

Problem Set #15
CHEM101A: General College Chemistry

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12 Topic G Problem 23

The concentration of H⁺ ions in a solution is 0.315 M.

- a) Calculate the concentration of OH⁻ ions in this solution.
- b) Where did these OH⁻ ions come from?
- c) What is the pH of this solution?

12.1 Solution

13 Topic G Problem 24

The pH of an HCl solution is 2.88. a) What is the concentration of H⁺ ions in this solution? b) What is the concentration of OH⁻ ions in this solution? c) What is the concentration of Cl⁻ ions in this solution?

13.1 Solution

14 Topic G Problem 25

Calculate the pH of a 7.4×10^{-4} M solution of Ba(OH)₂.

14.1 Solution

15 Topic G Problem 26

Write the K_a expression and the corresponding chemical equation for each of the following weak acids. a) HClO b) H₂C₄H₄O₄ c) NH₄⁺ d) H₂PO₄⁻

15.1 Solution

16 Topic G Problem 27

The pH of a 0.464 M solution of phosphorous acid (H_3PO_3) is 1.11. Using this information, calculate the K_a of phosphorous acid. (You may assume that only one hydrogen ion dissociates from phosphorous acid.)

16.1 Solution

17 Topic G Problem 28

Calculate the pH of a 0.27 M solution of HCO₂H (formic acid, K_a = 1.8 × 10⁻⁴)

17.1 Solution

18 Topic G Problem 29

Determine which solution from each of the following pairs has the higher pH. You may need to refer to the K_a values in Table 12.4.2 of your textbook.

- a) 0.1 M HCl or 0.1 M HNO_2
- b) 0.1 M HF or 0.1 M HClO
- c) 0.1 M HCN or 0.1 M NaCN

18.1 Solution

19 Topic G Problem 30

Each of the following species can function as an acid. Write the formula of its conjugate base. a) HC₃H₅O₃ b) N₂H₅⁺ c) H₂O d) HCO₃⁻ e) H₂SO₄

19.1 Solution

20 Topic G Problem 31

Each of the following species can function as a base. Write the formula of its conjugate acid. a) NH₃ b) HSO₃⁻ c) H₂O d) PO₄³⁻

20.1 Solution

21 Topic G Problem 32

Identify the acid and the base in each of the following reactions.

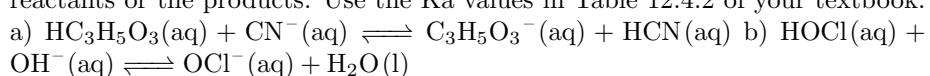
a) $\text{HNO}_2(\text{aq}) + \text{H}_2\text{O(l)} \rightarrow \text{H}_3\text{O}^+(\text{aq}) + \text{NO}_2^-(\text{aq})$

b) $\text{H}_2\text{PO}_4^-(\text{aq}) + \text{HSO}_4^-(\text{aq}) \rightarrow \text{H}_3\text{PO}_4(\text{aq}) + \text{SO}_4^{2-}(\text{aq})$

21.1 Solution

22 Topic G Problem 33

For each of the following reactions, tell whether the equilibrium will favor the reactants or the products. Use the K_a values in Table 12.4.2 of your textbook.



22.1 Solution

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