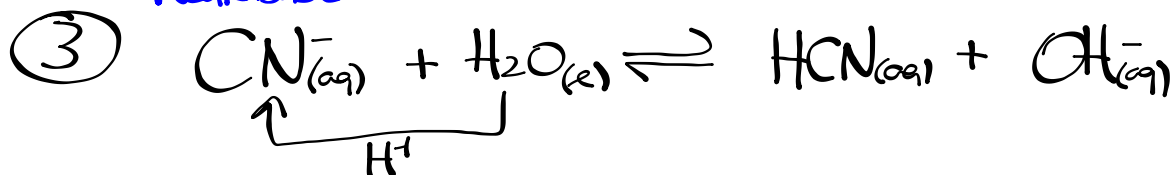


Homework - Bases Worksheet



Weak base



0.250M

$$K_b = \frac{[\text{HCN}_{(aq)}][\text{OH}^-_{(aq)}]}{[\text{CN}^-_{(aq)}]}, \quad [\text{HCN}_{(aq)}] = [\text{OH}^-_{(aq)}]$$

$$K_b = \frac{[\text{OH}^-_{(aq)}]^2}{[\text{CN}^-_{(aq)}]}$$

$$K_a K_b = K_w$$

$$K_b = \frac{K_w}{K_a} = \frac{1.0 \times 10^{-14}}{6.2 \times 10^{-10}}$$

$$K_b = 1.6 \times 10^{-5}$$

$$[\text{OH}^-_{(aq)}] = \sqrt{(1.6 \times 10^{-5})(0.250)}$$

$$[\text{OH}^-_{(aq)}] = 2.0 \times 10^{-3} \text{ M}$$

$$\text{pOH} = -\log[2.0 \times 10^{-3}]$$

$$\text{pOH} = 2.697$$

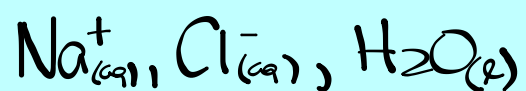
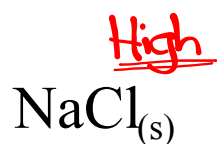
$$\text{pH} + \text{pOH} = 14.000$$

$$\text{pH} = 11.303$$

Pure Substance

Entities in Water

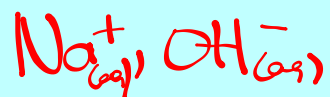
....Think High vs. Low Solubility



Pure Substance

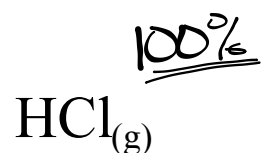
Entities in Water

....Think High vs. Low Solubility



Pure Substance

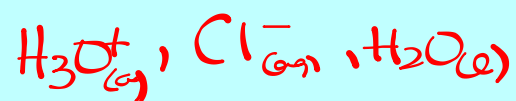
....Think High vs. Low Solubility

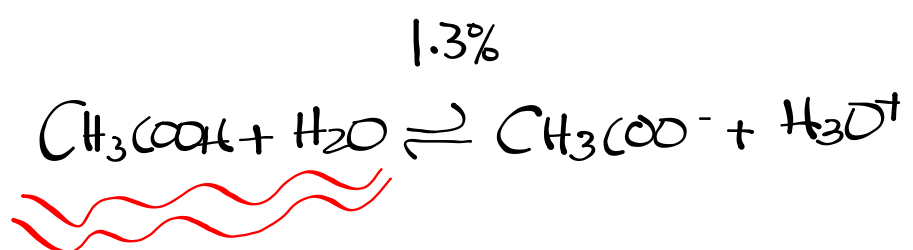


Strong vs. Weak Acid



Entities in Water

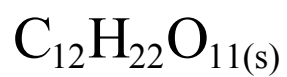




Pure Substance

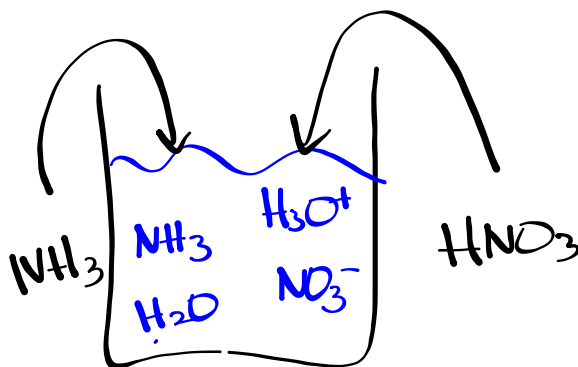
Entities in Water

....Think High vs. Low Solubility



Predicting Acid-Base Reactions

1. List all entities (ions, atoms, or molecules) initially present.
2. Identify all possible acids and bases, using Bronsted-Lowry definition.
3. Identify the strongest acid and strongest base, using table of acids and bases.
4. Transfer one proton from the acid to the base and predict the conjugate acid and conjugate base as products.
5. Predict the position of the equilibrium.

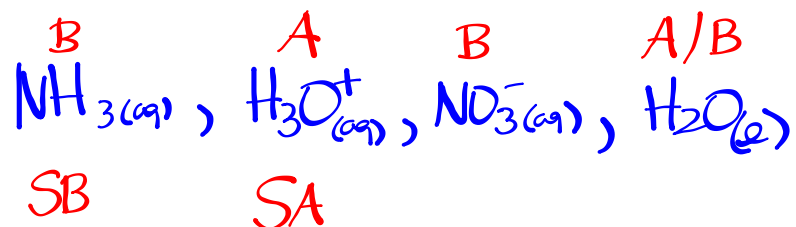


Sample Problem

Ammonium nitrate fertilizer is produced by the quantitative reaction of aqueous ammonia with nitric acid. Write a balanced acid-base equilibrium equation.



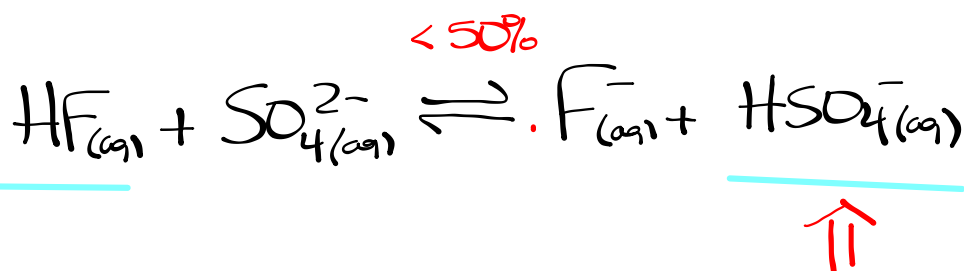
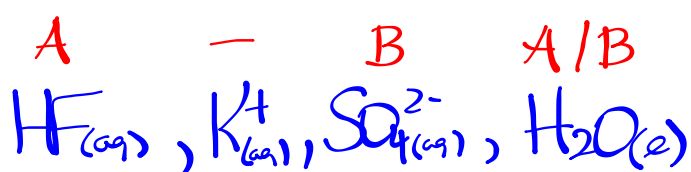
All entities in solution:



Sample Problem



Write a balanced acid-base equilibrium equation for the reaction of hydrofluoric acid and potassium sulfate.



Homework

Predicting Acid-Base Equilibria

Worksheet