Hey guys! Let's delve into more of Aldehydes and Ketones this week! As always, if you have any questions or need study tips, please do not hesitate to reach out to me at Megan_Hudson2@baylor.edu!

In-person group tutoring sessions will take place every Thursday from 5:15 - 6:15 pm in Sid Rich Rm. 75! In these sessions I will provide practice problems and be available for specific questions. To reserve a spot, go to https://baylor.edu/tutoring. I hope to see you there!

**Key Words:** Nucleophilic Addition, Acetal, Ketal, Hemiacetal, Imine, Enamine

**TOPIC OF THE WEEK:** NUCLEOPHILIC ADDITION REACTIONS

- **Nucleophilic Addition under Basic Conditions**
  
  **Steps:**
  1. Nucleophilic Attack
  2. Proton Transfer

- **Nucleophilic Addition under Acidic Conditions**
  
  **Steps:**
  1. Proton Transfer
  2. Nucleophilic Attack
• Oxygen Nucleophiles
  a. Hydrate Formation
  This mechanism can be acid or base catalyzed!

  ![Diagram showing the mechanism of hydrate formation](image)

  b. Acetal and Ketal Formation
  Steps:
  1. Proton Transfer
  2. Nucleophilic Attack
  3. Proton Transfer (Hemiacetal forms)
  4. Proton Transfer
  5. Loss of a Leaving Group
  6. Nucleophilic Attack
  7. Proton Transfer (Acetal Forms)

• Nitrogen Nucleophiles
  a. Imine Formation
  Steps:
  1. Nucleophilic Attack
  2. Proton Transfer
  3. Proton Transfer (Carbinolamine forms)
b. Other Reactions

c. Enamine Formation
Steps:
1. Nucleophilic Attack
2. Proton Transfer
3. Proton Transfer (Carbinolamine forms)
4. Proton Transfer
5. Loss of a Leaving Group
6. Proton Transfer (Enamine forms)
**HIGHLIGHT #1: REVIEW OF HOW TO MAKE ALDEHYDES**

1. Oxidation

   ![Oxidation](image1)

2. Ozonolysis

   ![Ozonolysis](image2)

3. Hydroboration-Oxidation

   ![Hydroboration-Oxidation](image3)

**HIGHLIGHT #1: REVIEW OF HOW TO MAKE KETONES**

1. Oxidation of a Secondary Alcohol

   ![Oxidation of a Secondary Alcohol](image4)

2. Ozonolysis of an Alkene

   ![Ozonolysis of an Alkene](image5)

3. Acid-Catalyzed Hydration of Terminal Alkynes

   ![Acid-Catalyzed Hydration of Terminal Alkynes](image6)

4. Friedel-Crafts Acylation (CH. 19)

   ![Friedel-Crafts Acylation (CH. 19)](image7)
THINGS YOU MAY STRUGGLE WITH:

1. REVIEW THESE MECHANISMS! I highly recommend doing problems 20.8, 20.9, 20.15, and 20.18. Be able to draw the entire mechanism FROM MEMORY to ensure you know what types of reagents to use and the products formed.

2. Be comfortable with the flow of the steps I listed above for each reaction. Try to explain why each step is necessary to check your learning. For example, you should be able to explain why 4 proton transfers take place in the formation of an acetal.

PRACTICE PROBLEMS:

1. Identify the type of mechanism and draw out the mechanism

![Mechanism 1]  

2. Identify the mechanism and predict the products

![Mechanism 2]  

3. Name this reaction and complete it

![Mechanism 3]
ANSWERS TO PRACTICE PROBLEMS:

1.

Nucleophilic Addition under Acidic Conditions:

2.

Ketone + Hydroxylamine → Oxime

3.

Ketone + Secondary Amine → Enamine Formation