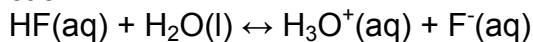
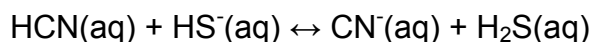


Solutions for Practice Exam 2

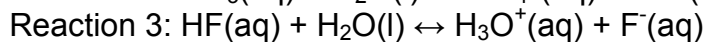
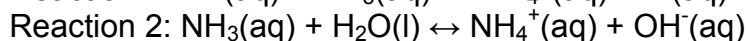
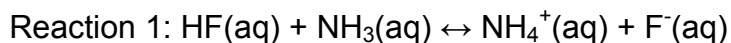
1. In the following reaction



- c. HF is an acid and F^- is its conjugate base.
2. What is the pH of a 4.2×10^{-4} M HBr solution at 25 °C?
- b. 3.38
3. Which is the strongest acid?
- e. Chloroacetic acid, $K_a = 1.4 \times 10^{-3}$
4. Knowing that H_2S is a stronger acid than HCN, determine, if possible, in which direction the following equilibrium lies.



- a. equilibrium lies to the left
5. We have a 4.63×10^{-4} M solution of HCl. What is the pH of this solution at 25 °C?
- a. 3.33
6. What is the pH of a 3.18 M CH_3COOH solution at 25 °C? $K_a = 1.8 \times 10^{-5}$?
- a. 2.12
7. What is the % ionization of a 3.14 M $\text{CH}_3\text{CO}_2\text{H}$ solution at 25 °C? For $\text{CH}_3\text{CO}_2\text{H}$, $K_a = 1.8 \times 10^{-5}$.
- a. 0.24%
8. Which of the following acid-base reactions will lie predominantly toward the products?



- a. 1 only

9. We add 1.00 mL of 10.0 M HNO_3 to 100. mL of 0.10 M NaHCOO . What is the pH of the resulting solution? $K_a(\text{HCOOH}) = 1.8 \times 10^{-4}$

a. 2.37

10. If you mix 100. mL of 0.11 M HCl with 50.0 mL of 0.22 M NH_3 , what is the pH of the resulting solution? For NH_4^+ , $K_a = 5.6 \times 10^{-10}$

b. 5.19

11. If you mix 125. mL of 0.50 M $\text{CH}_3\text{CO}_2\text{H}$ with 75.0 mL of 0.83 M NaOH , what is the pH of the resulting solution? For CH_3COO^- , $K_b = 5.6 \times 10^{-10}$

7.14 (Yes, this solution did not show up as a choice!)

12. What effect will the addition of the reagent in each of the following have on the pH of the $\text{CH}_3\text{CO}_2\text{H}$ solution respectively?

Flask 1: Addition of NaCH_3CO_2 to $\text{CH}_3\text{CO}_2\text{H}(\text{aq})$

Flask 2: Addition of $\text{Ca}(\text{CH}_3\text{CO}_2)_2$ to $\text{CH}_3\text{CO}_2\text{H}(\text{aq})$

e. increase, increase

13. If you add 20.0 mL of 2.30 M NH_3 to 100. mL of a 1.17 M NH_4Cl solution, what is the pH of the resulting solution? For NH_4^+ , $K_a = 1.8 \times 10^{-5}$

e. 8.85

14. We have 250. mL of a 0.56 M solution of NaCH_3COO . How many milliliters of a 0.50 M CH_3COOH solution should be added to make a buffer of pH = 4.40? $K_a(\text{CH}_3\text{COOH}) = 1.8 \times 10^{-5}$

c. 620

15. Which of the following is the solubility product constant for $\text{Mn}(\text{OH})_2$?

a. $K_{sp} = [\text{Mn}^{2+}][\text{OH}^-]^2$

16. Rank the compounds from lowest to highest molar solubility.

FeCO_3 ; $K_{sp} = 3.5 \times 10^{-11}$

BaSO_4 ; $K_{sp} = 1.1 \times 10^{-10}$

ZnCO_3 ; $K_{sp} = 1.5 \times 10^{-11}$

c. $\text{ZnCO}_3 < \text{FeCO}_3 < \text{BaSO}_4$

17. What is the concentration of SO_4^{2-} in a saturated solution of BaSO_4 if $K_{\text{Sp}} = 1.1 \times 10^{-10}$?
- d. $1.0 \times 10^{-5} \text{ M}$
18. Which of the following has the highest molar solubility?
- c. PbI_2 ; $K_{\text{Sp}} = 8.7 \times 10^{-9}$
19. For MgF_2 , $K_{\text{Sp}} = 6.4 \times 10^{-9}$. If you mix 400. mL of $1 \times 10^{-4} \text{ M Mg(NO}_3)_2$ and 500. mL of $1.00 \times 10^{-4} \text{ M NaF}$, what will be observed?
- d. No precipitate forms because $Q_{\text{Sp}} < K_{\text{Sp}}$.
20. For AgI , $K_{\text{Sp}} = 8.3 \times 10^{-17}$. What is the molar solubility of AgI in a solution which is $5.1 \times 10^{-4} \text{ M}$ in AgNO_3 ?
- d. $1.6 \times 10^{-13} \text{ mol/L}$