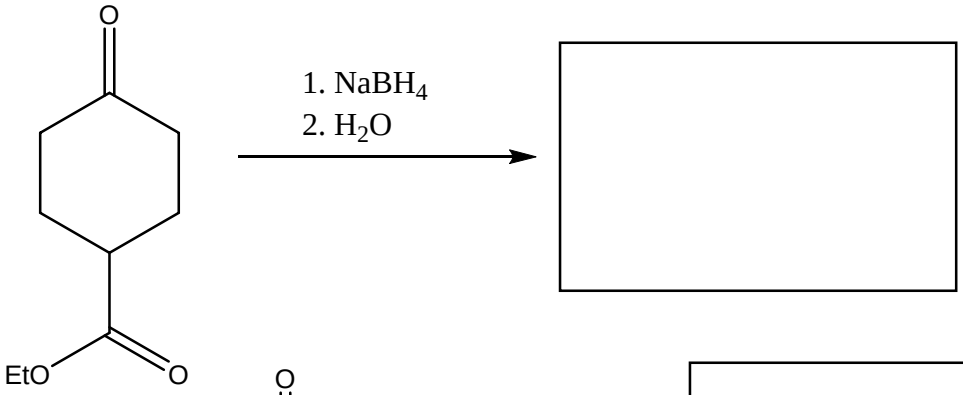
II. Provide a detailed mechanism for the below reaction. Explain briefly how the reaction equilibrium could be shifted to the right side of the chemical equation. (10 points)

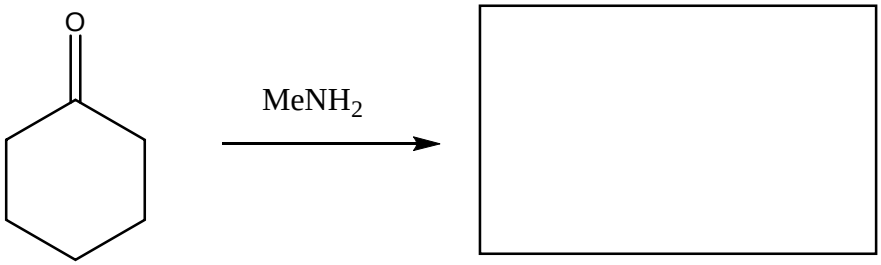


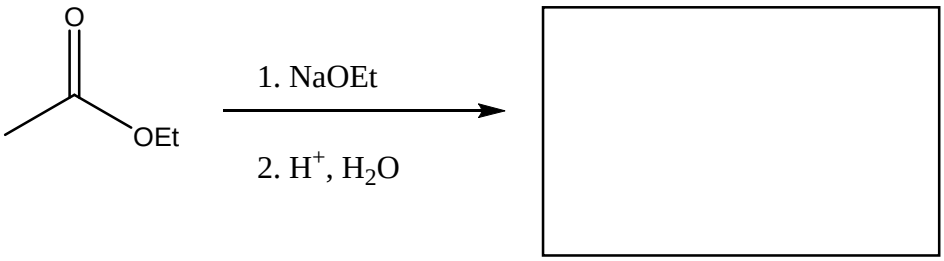
III. Show the **Major** Product for the following reactions: (30 points)

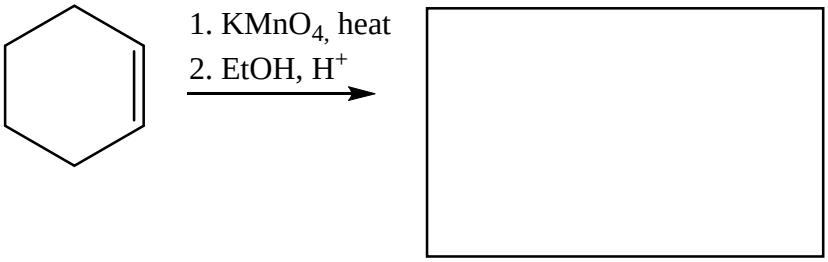




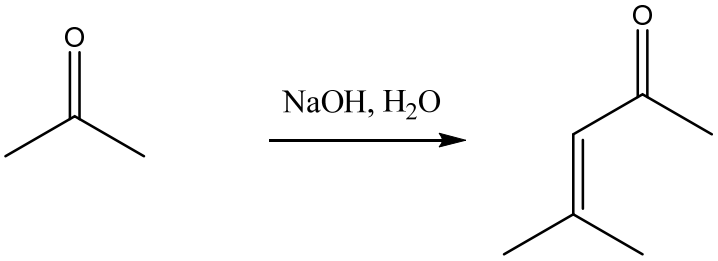




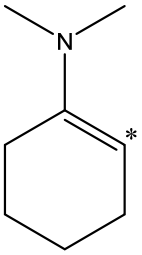




IV. Using curved arrows, propose a mechanism for the below formation of the below aldol product (10 points)



V. Why is the alpha carbon of an enamine (labeled here with an *) considered nucleophilic? (10 points)



VI. Synthesize following molecules. These transformations cannot be performed in a single step. Provide a sequence of reactions to perform each transformation, showing reagents and structures of isolated intermediates. **All carbon atoms in the product must be obtained from the given starting materials, methylbenzene (toluene) or other starting materials of four carbons or less. (10 points)**