

Acids and Bases Workbook 2

Strong acid/base and Weak Acid and base questions

Answer the following questions. Be sure to show all your work.

1. Calculate (a) the pH and (b) the percent ionization of a 0.250 M $\text{HC}_2\text{H}_3\text{O}_2$ solution. $K_a(\text{HC}_2\text{H}_3\text{O}_2) = 1.8 \times 10^{-5}$. (The formula for acetic acid may also be written as CH_3COOH .)
2. Calculate the pH of a 0.600 M solution of methylamine CH_3NH_2 . $K_b = 4.4 \times 10^{-4}$.
3. Find the pH of a 0.325 M acetic acid solution. $K_a = 1.8 \times 10^{-5}$.
4. Find the pH of a 0.056 M propionic acid solution ($K_a = 1.4 \times 10^{-5}$).
5. Find the pH of a 0.065 M solution of formic acid. The acid dissociation constant (K_a) for formic acid is 1.8×10^{-4} .

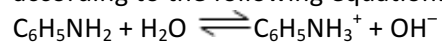
11. If $[\text{H}_3\text{O}^+] = 4.5 \times 10^{-6}$ mol/L in a 0.45 mol/L solution of the weak acid HX, calculate percent dissociation.

12. Find the percent dissociation in a 0.87 mol/L solution of the weak base HPO_3^{2-} if K_b is 1.6×10^{-7} .

13. Calculate the $[\text{H}_3\text{O}^+]$ of a 0.38 mol/L weak acid that is dissociated 0.12%.

14. Determine the K_a for an acid, HA, if a 0.45 mol/L solution is dissociated 0.025%.

15. Calculate the the percent dissociation of a 0.60 mol/L aniline ($\text{C}_6\text{H}_5\text{NH}_2$) solution ($K_b = 3.8 \times 10^{-10}$) if it dissociates according to the following equation:



16. Determine the K_a for an acid HA if a 0.750 mol/L solution is dissociated 0.015%.

17. If $[H_3O^+] = 4.5 \times 10^{-10}$ mol/L, calculate the K_a for a weak acid in a solution of 0.80 mol/L of an acid HB.

18. Calculate the pH of a 0.10 mol/L solution of hypochlorous acid, HOCl ($K_a = 3.5 \times 10^{-8}$)

19. A 0.20 mol/L solution of the weak base HPO_4^{2-} has a pH of 9.00. Find the K_b .

20. Calculate the K_a of a weak acid, HX, if a 0.25 mol/L solution has a pH of 4.40.

21. At 25°C, a 0.010 mol/L ammonia solution is 4.3% ionized. Calculate the pOH and pH.

22. Hydrazine (N_2H_4) is a weak base with a K_b of 3.0×10^{-6} . The reaction of hydrazine in water is
$$\text{H}_2\text{NNH}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{NNH}_3^+ + \text{OH}^-$$

Calculate the pH of a 2.0 mol/L solution of hydrazine.

23. Calculate the percent dissociation of a 0.20 mol/L solution of the weak acid, HNO_2 , if the pH of the solution is 4.20.