Exercise 7.62 – Buffer solutions

Q762-01 What must be the ratio of ethanoate ion concentration to ethanoic acid concentration in an aqueous solution in order to provide a solution of pH 5? The Ka of ethanoic acid is 1.8×10^{-5}.

A. 0.056
B. 1.0
C. 1.8
D. 5.0

Q762-02 What is the pH of the solution that results when 10.0 cm^3 of 0.10 HF (Ka= 6.7×10^{-4}) and 10.0 cm^3 of 0.040 M NaOH are mixed?

A. 1.0
B. 1.2
C. 1.5
D. 3.0

Q762-03 A certain buffer solution contains equal concentrations of X-(aq) and HX(aq). The Kb value for X-(aq) is 1.0×10^{-10}. What is the pH of the buffer?

A. 1
B. 4
C. 5
D. 10

Q762-04 Calculate the pH of the buffer made by dissolving 0.1 moles of ammonium chloride in 1dm^3 of 0.1 mol dm^{-3} ammonia solution. (pKb = 4.76)

Q762-05 Which of the following is the pH of a solution made by mixing 150 cm^3 of 0.10 M CH_3CO_2Na and 250 cm^3 of 0.10 M CH_3CO_2H? [Ka of $CH_3CO_2H = 1.8 \times 10^{-5}$]

A. 2.37
B. 4.52
C. 4.74
D. 4.97

Q762-06 Which of the following is a buffer solution?
I 0.01 mol dm^{-3} HCl, 0.01 mol dm^{-3} NaCl
II 0.01 mol dm^{-3} CH_3COOH, 0.01 mol dm^{-3} CH_3COONa

A. I only
B. II only
C. Both I and II
D. Neither I nor II

Q762-07 A buffer solution will be formed by combining equal volumes of 0.1 solutions of mol dm^{-3}

A. hydrochloric acid and sodium hydroxide.
B. hydrochloric acid and sodium ethanoate.
C. ethanoic acid and sodium hydroxide.
D. ethanoic acid and sodium ethanoate.

Q762-08 A 0.1 mol dm^{-3} solution of methanoic acid is also 0.02 mol dm^{-3} in soldium methanoate. The pH was measured to be 3.05. Use the information to determine the pKa of methanoic acid.

Q762-09 A 0.01 mol dm^{-3} solution of ammonia is 0.5 mol dm^{-3} in ammonium chloride. The pH was measured to be 7.55. Use the information to determine the pKb of ammonia.

Q762-10 A certain buffer solution contains equal concentrations of X-(aq) and HX(aq). The Kb value for X-(aq) is 1.0×10^{-10}. What is the pH of the buffer?

A. 1
B. 4
C. 5
D. 10