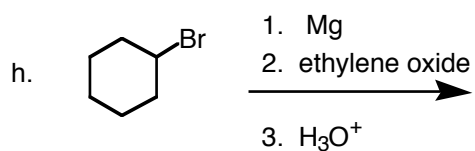
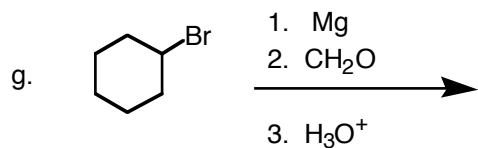
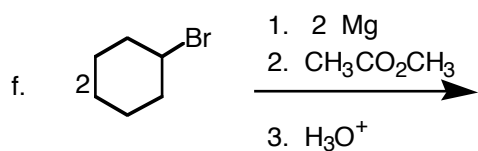
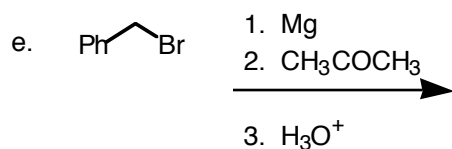
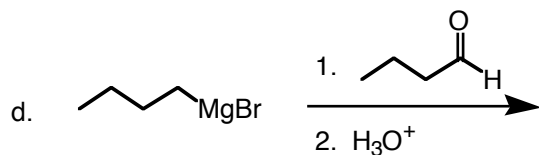
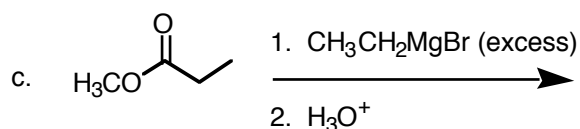
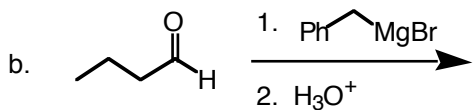
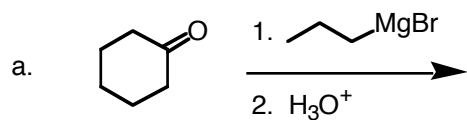


Name

Organic Chemistry II Jasperse Quiz #1 Grignard Chemistry

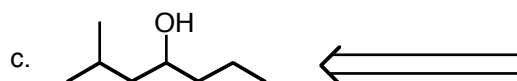
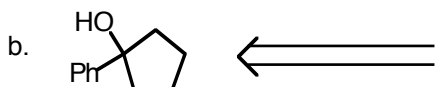
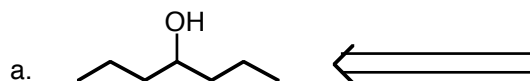
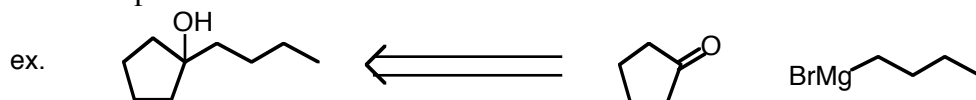
Due: Submit by Test 1. Can print, hand-write answers, scan or take cell-phone pictures, and email in.

1. Draw the major product for the following reactions involving Grignard reagents.



Name

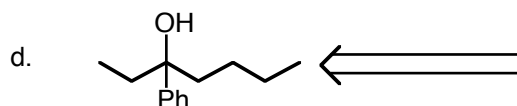
2. For each of the following, draw a Grignard reagent and a carbonyl compound (formaldehyde, an aldehyde, a ketone, or an ester) from which the alcohol shown would be produced, following acid workup.



Combo
One

There are two possible combinations for this one. Draw both possible combinations of carbonyl compound and Grignard.

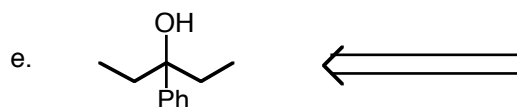
Combo
Two



Combo
One

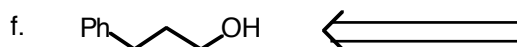
There are three possible combinations for this one. Draw all possible combinations of carbonyl compound and Grignard.

Combo
Two



Makes this one using an ester as your carbonyl compound.

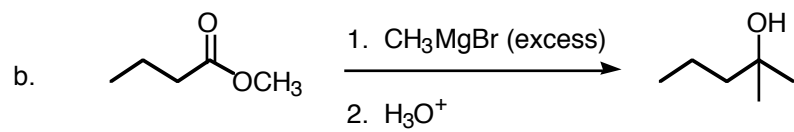
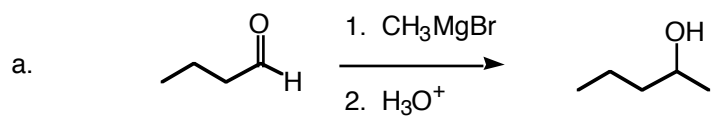
Combo
Three



(there are two solutions, but give at least one)

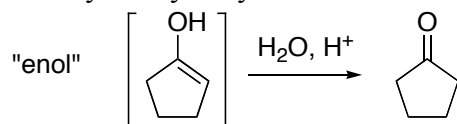
Name

3. Draw the mechanisms for the following Grignard reactions.

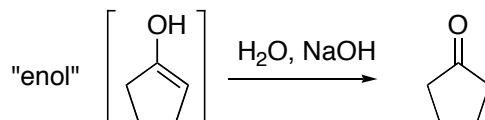


Note: Anything inside of brackets [] represents something that isn't or can't be isolated. Often something in brackets is an intermediate on the way to something else, and something which forms very briefly but is then carried on to product or returns back to starting material. Often something in brackets is something that never builds up, but is only present in a small equilibrium concentration.

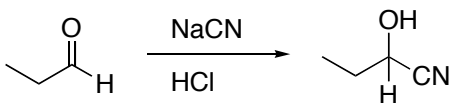
1. Draw the mechanism for acid-catalyzed hydrolysis of the following enol.



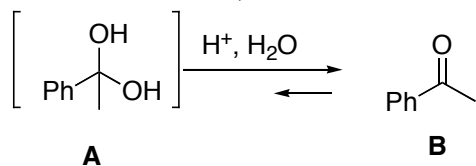
2. Draw the mechanism for base-catalyzed hydrolysis of the following enol.



3. Draw the mechanism for the reaction shown.



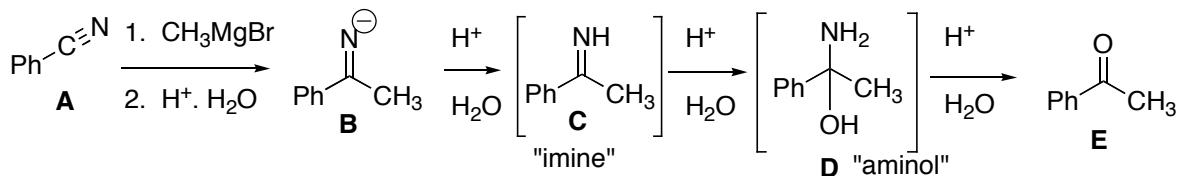
4. Shown below is an example of a hydrate/ketone equilibrium. Draw the mechanism for the elimination reaction (**A** \rightarrow **B**).
5. Fact: The conversion from **A** \rightarrow **B** strongly favors the carbonyl product **B**. But **A** and **B** are actually in equilibrium, with a small equilibrium quantity of **A** present (in the presence of acid and water). Problem: Draw the mechanism for the addition reaction **B** \rightarrow **A**.



4. (**A** \rightarrow **B**)

5 **B** \rightarrow **A**

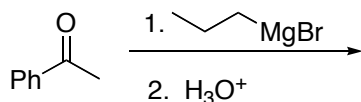
6. Shown below is an example of the reaction for making a ketone from a nitrile using Grignard addition followed by an aqueous acid workup/hydrolysis. Draw the mechanism for the addition phase of the hydrolysis (**C** \rightarrow **D**).
7. Draw the mechanism for the elimination phase of the hydrolysis (**D** \rightarrow **E**).



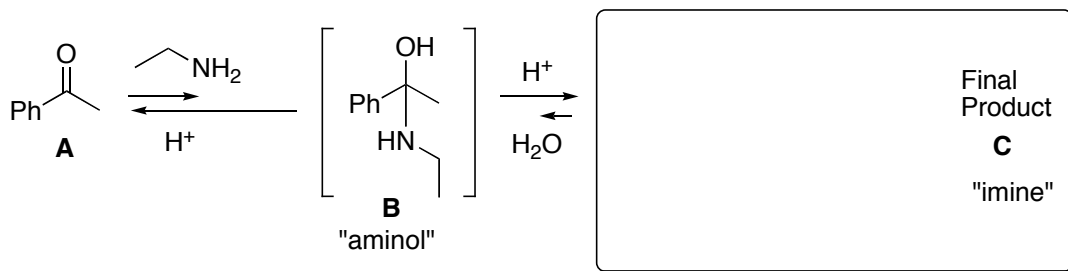
6 **C** \rightarrow **D**

7 **D** \rightarrow **E**

8. Draw the product for the reaction shown.
 9. Draw the mechanism for formation of the product.



10. Shown below is an example of the reaction for reacting aldehydes or ketones with ZNH₂ compounds. Draw the final product **C** for the reaction shown.
 11. Draw the mechanism for the addition phase of the reaction (**A** → **B**).
 12. Draw the mechanism for the elimination phase of the reaction (**B** → **C**).
 13. Fact: The conversion from **B** → **C** strongly favors the final product **D**. But **C** and **B** are actually in equilibrium, with a small equilibrium quantity of **B** present (in the presence of acid and water). Problem: Draw the mechanism for the addition reaction **C** → **B**.
 14. Fact: The conversion from **A** → **B** strongly favors the carbonyl reactant **A**. But **A** and **B** are actually in equilibrium, with a small equilibrium quantity of **B** present (in the presence of acid and amine). Problem: Draw the mechanism for the elimination reaction **B** → **A**.



11 **A** → **B**

12 **B** → **C**

13 **C** → **B**

14 **B** → **A**

15. Shown below is an example of the reaction for reacting aldehydes or ketones with alcohols.

Draw the final product **C** for the reaction shown.

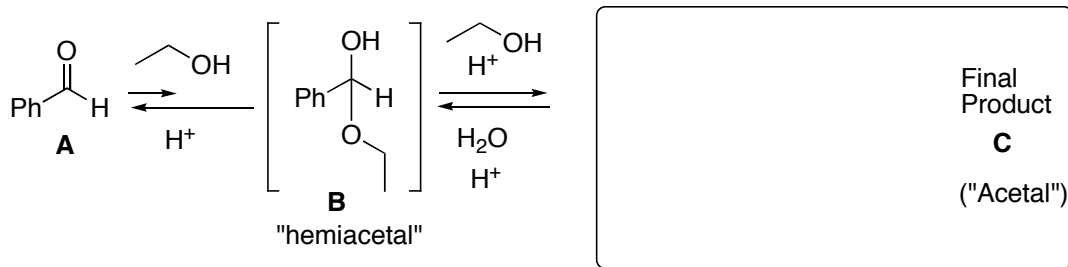
16. Draw the mechanism for the addition phase of the reaction (**A** \rightarrow **B**).

17. Draw the mechanism for the substitution phase of the reaction (**B** \rightarrow **C**).

18. Draw the mechanism for the reverse substitution phase of the reaction (**C** \rightarrow **B**).

19. Draw the mechanism for the elimination reaction **B** \rightarrow **A**.

Fact: **B** is in two equilibria, an unfavorable one with **A** (carbonyl strongly favored), and a solvent dependent one with acetal **C**. In excess alcohol, things end up at **C**; in water they go back to **A**.



16 **A** \rightarrow **B**

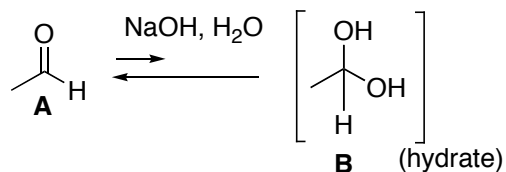
17 **B** \rightarrow **C**

18 **C** \rightarrow **B**

19 **B** \rightarrow **A**

20. Shown below is base-catalyzed addition of water to form a hydrate. Draw the mechanism for the addition phase of the reaction (**A** \rightarrow **B**).

21. Draw the mechanism for the base-catalyzed elimination reaction **B** \rightarrow **A**.



20 **A** \rightarrow **B**

21 **B** \rightarrow **A**