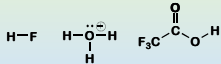


## Acids and Bases, Ch 3

$$pK_a = 3.2 \quad -1.74 \quad 0.18$$

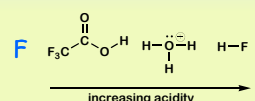
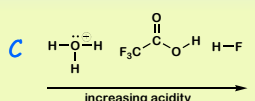
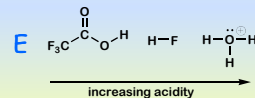
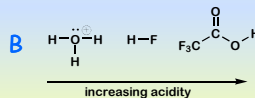
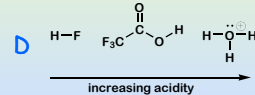
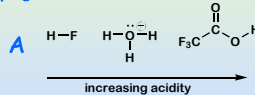


Which of the above acids is the most acidic?

Which of the above acids is the least acidic?

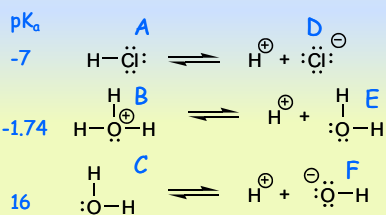
Choose the order that has the following acids correctly arranged with respect to increasing acidity.

$$pK_a = 3.2 \quad -1.74 \quad 0.18$$



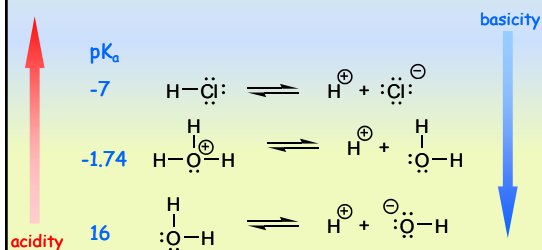
Which of the following species is the weakest base?

[pK<sub>a</sub> table](#)



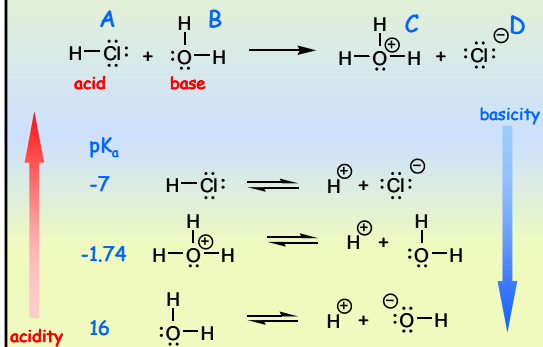
3

[pK<sub>a</sub> table](#)



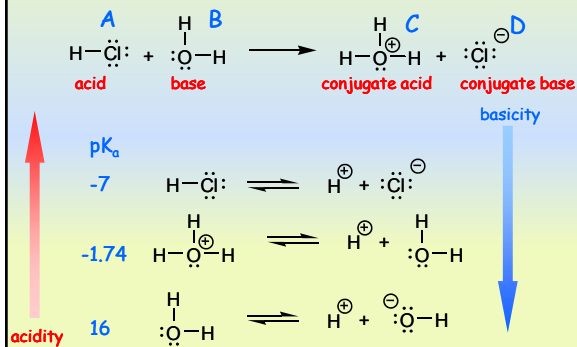
4

Which is the acid in the following reaction? [pK<sub>a</sub> table](#)



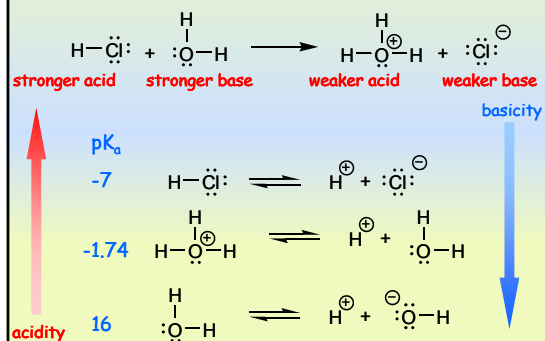
5

Which is the conjugate base in the following reaction?

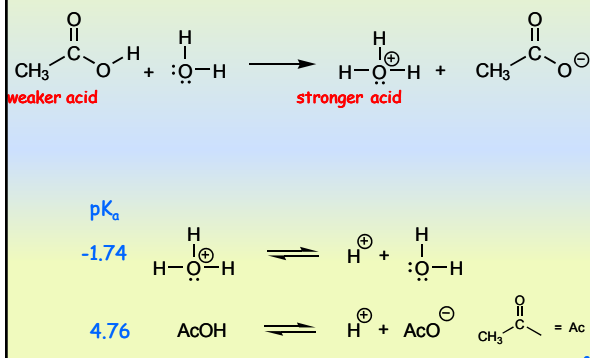


6

Does H-Cl spontaneously react with water?

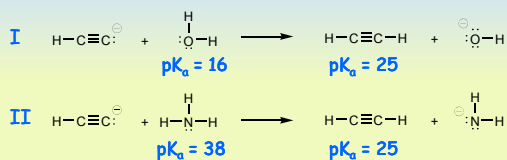


Does acetic acid spontaneously react with water?



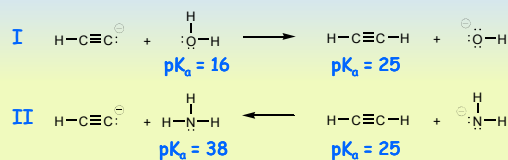
Which of the following acid base reactions is written correctly?

- A. I and II.    B. only II.  
C. only I    D. neither I or II.



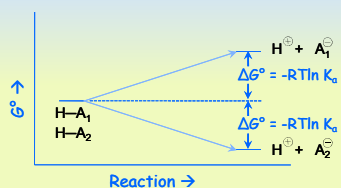
Which of the following acid base reactions is written correctly?

- A. I and II.    B. only II.  
C. only I    D. neither I or II.



How does the equilibrium constant,  $K_a$ , relate to thermodynamics?     $\Delta G^\circ = -RT \ln K_a$

Is  $\text{H}^{\oplus} + \text{A}_1^{\ominus}$  more or less stable than  $\text{H}^{\oplus} + \text{A}_2^{\ominus}$ ?

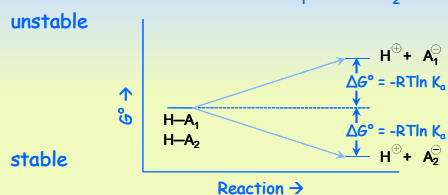


11

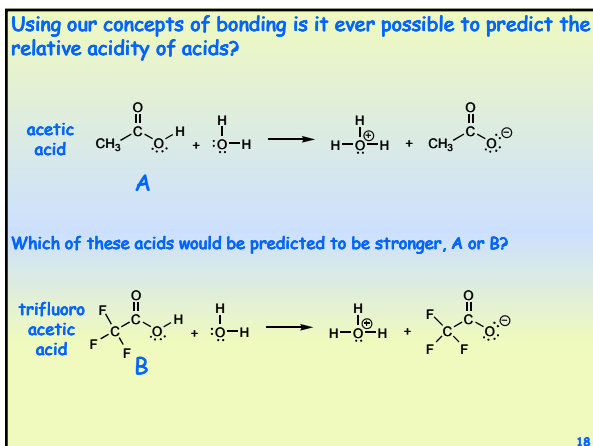
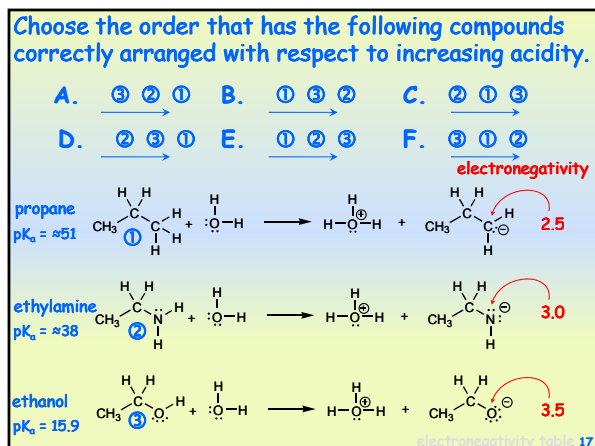
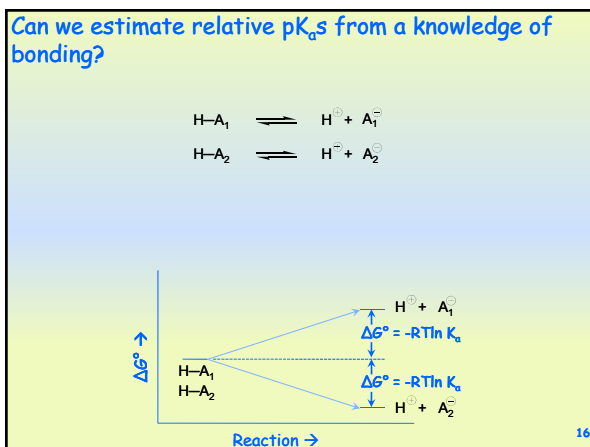
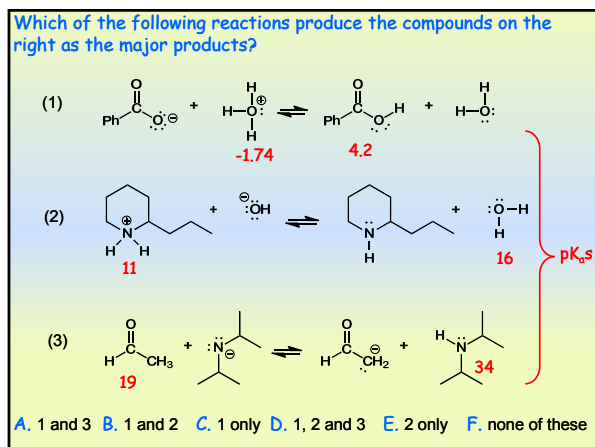
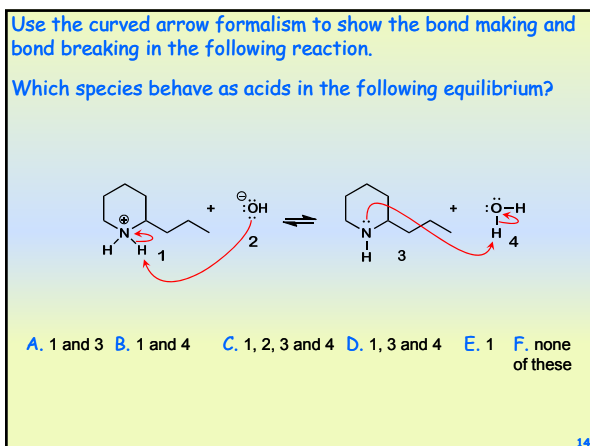
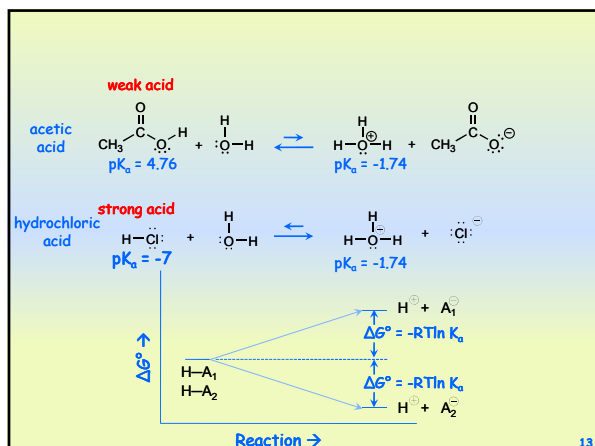
How does the equilibrium constant,  $K_a$ , relate to thermodynamics?     $\Delta G^\circ = -RT \ln K_a$

Choose the correct statement

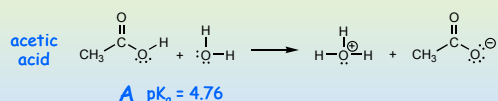
- A.  $\text{H}-\text{A}_1$  is a weak acid.  
B.  $\text{H}-\text{A}_1$  is a strong acid.  
C.  $\text{H}-\text{A}_1$  and  $\text{H}-\text{A}_2$  are strong acids.  
D.  $\text{H}-\text{A}_1$  and  $\text{H}-\text{A}_2$  are weak acids.



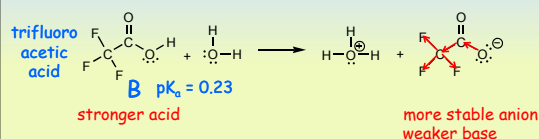
12



Using our concepts of bonding is it ever possible to predict the relative acidity of acids?



Which of these acids would be predicted to be stronger, A or B?



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Review: Is H-A a strong acid? **no**

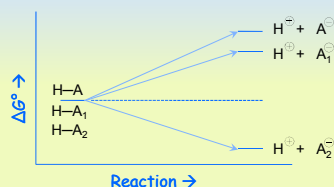
Is H-A<sub>1</sub> a strong acid? **no**

Is H-A<sub>1</sub> a stronger acid than H-A? **yes**

Is H-A<sub>2</sub> a strong acid? **yes**

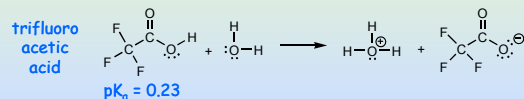
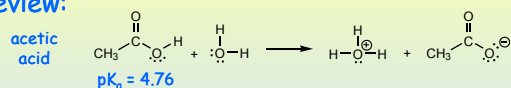
Is A<sup>⊖</sup> a stronger base than A<sub>1</sub><sup>⊖</sup>? **yes**

Is H-A<sub>2</sub> more stable than H<sup>⊕</sup> + A<sub>2</sub><sup>⊖</sup>? **no**

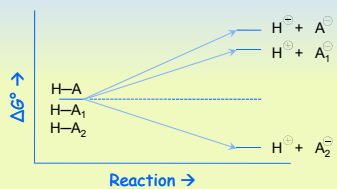


20

Review:

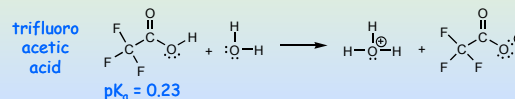
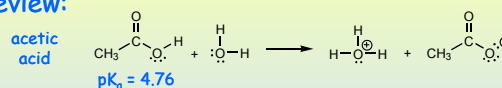


Are these strong acids? **no**

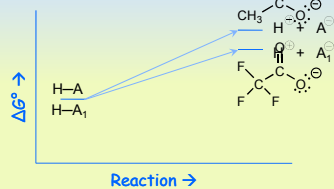


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Review:



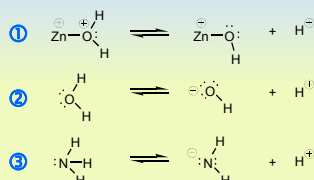
Is this diagram correctly labeled? **yes**



22

Choose the order that has the following acids correctly arranged with respect to increasing acidity.

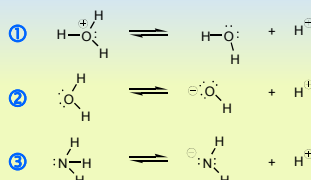
- A.  $\underline{2} \rightarrow \underline{1} \rightarrow \underline{3}$     B.  $\underline{1} \rightarrow \underline{3} \rightarrow \underline{2}$     C.  $\underline{1} \rightarrow \underline{2} \rightarrow \underline{3}$   
 D.  $\underline{2} \rightarrow \underline{3} \rightarrow \underline{1}$     E.  $\underline{3} \rightarrow \underline{2} \rightarrow \underline{1}$     F.  $\underline{3} \rightarrow \underline{1} \rightarrow \underline{2}$



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Choose the order that has the following acids correctly arranged with respect to increasing acidity.

- A.  $\underline{2} \rightarrow \underline{1} \rightarrow \underline{3}$     B.  $\underline{1} \rightarrow \underline{3} \rightarrow \underline{2}$     C.  $\underline{1} \rightarrow \underline{2} \rightarrow \underline{3}$   
 D.  $\underline{2} \rightarrow \underline{3} \rightarrow \underline{1}$     E.  $\underline{3} \rightarrow \underline{2} \rightarrow \underline{1}$     F.  $\underline{3} \rightarrow \underline{1} \rightarrow \underline{2}$



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