Midterm 2 Review

1. Draw the products formed when the α, β-unsaturated ketone is treated with each reagent (17.40)
   a. 
   \[
   \begin{align*}
   &\text{NaBH}_3 \\
   &\text{CH}_3\text{OH}
   \end{align*}
   \]
   b. 
   \[
   \begin{align*}
   &\text{H}_2 (1 \text{ equiv.}) \\
   &\text{Pd-C}
   \end{align*}
   \]
   c. 
   \[
   \begin{align*}
   &\text{H}_2 \text{(excess)} \\
   &\text{Pd-C}
   \end{align*}
   \]
   d. 
   \[
   \begin{align*}
   &[1] \text{CH}_3\text{Li} \\
   &[2] \text{H}_2\text{O}
   \end{align*}
   \]
2. Draw the stepwise mechanism for the following reaction. (17.52)

3. Draw a stepwise mechanism for the following reaction. (17.55)

4. Outline a synthesis of each Wittig reagent from Ph₃P and an alkyl halide

   a.

   b.

   c.
4. **Cyanohydrins**: Draw out the products of each reaction. Keep potential stereoisomers in mind.
   a. 
   ![Reaction 1](image1)
   b. 
   ![Reaction 2](image2)

**Imine/Enamines**
5. Draw the product formed when the following molecules react with i) MeNH₂ ii) Et₂NH in catalytic acetic acid
   a. 
   ![Reaction 3](image3)
   b. 
   ![Reaction 4](image4)
6. What carbonyl and amine are needed to produce the following products?

a. 

b. 

7. What Wittig reagent and carbonyl are needed to produce the following alkenes? Choose the preferred route.

a. 

b. 
Mechanisms
8. Draw out the stepwise mechanisms for the following reactions
a.

\[ \text{Mechanism a image} \]

b.

\[ \text{Mechanism b image} \]
Spectroscopy

9. Draw out the compound given the molecular formula and NMR spectra
   a. $\text{C}_{10}\text{H}_{12}\text{O}$

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- **ppm**
  - m, 5H
  - q, 2H
  - s, 2H
  - t, 3H

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- **ppm**
  - There are 2 separate carbon signals here
10. Circle the compound that corresponds to the following NMR spectra.

b.