Concepts Covered:

**Ch 18: Ketones and Aldehydes**
- Cyanohydrin Formation
  - Rxn cond. and mechanism
  - Hydrolysis of CN
- Wittig Reaction
  - Production of stereoisomers
  - Synthesis of the Wittig Reagent
    - Finding the ideal synthesis pathway
- Imine and Enamine Formation
  - Rxn cond. and Mechanism
- Acetal Formation
  - Rxn cond. and mechanism
  - Intramolecular acetal formation
- IR/NMR Spectroscopy

**Ch 19: Carboxylic Acids and Nitriles**
- Basic Acid-Base Equilibrium
- Trends in Acidity
  - Resonance Stabilization of the Conjugate Base
  - Inductive Effects
  - Substituent Effects on Benzoic Acids
- IR/NMR Spectroscopy

1. Complete the following reactions.
   a. 

\[
\begin{align*}
\text{CH}_3\text{CH}_2\text{C} &\text{O} \quad \xrightarrow{\text{NaCN}} \quad \text{CH}_3\text{CH}_2C\text{N}\text{H}_2 \\
\text{HCl} & \quad \xrightarrow{6\text{M HCl}} \quad \text{H}_2\text{O}, \Delta 
\end{align*}
\]
b.

Draw out the compound given the molecular formula and NMR spectra:

\[ C_{10}H_{12}O \]

2. Draw out the compound given the molecular formula and NMR spectra:

\[ C_{10}H_{12}O \]

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

← There are 2 separate carbon signals here
3. Predict the products and/or reagents in the following reactions.

\[
\text{\( \text{Cyclic O} + \text{Ph}-\text{NNNH}_2 \rightarrow \text{pH} 5.0 \)}
\]

\( \text{a.} \)

\[
\text{\( \text{Br} + \text{Ph}_3\text{P} \rightarrow \text{O} \)}
\]

\( \text{b.} \)

1. \( \text{Ph}_3\text{P} \)
2. \( n-\text{BuLi} \)
3. \( \text{O} \)
4. Provide a synthesis of the following compound started from benzonitrile (*Hint: involves a reaction from Chapter 20*).