

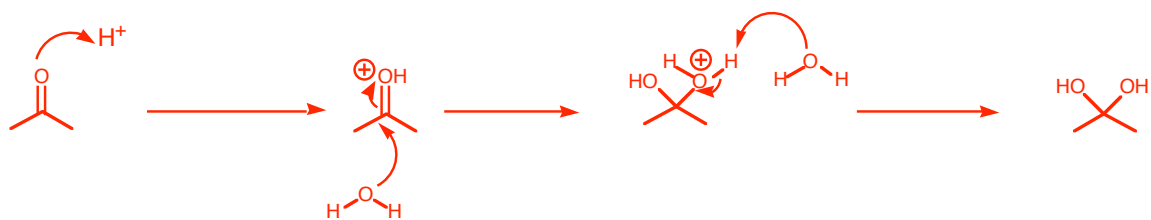
## Chemistry 218, Problem Set 9

Recommended problems from the book: 21.3-21.5, 21.15-21.21, 21.23-21.40, 21.43-21.45, 21.46-21.51, 21.52 (a-d, f-h), 21.53-21.57, 21.61-21.71, 21.72-21.80, 21.87-21.88

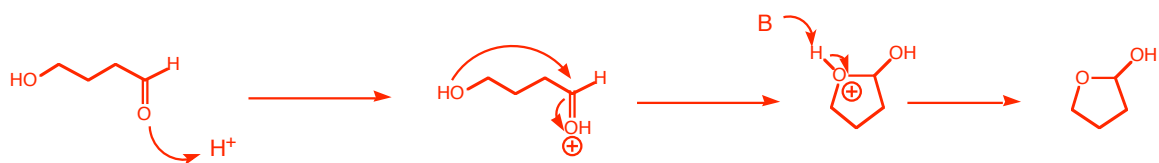
(1<sup>st</sup> ed.: 21.3-21.5, 21.17-21.21, 21.23-21.38, 21.41-21.43, 21.44-21.49, 21.50 (a-d, f-h), 21.51-21.55, 21.59-21.65, 21.66-21.74, 21.81-21.82)

1. Draw a mechanism for each of the following transformations. Repeat this problem until you can do it without looking at the answer.

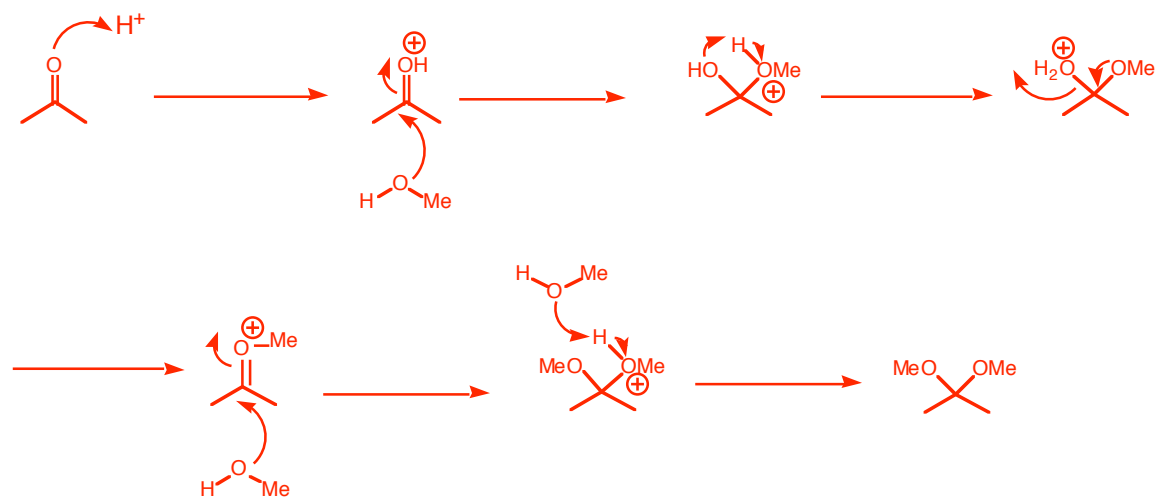
a.



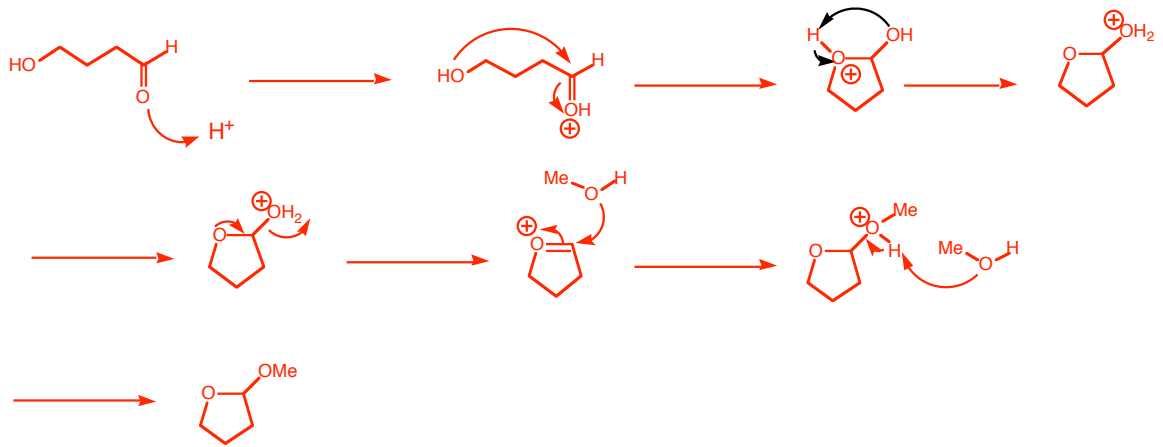
b.



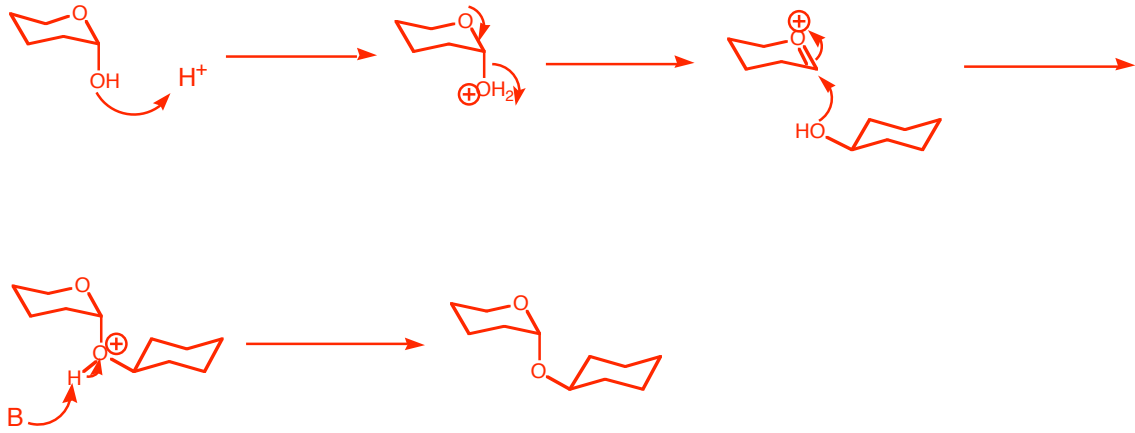
c.



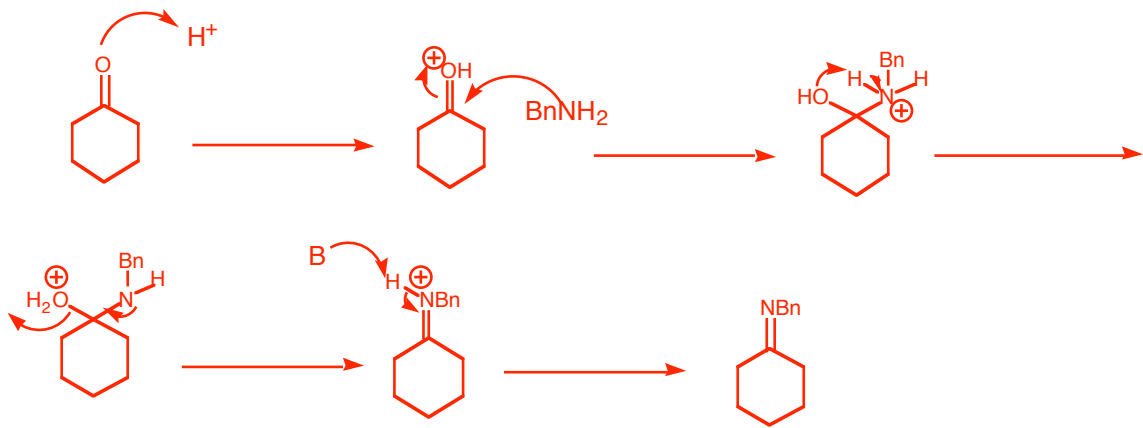
d.



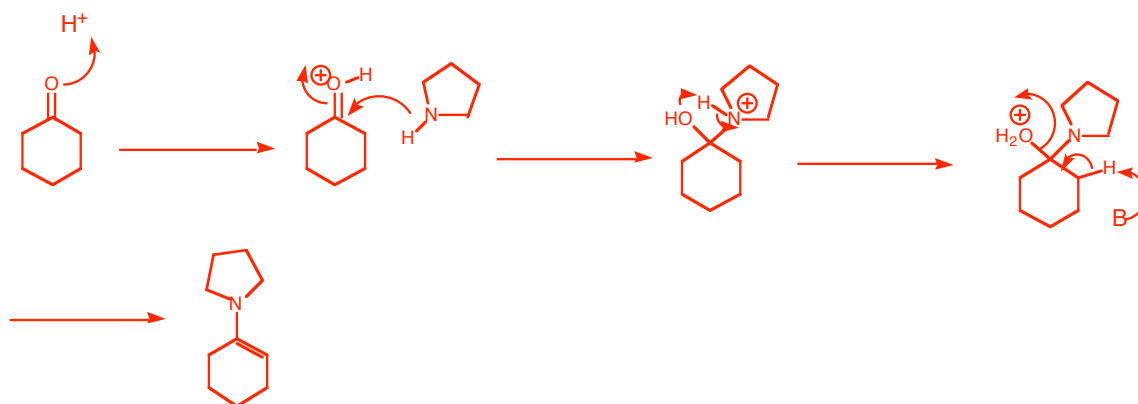
e.



f.



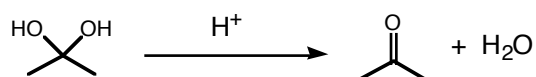
g.



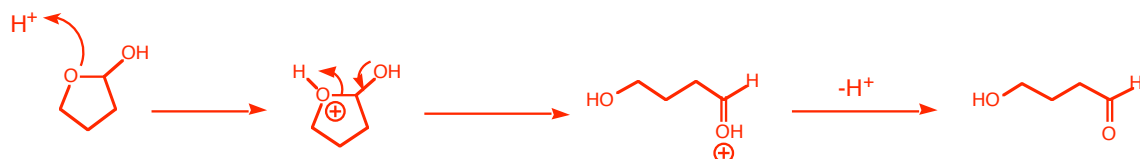
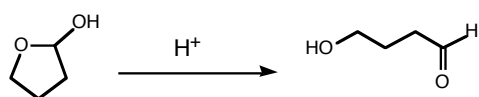
2. Give the conditions that are necessary to convert the product of every reaction above back into the starting material. Draw the mechanism for every one until you can do it without the answer.

In every case, the mechanism is exactly the reverse of the mechanisms from problem 1.

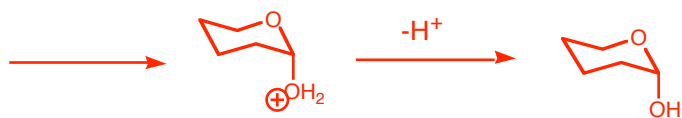
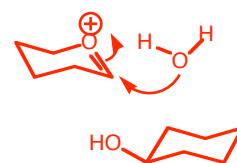
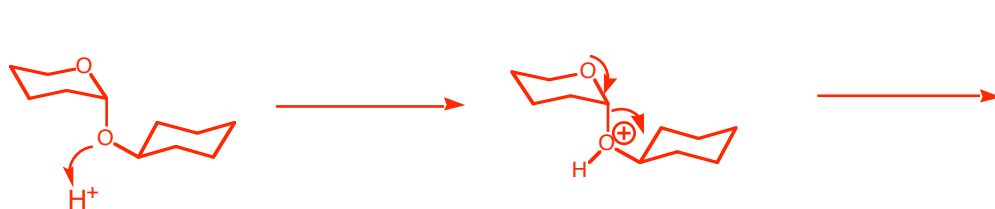
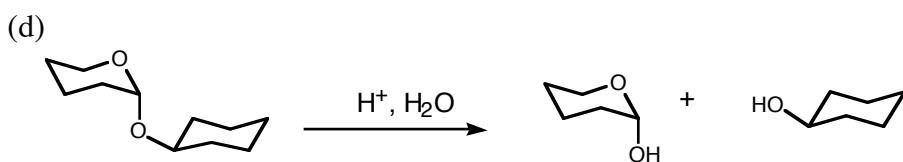
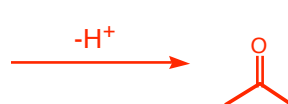
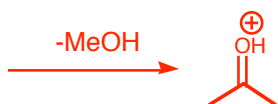
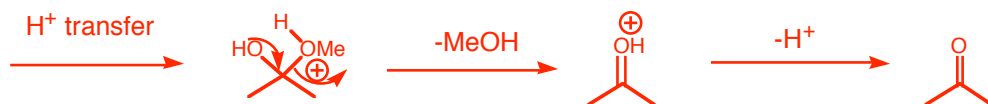
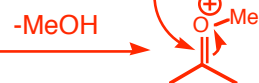
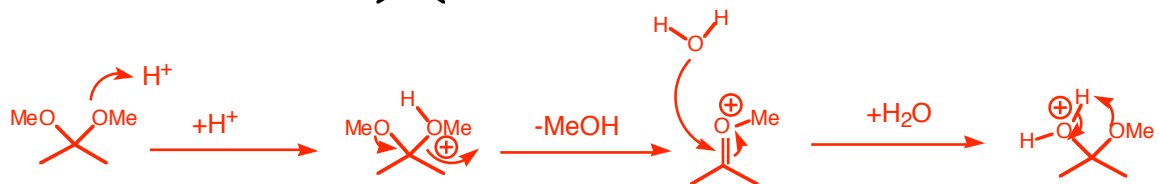
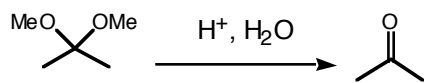
(a)



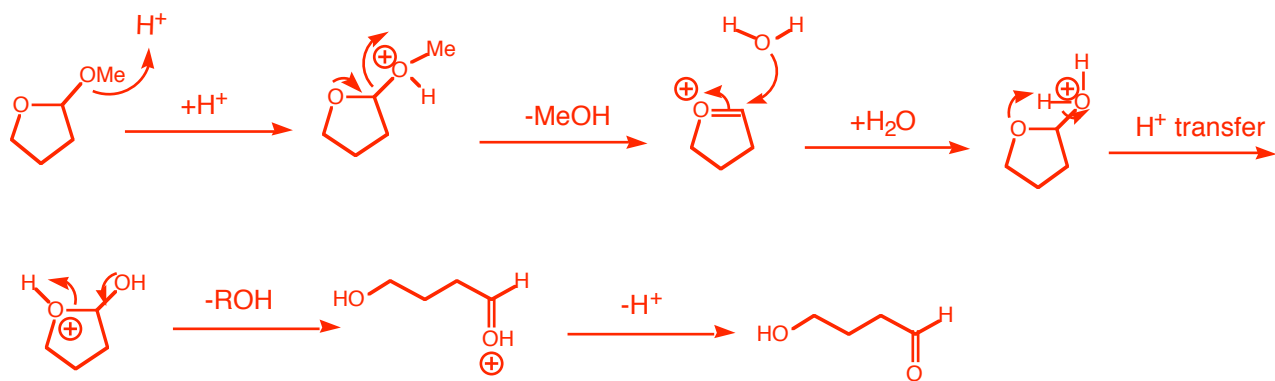
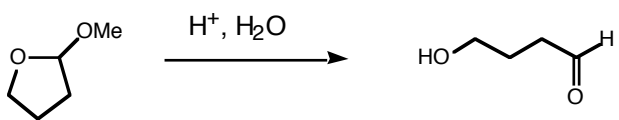
(b)



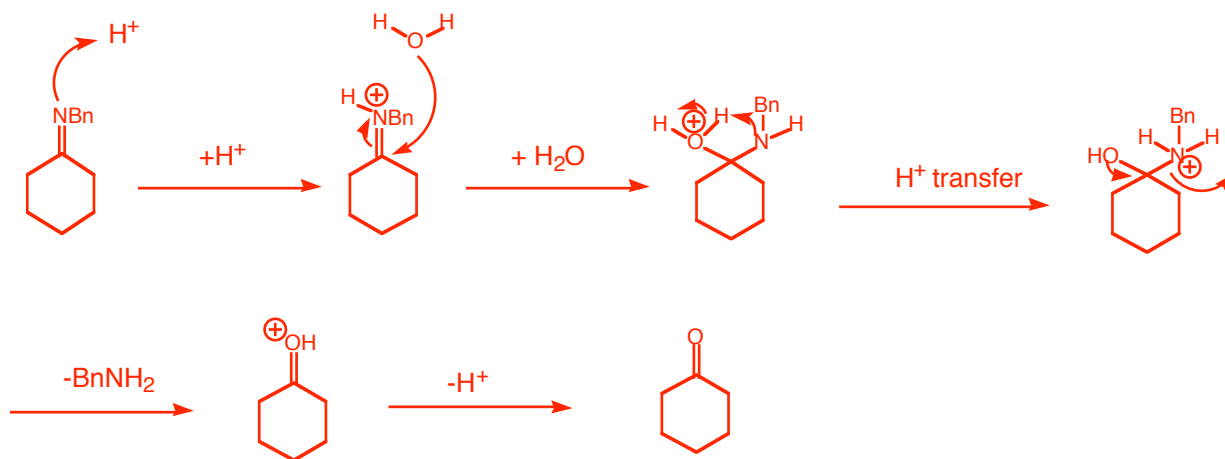
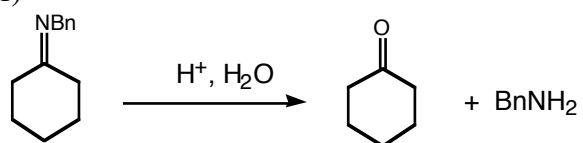
(c)



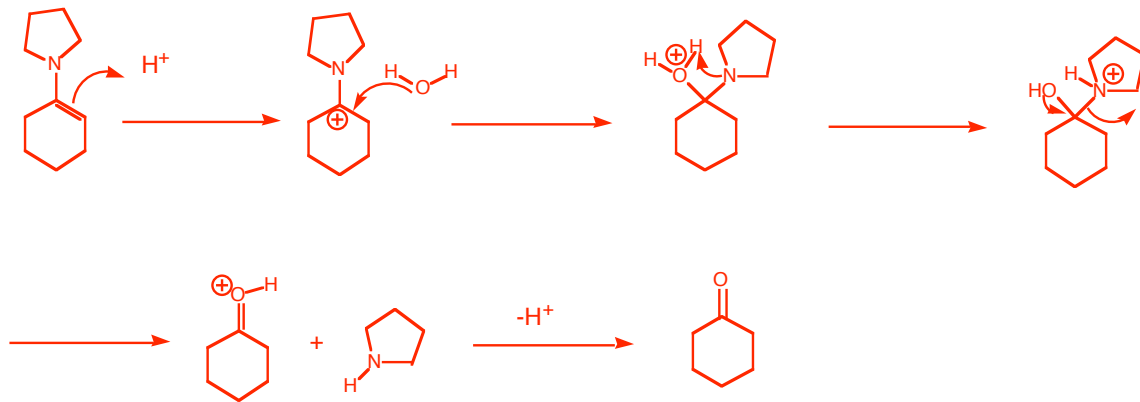
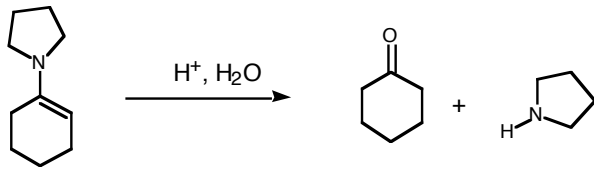
(e)



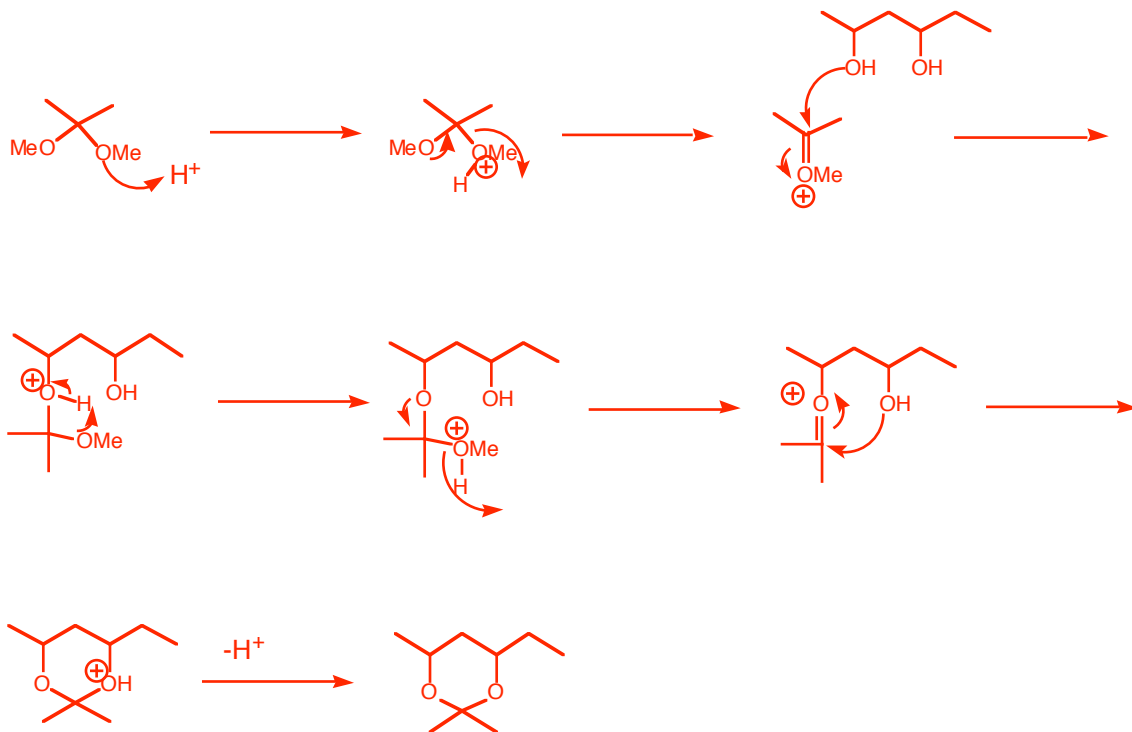
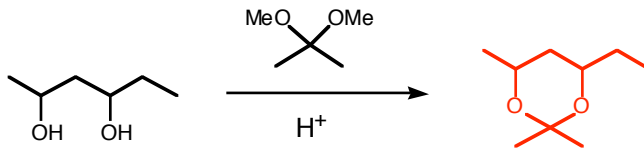
(f)



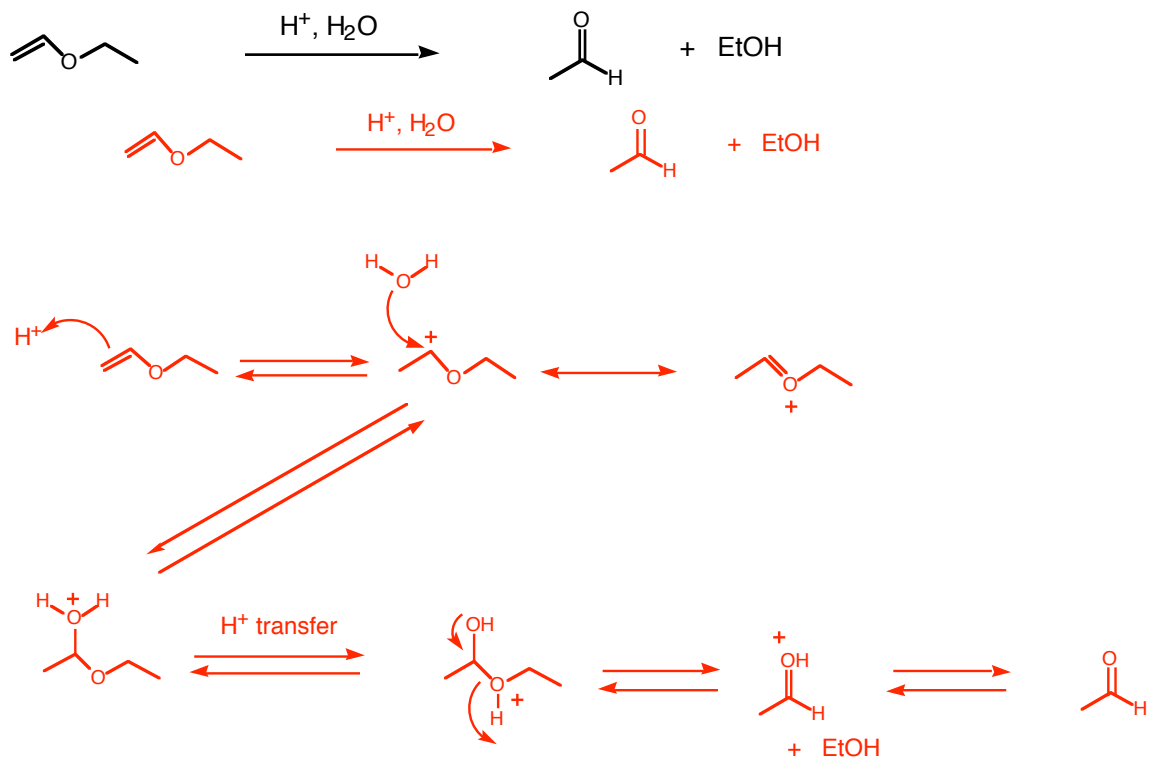
(g)



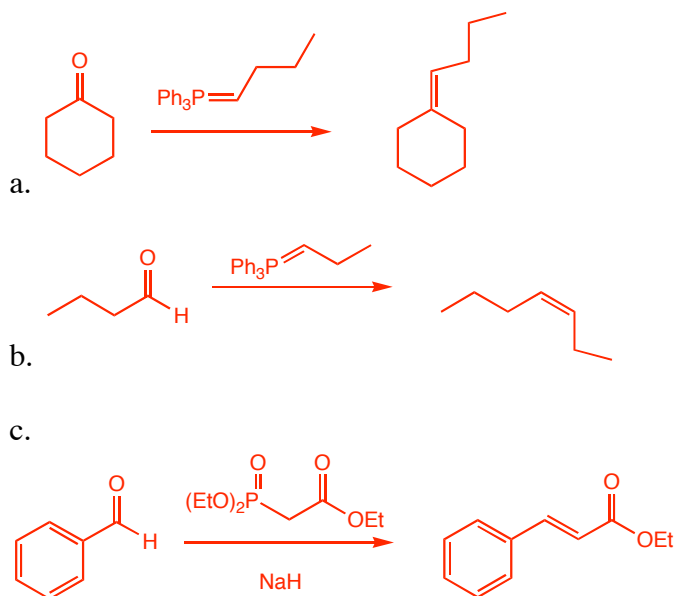
3. Predict the product of the following reaction, and draw the mechanism:



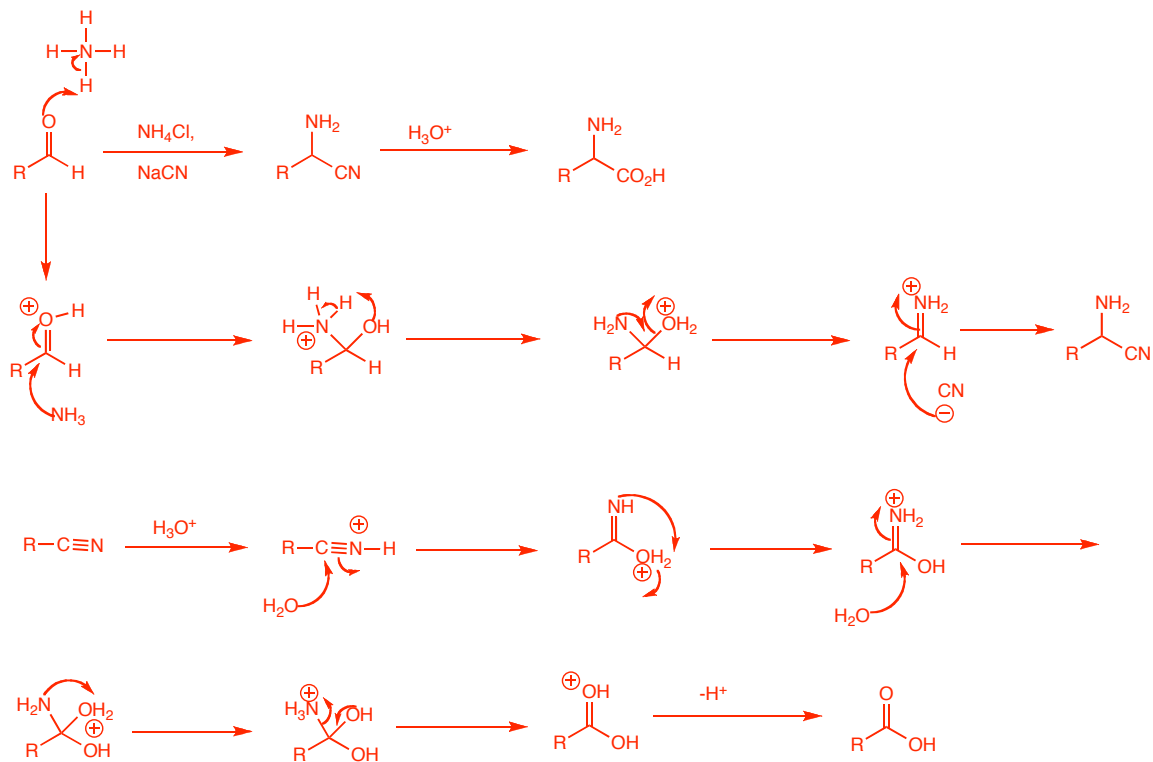
4. Enol ethers such as ethyl vinyl ether will give aldehydes or ketones in the presence of even very slightly acidic conditions. Draw the mechanism for this conversion. (Hint: Start with an acid catalyzed hydration of the alkene)



5. Draw the products of the following reactions:

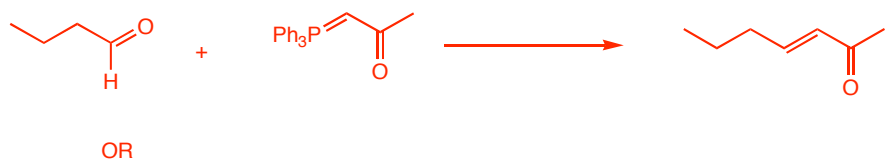


6. The Strecker synthesis is another method to make amino acids. Propose a mechanism for each step.

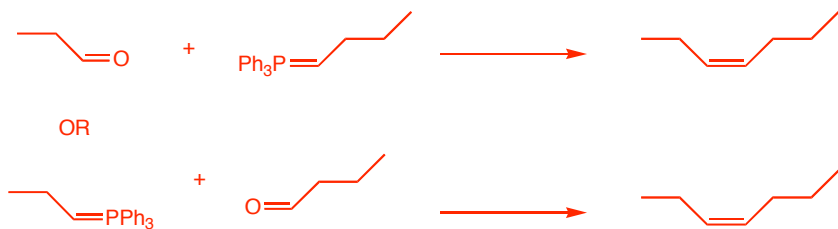


6. Show how the following compounds can be prepared using Wittig chemistry:

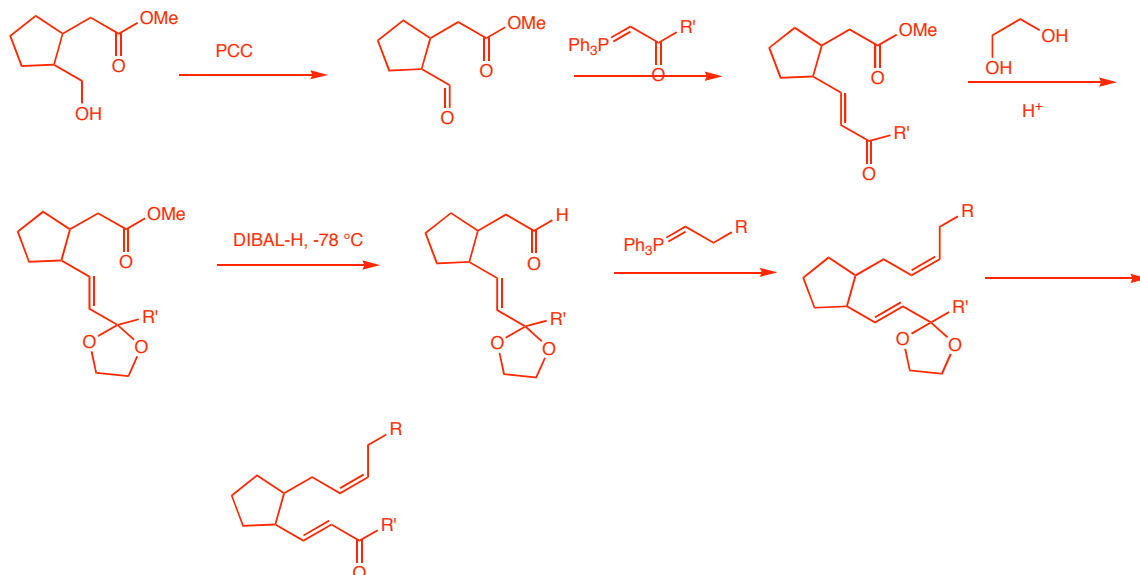
a.



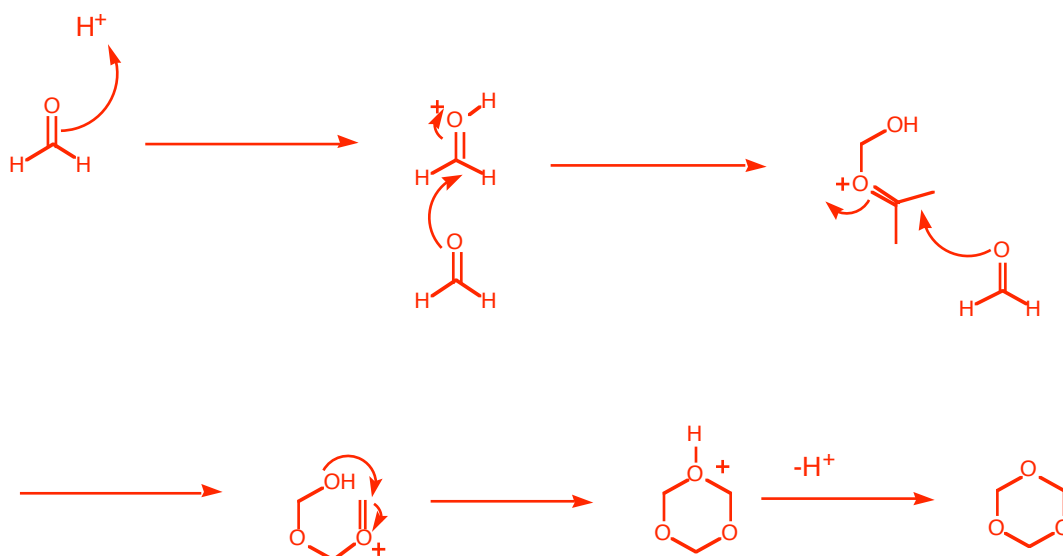
b.



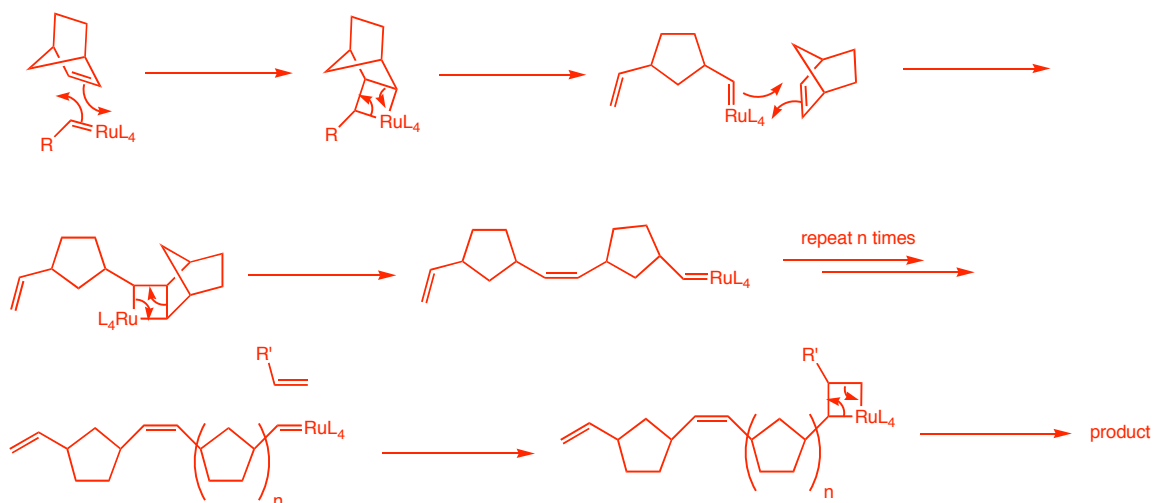
7. Propose a synthesis for how you could prepare the following diene from the compound shown.



8. Formaldehyde is a gas that is available commercially as an aqueous solution or as a solid polymer, paraformaldehyde. Draw a mechanism to show how three molecules of formaldehyde undergo acid-catalyzed formation of formaldehyde:



9. Propose a mechanism for ring opening metathesis polymerization. Note that the polymerization must be terminated by adding a second alkene.



10. The following metathesis reactions were taken from the recent literature. Give the starting material for each one.

