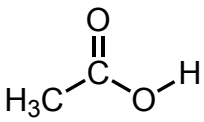
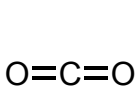
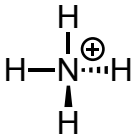
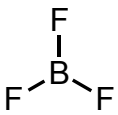
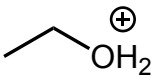
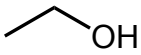
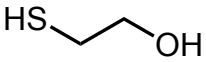
Acid-Base Chemistry

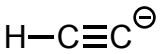
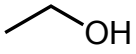
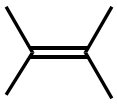
1. The species shown below are all Lewis acids. Considering the individual bond dipoles, **draw a circle around any Lewis acidic atoms**. *Which of the circled atoms are also Brønsted acids*?

2. **Draw the conjugate base** for each of the following acids. Assume that deprotonation only occurs one time.

Acid	Conjugate Base
	
	
	

3. **Draw the conjugate acid** of each of the following bases. Assume that protonation only occurs one time.

Base	Conjugate Acid
	
	
	

4. **Select the more acidic molecule in each pair below**. Then, provide a **brief explanation** of your reasoning (e.g. eN, bond length, resonance, hybridization, etc…)

A.

Explanation:

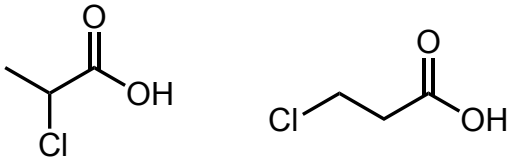
B.

Explanation:

C.

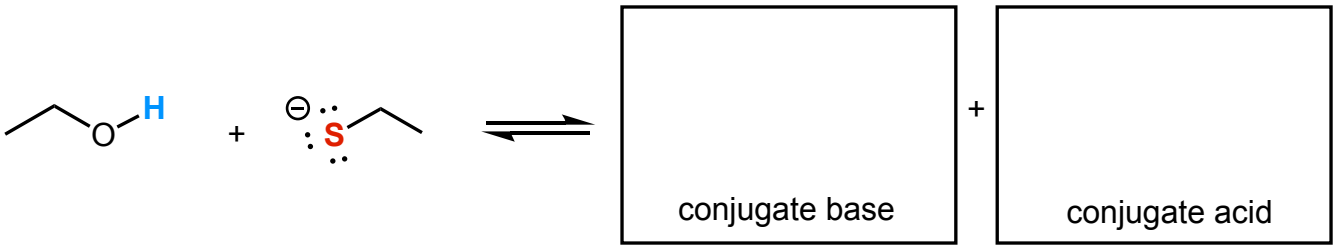
Explanation:

D.

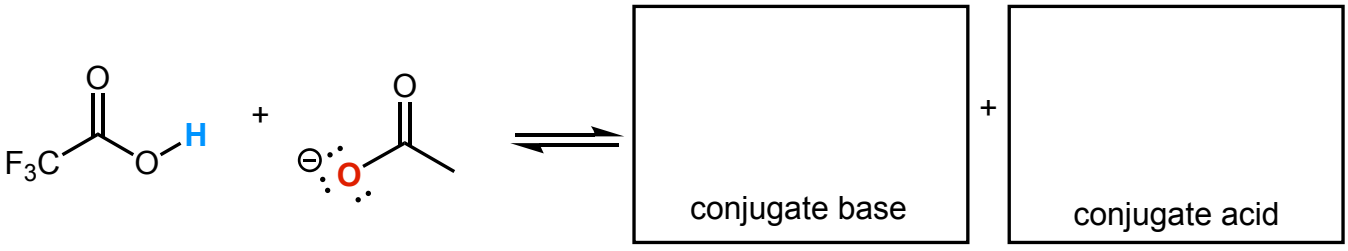


Explanation:

5. Using the process outlined on page 2 of the Acid-Base Core Concepts, **draw the products** of the following acid/base reactions and **determine which side of the reaction is favored at equilibrium**. In your own words, explain your selection.

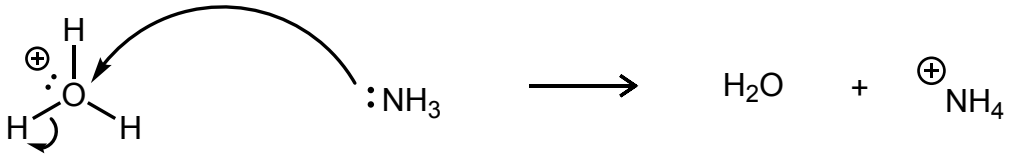


Explanation:

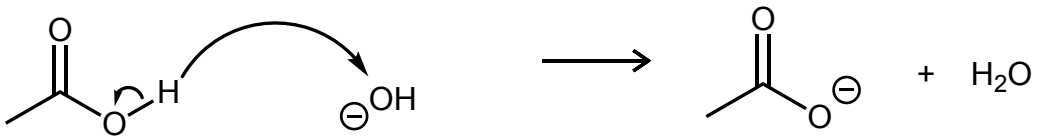


Explanation:

6. **The acid-base mechanisms below are incorrect**. In your own words, **explain why and draw correct arrow pushing mechanisms.**

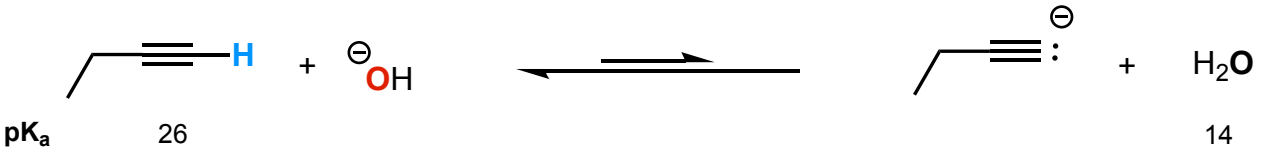


Explanation:



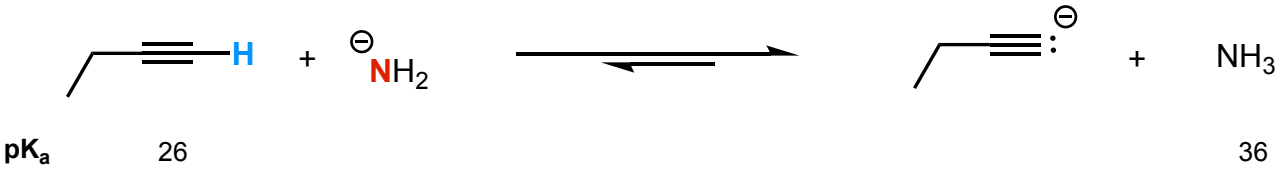
Explanation:

7. Hydroxide is often presented as a strong base, but in some reactions it is not strong enough. **Given the pK_a values shown below, explain why the reaction below is disfavored in the forward reaction.**



Explanation:

If strong acids have stable conjugate bases, **weak acids have more reactive conjugate bases**. With this in mind, explain why $NaNH_2$ **is** an appropriate base for the reaction below.



Explanation:

Using the example above, **select which base** ($^{1-}$OH or $^{1-}$H) is reactive enough for deprotonating the most acidic proton in ethanol.