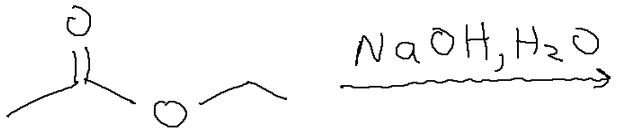
How to draw reasonable electron-pushing arrows
Homework problems for video (5)
Answers in video (6)

1. For the following set of starting materials:
(a) Draw reasonable electron-pushing arrows. DO NOT DRAW ACID-BASE ARROWS, ONLY NUCLEOPHILE, ELECTROPHILE, AND LEAVING GROUP ARROWS. If no arrows are reasonable, write "no reaction".
(b) Identify the roles being played in the reaction.
(c) Draw the product, based on the arrows you drew in part (a).



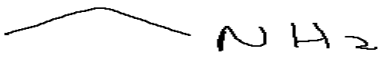
2. What are the five major "roles" atoms can play in organic chemistry? Write the definition of each role.

3. What is an example of an acid that we can use to remember the definition of "acid"? What is an example of a base that we can use to remember the definition of "base"?

4. An atom with a negative formal charge is likely to play what role(s)?

5. An atom with a positive formal charge is likely to play what role(s)?

6. Identify whether this molecule is likely to play the role of acid, base, both, or neither.



7. How can you identify the strong acids?

8. How can you identify the strong bases?

9. What role(s) do Cl^-, Br^-, and I^- generally play in reactions?

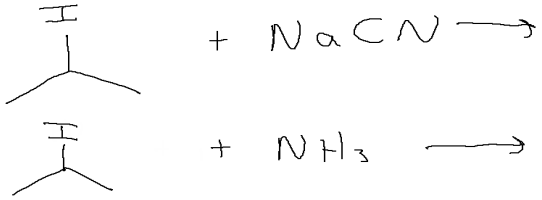
10. What role(s) does the carbonyl O generally play in reactions?

11. What role(s) does HSO_4^- generally play in reactions?

12. (a) Acids make other molecules into better _____.
(b) Bases make other molecules into better _____.

13. (a) How can you make a molecule into a better electrophile?
(b) How can you give a molecule a better leaving group?
(c) How can you make a molecule a better nucleophile?

14. For each set of starting materials: Draw a reasonable set of electron-pushing arrows. Then, draw the product based on those arrows. Then, draw reasonable electron-pushing arrows for the product from the first step. Keep repeating this process until you arrive at acceptable final products, like we did in the video. If no reaction seems reasonable for the starting materials, write "no reaction."



For the next three reactions, the leaving group just "falls off" without being pushed by a nucleophile.