

scores:

- 1)
 - 2)
 - 3)
 - 4)
 - 5)
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CU Honor Code Pledge: On my honor, as a University of Colorado at Boulder Student, I have neither given nor received unauthorized assistance.

Name (printed): _____

Signature: _____

Recitation TA Name: _____

Recitation day and time: _____

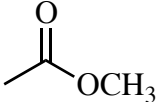
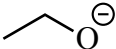
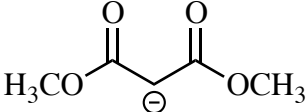
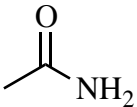
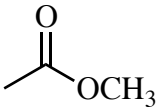
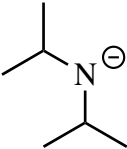
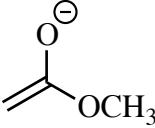
This is a closed-book exam. The use of notes, calculators, scratch paper, or cell phones will not be allowed during the exam. You may use models brought in a clear ziplock bag. Please put all you answers on the test. Use the backs of the pages for scratch.

PLEASE read the questions very carefully!

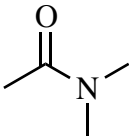
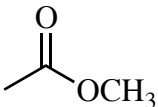
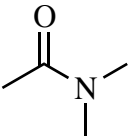
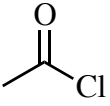
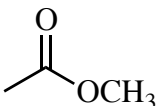
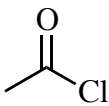
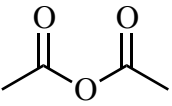
1A								8A
1 H								2 He
	2A		3A	4A	5A	6A	7A	
3 Li	4 Be		5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg		13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
							35 Br	
							53 I	

Printed Name: _____

1. (20 pts) a) For each of the following pairs of compounds, circle the **stronger Brønsted base**.

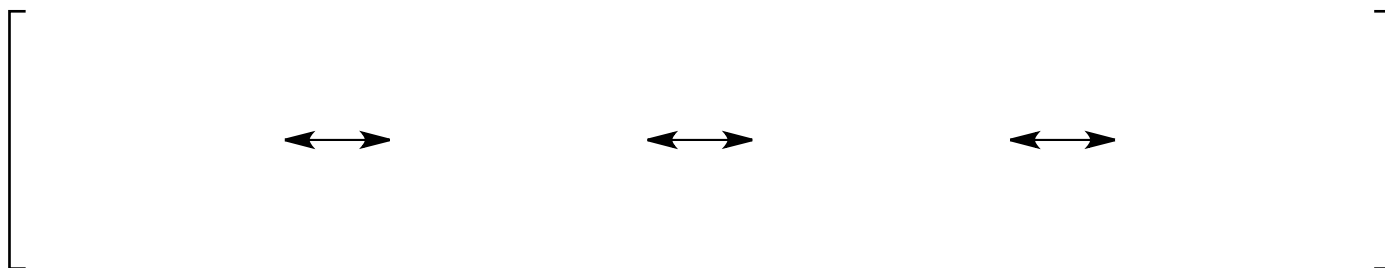
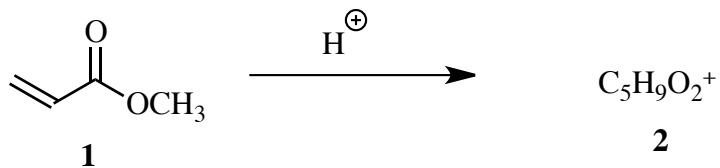
$\text{H}_3\text{C}-\text{C}\equiv\text{N}$			
			

b) For each of the following pairs of compounds, circle the compound that **reacts fastest** under hydrolysis conditions (e.g. NaOH, H₂O, or H₃O⁺, Δ).

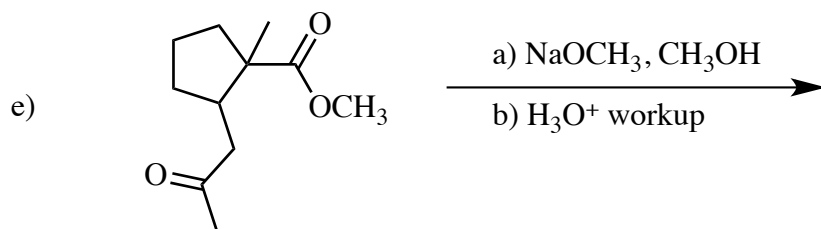
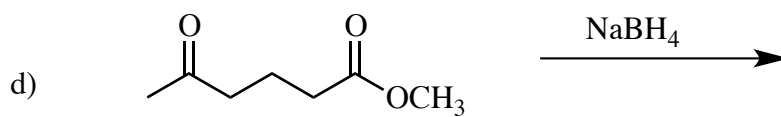
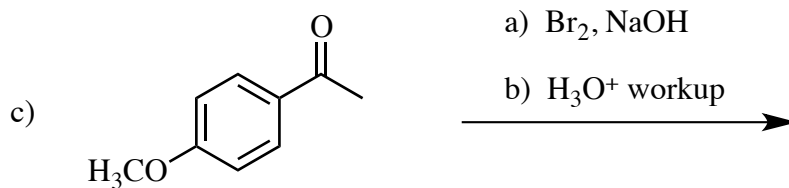
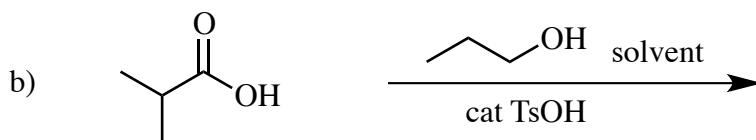
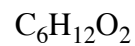
		$\text{H}_3\text{C}-\text{C}\equiv\text{N}$	
			

1. -continued-

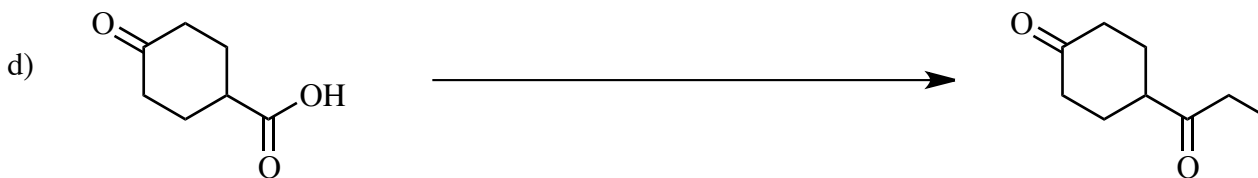
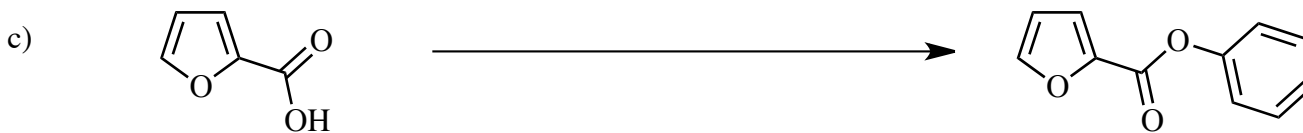
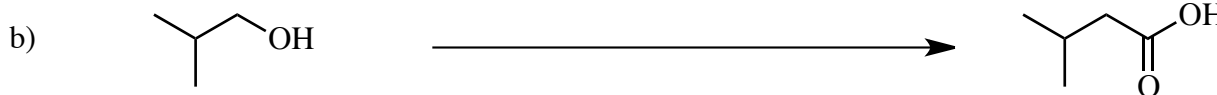
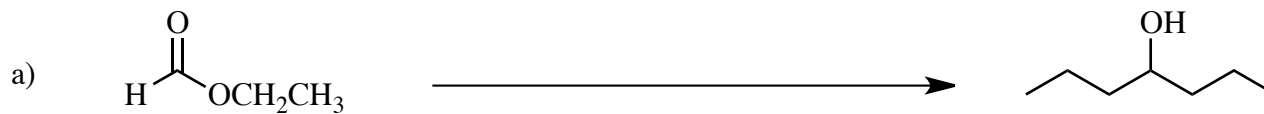
c) Simple protonation of methyl acrylate (**1**) gives a cation **2** with formula $C_5H_9O_2^+$. Draw the four most important resonance contributors to the structure of cation **2**.



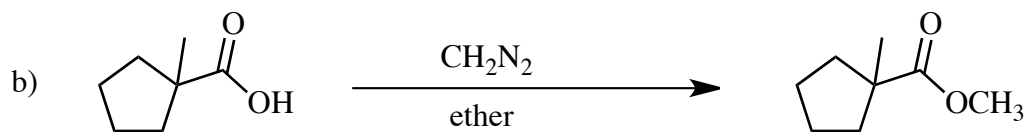
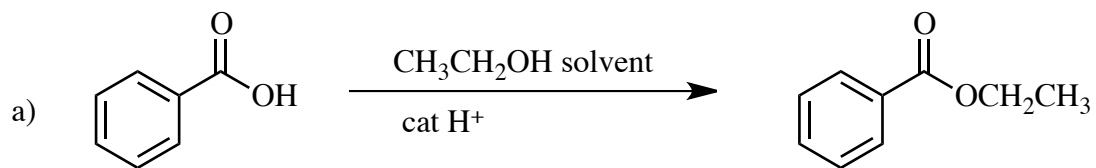
2) (20 pts) Give the major product of each of the following reactions. For these questions, please ignore stereochemistry - the major product may be a mixture of diastereomers – ignore racemates.



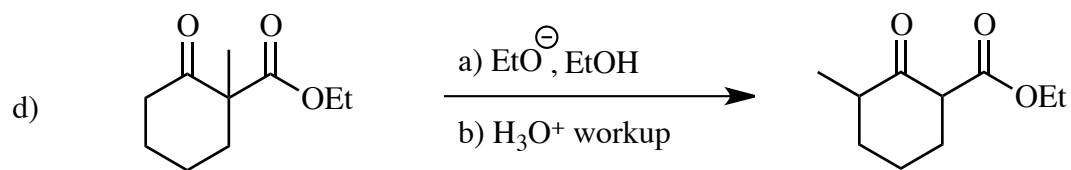
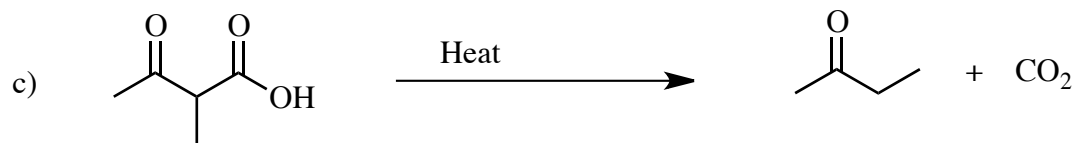
3) (20 pts) Propose reagents for accomplishing the following transformations. NOTE: more than one step may be required! Try to make your synthesis efficient (i.e. the desired product should be the major product, and generally a shorter synthesis is better than a longer one). You must use the starting material given; you may use any other reagents you need, including organometallic reagents such as Grignards, alkyllithiums, and dialkyl cuprates.



4) (20 pts) Propose arrow-pushing mechanisms for the following transformations.

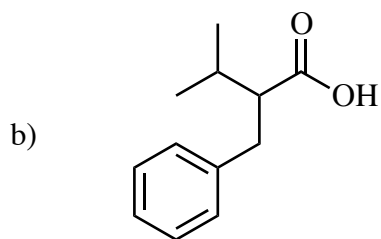
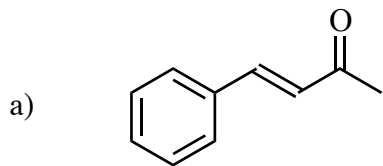


4. -continued-



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5) (20 pts) Propose a synthesis for each of the following targets. Allowed starting materials include benzene, and/or any other organic molecules containing **five (5) carbons or less**. You may use any necessary inorganic reagents. Try to make your syntheses efficient (i.e. the target should be produced in the highest possible yield). More than one step will be required. Please show all the intermediates in your synthesis (not intermediates in the mechanisms, but actual isolated molecules on the path from starting material to product).



5) – Continued

