Chapter 17

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The pH of a solution that contains 0.818 M acetic acid ($K_a = 1.76 \times 10^{-5}$) and 0.172 M sodium acetate is _____. 1) _____

A) 4.08 B) 8.37 C) 5.43 D) 9.92 E) 8.57

2) Consider a solution containing 0.100 M fluoride ions and 0.126 M hydrogen fluoride. The concentration of fluoride ions after the addition of 5.00 mL of 0.0100 M HCl to 25.0 mL of this solution is _____ M. 2) _____

A) 0.0817 B) 0.0850 C) 0.00253 D) 0.00167 E) 0.0980

3) Consider a solution containing 0.100 M fluoride ions 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. 3) _____

A) 0.126 B) 0.107 C) 0.00193 D) 0.100 E) 0.00976

4) The K_a of acetic acid is 1.76×10^{-5}. The pH of a buffer prepared by combining 50.0 mL of 1.00 M potassium acetate and 50.0 mL of 1.00 M acetic acid is _____. 4) _____

A) 4.77 B) 1.70 C) 2.38 D) 0.85 E) 3.40

5) The K_b of ammonia is 1.77×10^{-5}. The pH of a buffer prepared by combining 50.0 mL of 1.00 M ammonia and 50.0 mL of 1.00 M ammonium nitrate is _____. 5) _____

A) 9.37 B) 9.25 C) 7.00 D) 4.63 E) 4.74

6) Calculate the pH of a solution prepared by dissolving 0.370 mol of formic acid (HCO_2H) and 0.230 mol of sodium formate ($NaCO_2H$) in water sufficient to yield 1.00 L of solution. The K_a of formic acid is 1.77×10^{-4}. 6) _____

A) 3.54 B) 3.95 C) 10.46 D) 2.09 E) 2.30

7) Calculate the pH of a solution prepared by dissolving 0.750 mol of NH_3 and 0.250 mol of NH_4Cl in water sufficient to yield 1.00 L of solution. The K_b of ammonia is 1.77×10^{-4}. 7) _____

A) 4.27 B) 8.78 C) 0.89 D) 5.22 E) 9.73

8) Calculate the pH of a solution prepared by dissolving 0.250 mol of benzoic acid ($C_7H_5O_2H$) and 0.150 mol of sodium benzoate ($NaC_7H_5O_2$) in water sufficient to yield 1.00 L of solution. The K_a of benzoic acid is 6.50×10^{-5}. 8) _____

A) 4.41 B) 2.39 C) 10.0 D) 4.19 E) 3.97

9) Calculate the pH of a solution prepared by dissolving 0.150 mol of benzoic acid (HBz) and 0.300 mol of sodium benzoate in water sufficient to yield 1.00 L of solution. The K_a of benzoic acid is 6.50×10^{-5}. 9) _____

A) 4.49 B) 4.19 C) 3.89 D) 10.1 E) 2.51

10) The pH of a solution prepared by dissolving 0.350 mol of solid methylamine hydrochloride (CH_3NH_3Cl) in 1.00 L of 1.10 M methylamine (CH_3NH_2) is _____. The K_b for methylamine is 4.40×10^{-4}. 10) _____

A) 2.86 B) 1.66 C) 10.2 D) 11.1 E) 10.6

11) A 25.0 mL sample of 0.723 M $HClO_4$ is titrated with a 0.273 M KOH solution. What is the $[H^+]$ (molarity) before any base is added? 11) _____

A) 1.00×10^{-7}

B) 0.439

C) 0.273

D) 2.81×10^{-13}

E) 0.723

12) A 25.0 mL sample of 0.723 M $HClO_4$ is titrated with a 0.273 M KOH solution. The H_3O^+ concentration after the addition of 10.0 mL of KOH is _____ M. 12) _____

A) 0.440

B) 0.723

C) 1.00×10^{-7}

D) 0.273

E) 2.81×10^{-13}

13) A 25.0 mL sample of 0.723 M $HClO_4$ is titrated with a 0.273 M KOH solution. The H_3O^+ concentration after the addition of 66.2 mL of KOH is _____ M. 13) _____

A) 0.439

B) 2.81×10^{-13}

C) 1.00×10^{-7}

D) 0.273

E) 0.723

14) A 25.0 mL sample of 0.723 M $HClO_4$ is titrated with a 0.27 M KOH solution. The H_3O^+ concentration after the addition of 80.0 mL of KOH is _____ M. 14) _____

A) 0.72

B) 2.8×10^{-13}

C) 3.6×10^{-2}

D) 0.44

E) 1.0×10^{-7}

15) The pH of a solution prepared by mixing 50.0 mL of 0.125 M KOH and 50.0 mL of 0.125 M HCl is _____. 15) _____

A) 0.00 B) 6.29 C) 8.11 D) 5.78 E) 7.00

16) A 25.0 mL sample of an acetic acid solution is titrated with a 0.175 M NaOH solution. The equivalence point is reached when 37.5 mL of the base is added. The concentration of acetic acid is _____ M. 16) _____

A) 1.83×10^{-4}

B) 0.119

C) 0.263

D) 0.365

E) 0.175

17) A 50.0 mL sample of an aqueous H_2SO_4 solution is titrated with a 0.375 M NaOH solution. The equivalence point is reached with 62.5 mL of the base. The concentration of H_2SO_4 is _____ M. 17) _____

A) 0.938 B) 0.469 C) 0.150 D) 0.300 E) 0.234

18) The concentration of iodide ions in a saturated solution of lead (II) iodide is _____ M. The solubility product constant of PbI_2 is 1.4×10^{-8}. 18) _____

A) 1.4×10^{-8} B) 3.8×10^{-4} C) 3.5×10^{-9} D) 1.5×10^{-3} E) 3.0×10^{-3}

19) The solubility of lead (II) chloride ($PbCl_2$) is 1.6×10^{-2} M. What is the K_{sp} of $PbCl_2$? 19) _____

A) 3.1×10^{-7} B) 4.1×10^{-6} C) 5.0×10^{-4} D) 1.6×10^{-2} E) 1.6×10^{-5}

20) The solubility of manganese (II) hydroxide ($Mn(OH)_2$) is 2.2×10^{-5} M. What is the Ksp of Mn $(OH)_2$? 20) _____

A) 4.8×10^{-10}

B) 1.1×10^{-14}

C) 4.3×10^{-14}

D) 2.1×10^{-14}

E) 2.2×10^{-5}

21) Determine the K_{sp} for magnesium hydroxide ($Mg(OH)_2$) where the solubility of $Mg(OH)_2$ is 1.4×10^{-4} M. 21) _____

A) 3.9×10^{-8}

B) 1.1×10^{-11}

C) 2.7×10^{-12}

D) 2.0×10^{-8}

E) 1.4×10^{-4}

22) Calculate the maximum concentration (in M) of silver ions (Ag^+) in a solution that contains 0.025 M of CO_3^{2-}. The K_{sp} of Ag_2CO_3 is 8.1×10^{-12}. 22) _____

A) 8.1×10^{-12}

B) 1.8×10^{-5}

C) 3.2×10^{-10}

D) 1.4×10^{-6}

E) 2.8×10^{-6}

23) What is the solubility (in M) of $PbCl_2$ in a 0.15 M solution of HCl? The K_{sp} of $PbCl_2$ is 1.6×10^{-5}. 23) _____

A) 1.6×10^{-5} B) 2.0×10^{-3} C) 1.8×10^{-4} D) 1.1×10^{-4} E) 7.1×10^{-4}

24) The K_{sp} for $Zn(OH)_2$ is 5.0×10^{-17}. Determine the molar solubility of $Zn(OH)_2$ in a buffer solution with a pH of 11.5. 24) _____

A) 1.6×10^{-14}

B) 5.0×10^{6}

C) 5.0×10^{-12}

D) 5.0×10^{-17}

E) 1.2×10^{-12}

1) A
2) A
3) B
4) A
5) B
6) A
7) E
8) E
9) A
10) D
11) E
12) A
13) C
14) C
15) E
16) C
17) E
18) E
19) E
20) C
21) B
22) B
23) E
24) C