

Study Guide

Chapter 16

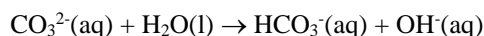
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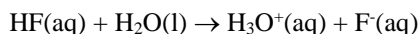
- List some properties of acids: _____

- List some properties of bases: _____

- Define:
 - Arrhenius Acid: _____
 - Arrhenius Base: _____
 - Brønsted-Lowry Acid: _____
 - Brønsted-Lowry Base: _____
 - Amphoteric: _____
- Write the formula for the auto-ionization of water. _____
 - What is the $[H^+]$ in pure water at $25^\circ C$? _____ $[OH^-]$?: _____
 - What is the ion product expression for pure water? $K_w =$ _____
 - What is the value of K_w at $25^\circ C$? _____
- What is the definition of a strong acid? _____
- List the strong acids: _____
- Are most acids strong or weak? _____
- What is the definition of a strong base? _____
- List the strong bases: _____
- Determine the acid-base conjugate pairs for the following reaction:



- Determine the acid-base conjugate pairs for the following reaction:



- What is the formula for calculating the pH of a solution from $[H^+]$? _____ from $[OH^-]$ _____
- What is the formula for calculating the pOH of a solution from $[H^+]$? _____ from $[OH^-]$ _____
- How is pH related to pOH? _____
- How does K vary with temperature? _____
- How does K_a relate to the strength of an acid? _____
- How does K_b relate to the strength of an acid? _____
- What is the relationship between K_a , K_b and K_w ? _____
- Under what conditions can the change in acid concentration of a weak acid be disregarded in an K_a calculation? _____

- How is pK_a calculated? _____ pK_b ? _____
 - What is the relationship between pK_a & pK_b ? _____
- What is meant "abstraction of H^+ "? _____

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22. What is the pOH of a 0.035 M solution of barium hydroxide? (1.15)
23. Calculate the pH of a solution at 25.0 °C that contains 1.94×10^{-10} M hydronium ions. (9.71)
24. HZ is a weak acid. An aqueous solution of HZ is prepared by dissolving 0.020 mol of HZ in sufficient water to yield 1.0 L of solution. The pH of the solution was 4.93 at 25.0°C. The K_a of HZ is _____. (6.9×10^{-9})
25. The pH of a 0.25 M aqueous solution of hydrofluoric acid, HF, at 25.0°C is 2.03. What is the value of K_a for HF? (3.5×10^{-4})
26. K_a for HX is 7.5×10^{-12} . What is the pH of a 0.15 M aqueous solution of NaX? (12.10)
27. The acid-dissociation constants of phosphoric acid (H_2PO_3) are $K_{a1} = 7.5 \times 10^{-3}$, $K_{a2} = 6.2 \times 10^{-8}$, and $K_{a3} = 4.2 \times 10^{-13}$ at 25.0°C. What is the pH of a 2.5 M aqueous solution of phosphoric acid? (0.86)
28. The K_a for formic acid (HCO_2H) is 1.8×10^{-4} . What is the pH of a 0.10 M aqueous solution of sodium formate ($NaHCO_2$)? (8.37)
29. The base-dissociation constant, K_b , for pyridine, C_5H_5N , is 1.4×10^{-9} . The acid-dissociation constant, K_a , for the pyridinium ion, $C_5H_5NH^+$, is _____. (7.1×10^{-6})
30. K_a for HF is 7.0×10^{-4} . K_b for the fluoride ion is _____. (1.4×10^{-11})

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31. Which of the following ions will act as a weak base in water?
- HS^-
 - F^-
 - NO_2^-
 - ClO^-
 - All of the above will act as a weak base in water. (*Because all are anions (conjugate bases) of weak acids.*)
32. Of the following substances, an aqueous solution of _____ will form basic solutions.
- NH_4Cl $\text{Cu}(\text{NO}_3)_2$ K_2CO_3 NaF
- NH_4Cl , $\text{Cu}(\text{NO}_3)_2$
 - K_2CO_3 , NH_4Cl
 - NaF only
 - NaF , K_2CO_3
 - NH_4Cl only
33. Of the following, which is the strongest acid?
- HIO
 - HIO_4
 - HIO_2
 - HIO_3
 - The acid strength of all of the above is the same.
34. The conjugate base of H_2PO_4^- is _____. (HPO_4^{2-})