

Ch 16 Pract Test #1

Page 1

1. In which of the following aqueous solutions would you expect AgCl to have the lowest solubility?
- a. pure water
 - b. 0.020 M BaCl₂
 - c. 0.015 NaCl
 - d. 0.020 AgNO₃
 - e. 0.020 KCl

K_{sp}/S/
Le Chat.

pH of
buffer

2. Calculate the pH of a 1.0-L aqueous solution containing 0.30 mol of HF and 0.10 mol of HCl. (K_a for HF = 6.8 × 10⁻⁴)
- a. 0.016
 - b. 0.40
 - c. 1.0
 - d. 2.6
 - e. 1.4 × 10⁻³

buffer

3. Which one of the following pairs cannot be mixed together to form a buffer solution?
- a. NH₃, NH₄Cl
 - b. NaC₂H₃O₂, HCl
 - c. RbOH, HBr
 - d. KOH, HF
 - e. H₃PO₄, KH₂PO₄

buffer

4. A solution containing which one of the following pairs of substances will be a buffer solution?
- a. NaI, HI
 - b. KBr, HBr
 - c. RbCl, HCl
 - d. CsF, HF
 - e. none of these

- X Consider a solution containing 0.100 M fluoride ion and 0.126 M hydrogen fluoride. The concentration of hydrogen fluoride after addition of 5.00 mL of 0.0100 M HCl to 25.0 mL of this solution is _____ M.
- a. 0.107
 - b. 0.100
 - c. 0.126
 - d. 0.00976
 - e. 0.00193

- buffer capacity*
6. Of the following, which solution has the greatest buffering capacity?
- 0.821 M HF and 0.217 M NaF
 - 0.821 M HF and 0.909 M NaF
 - 0.100 M HF and 0.217 M NaF
 - 0.121 M HF and 0.667 M NaF
 - They are all buffer solutions and would all have the same capacity.
- pH of buffer*
7. Determine the pH of a solution prepared by dissolving 0.75 mol of NH_3 and 0.25 mol of NH_4Cl in a liter of solution. $K_b = 1.8 \times 10^{-4}$ for NH_3 .
- 4.27
 - 8.78
 - 10.73
 - 5.22
 - 9.78
- pH of buffer*
8. Calculate the pH of a solution prepared by dissolving 0.25 mol of benzoic acid ($\text{C}_7\text{H}_5\text{O}_2\text{H}$) and 0.15 mol of sodium benzoate ($\text{NaC}_7\text{H}_5\text{O}_2$) in 1.00 L of solution. $K_a = 6.5 \times 10^{-5}$ for benzoic acid.
- 4.41
 - 2.39
 - 3.97
 - 10.03
 - 4.19
- pH of buffer*
9. Determine the pH of a solution prepared by adding 0.45 mol of solid KOAc to 1.00 L of 2.00 M HOAc. $K_a = 1.8 \times 10^{-5}$ for HOAc.
- 2.22
 - 4.10
 - 2.52
 - 5.39
 - 4.74
- ~~10.~~ Consider a solution prepared by adding 0.45 mol of solid KOAc to 1.00 L of 2.00 M HOAc. ($K_a = 1.8 \times 10^{-5}$) If 0.05 mol of HCl is added to this buffer solution, the pH of the solution will drop slightly. The pH does not drastically decrease because the HCl reacts with the _____ present in the buffer solution.
- OAc^-
 - H_3O^+
 - H_2O
 - HOAc
 - This is a buffer solution so that the pH does not change.

- X. Consider a solution prepared by dissolving 0.35 mol of solid $\text{CH}_3\text{NH}_3\text{Cl}$ (methylamine hydrochloride) in 1.00 L of 1.1 M CH_3NH_2 (methylamine). The K_b for methylamine is 4.4×10^{-4} . If 10 mL of 0.01 M HCl is added to this buffer solution, the pH of the solution will _____ slightly because the HCl reacts with the _____ present in the solution.
- increase, OH^-
 - increase, CH_3NH_2
 - decrease, CH_3NH_2
 - _____ +
decrease, CH_3NH_3^+
 - This is a buffer solution so that the pH does not change.

- buffer (12). Which of the following substances, when added to a solution of hydrofluoric acid, could be used to prepare a buffer solution?
- HCl
 - NaNO_3
 - NaF
 - NaCl
 - NaBr

- X3. Which of the following could be added to a solution of potassium fluoride to prepare a buffer?
- sodium hydroxide
 - potassium acetate
 - hydrochloric acid
 - sodium fluoride
 - ammonia

- buffer (14). Which of the following could be added to a solution of acetic acid to prepare a buffer?
- sodium hydroxide
 - hydrochloric acid
 - nitric acid
 - more acetic acid
 - none of these can be added to an acetic acid solution to prepare a buffer

- titration MATH (15). Consider the titration of 25.00 mL of 0.723 M HClO_4 with 0.273 M KOH. The H_3O^+ concentration after addition of 10.0 mL of KOH is _____ M.
- 0.438
 - 1.00×10^{-7}
 - 0.723
 - 2.81×10^{-13}
 - 0.273

- titration math*
16. Consider the titration of 25.0 mL of 0.723 M HClO_4 with 0.273 M KOH. The H_3O^+ concentration after addition of 66.2 mL of KOH is _____.
- 0.439
 - 1.00×10^{-7}
 - 0.723
 - 2.81×10^{-13}
 - 0.273
- titration math*
17. Consider the titration of 50.0 mL of 0.217 M hydrazoic acid (HN_3 , $K_a = 2.6 \times 10^{-5}$) with 0.183 M NaOH. Calculate the pH of the solution after addition of 29.7 mL of NaOH solution.
- 2.61
 - 8.79
 - 12.21
 - 4.59
 - 7.00
- titration math*
18. Consider the titration of 50.0 mL of 0.217 M hydrazoic acid (HN_3 , $K_a = 2.6 \times 10^{-5}$) with 0.183 M NaOH. Calculate the pH of the solution after addition of 70.0 mL of NaOH solution.
- 2.61
 - 8.79
 - 12.21
 - 4.59
 - 7.00
- titration curve*
19. An initial pH of 4.00, an equivalence point at pH 9.35, and a moderately short, nearly vertical middle section correspond to a titration curve for _____.
- strong acid titrated by strong base
 - strong base titrated by strong acid
 - weak acid titrated by strong base
 - weak base titrated by strong acid
 - weak base titrated by weak acid
- titration curve*
20. An initial pH of 13.00, an equivalence point at pH 7.0, and a relatively long, nearly vertical middle section correspond to a titration curve for _____.
- strong acid titrated by strong base
 - strong base titrated by strong acid
 - weak acid titrated by strong acid
 - weak base titrated by strong acid
 - weak base titrated by weak acid

21. 50.50 mL of 0.116 M HF is titrated with 0.1200 M NaOH. What is the pH when 25.00 mL of base have been added? (K_a for HF is 6.8×10^{-4})

- a. 5.118
- b. 3.146
- c. 6.168
- d. 3.547
- e. 3.189

22. What is the molar solubility of MgC_2O_4 ? (K_{sp} for MgC_2O_4 is 8.6×10^{-5})

- a. 9.3×10^{-3}
- b. 2.8×10^{-2}
- c. 4.4×10^{-2}
- d. 7.0×10^{-9}
- e. 6.4×10^{-13}

23. The solubility of $PbCl_2$ is 1.6×10^{-2} mol/L. What is the K_{sp} of $PbCl_2$?

- a. 5.0×10^{-4}
- b. 4.1×10^{-6}
- c. 3.1×10^{-7}
- d. 1.6×10^{-5}
- e. 1.6×10^{-2}

24. Calculate the solubility (in M) of aluminum hydroxide, $K_{sp} = 1.9 \times 10^{-33}$, in 0.0182 M KOH solution.

- a. 3.2×10^{-28}
- b. 2.9×10^{-9}
- c. 1.2×10^{-11}
- d. 3.1×10^{-12}
- e. 1.9×10^{-33}

25. Which one of the following compounds will increase in solubility if the pH of a saturated solution of the compound is lowered?

- a. AgCl
- b. AgI
- c. $PbCl_2$
- d. NaCl
- e. $Cr(OH)_3$

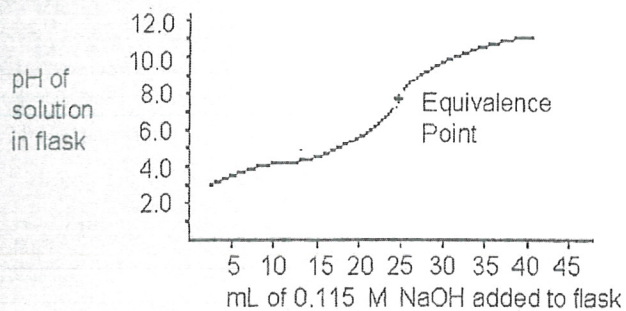
Indicator

25. The potentiometric titration curve of a solution is shown below.

Which one of the following indicators would be the best one to use for this titration?

Indicator	pK _a
methyl red	5.3
bromthymol blue	6.8
thymol blue	8.8
phenolphthalein	9.1

- a. methyl red
- b. bromthymol blue
- c. thymol blue
- d. phenolphthalein
- e. a combination of methyl red and phenolphthalein



Page 1

1. b
2. c
3. c
4. d
5. ~~a~~ c
6. b
7. c
8. c
9. b
10. a
11. c
12. c
13. c
14. a
15. a
16. b
17. d
18. c
19. c
20. b
21. e
22. a
23. d
24. a
25. e

25 on page 6. c