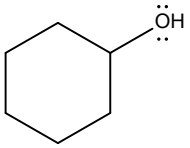
Exercise 12.1
Conjugate Acid-Base Pairs

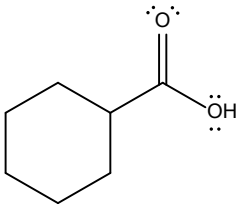
1. Draw the conjugate base of each of the following organic molecules.

   While each molecule contains multiple hydrogen atoms, each has one type of hydrogen atom that is significantly more acidic than the others, so only one conjugate base can form.

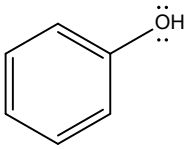
(a)



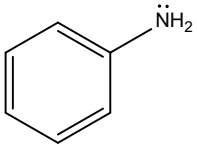
(b)



(c)



(d)

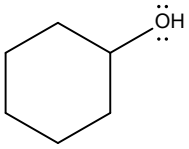


2. The pK_a values for the four molecules in question 1 are approximately 5, 10, 15 and 28. Match each molecule with its approximate pK_a value.

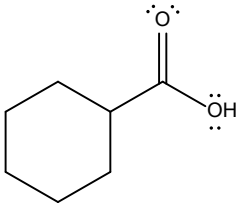
3. Rank the four conjugate bases from question 1 from strongest to weakest.

4. Draw the conjugate acid of each of the following organic molecules.

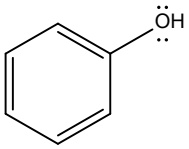
(a)



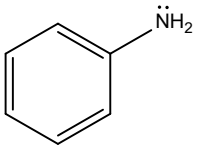
(b)



(c)



(d)



5. Which of the four molecules in question 4 would you expect to be the strongest base? Why?

6. Which pK_a values would you need to verify your answer to question 5?