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 Ka 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 (H3PO3) is 1.11. Using this information, calculate the Ka 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, Ka = 1.8 x 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 top refer to the Ka values in Table 12.4.2 of your textbook. a) 0.1 M HCl or 0.1 M HNO2 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) HNO2(aq) + H2O(l) → H3O+(aq) + NO2–(aq) b) H2PO4–(aq) + HSO4–(aq) → H3PO4(aq) + SO42–(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 Ka values in Table 12.4.2 of your textbook. a) $HC_3H_5O_3(aq) + CN^-(aq) \rightleftharpoons C_3H_5O_3{}^-(aq) + HCN(aq)$ b) $HOCl(aq) + OH^-(aq) \rightleftharpoons OCl^-(aq) + H_2O(l)$

22.1 Solution

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