Chapter 17

Additional Aspects of Aqueous Equilibria

1. Which one of the following pairs cannot be mixed together to form a buffer solution? _____

A) C_5H_5N, C_5H_5NHCl
B) $HC_2H_3O_2$, NaOH ($C_2H_3O_2^-$ = acetate)
C) KOH, HI
D) NH_2CH_3, HCl
E) NaClO, HNO_3

2. The addition of sodium hydroxide and _____ to water produces a buffer solution.

A) HCl
B) $NaC_2H_3O_2$
C) NaF
D) NH_3
E) none of the above

3. Of the following solutions, which has the greatest buffering capacity? _____

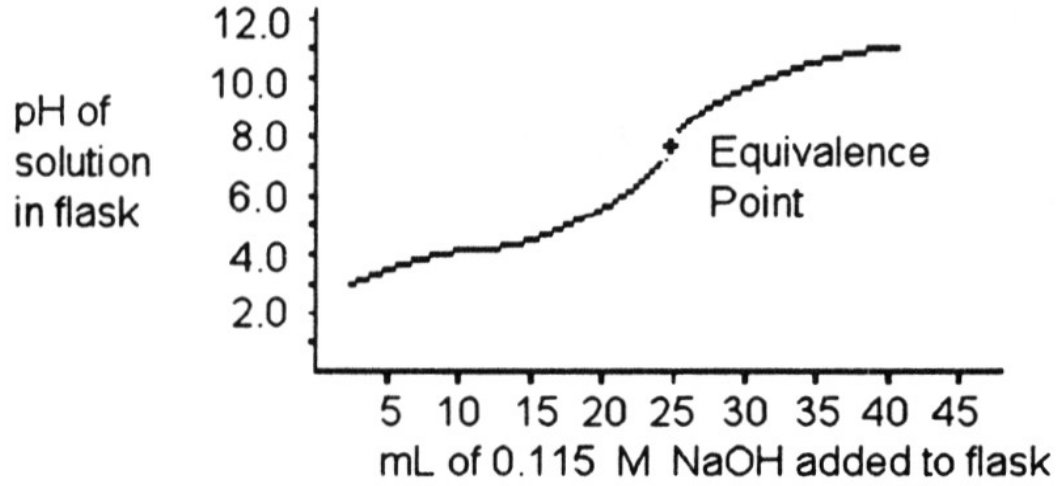
A) 1.15 M HF and 0.624 M NaF
B) 0.574 M HF and 0.312 M NaF
C) 0.287 M HF and 0.156 M NaF
D) 0.189 M HF and 0.103 M NaF
E) They are all buffer solutions and would all have the same capacity.

4. Which of the following could be added to a solution of sodium acetate to produce a buffer? _____

A) acetic acid only
B) acetic acid or hydrochloric acid
C) hydrochloric acid only
D) potassium acetate only
E) sodium chloride or potassium acetate

5. A 25.0 mL sample of a solution of an unknown compound is titrated with a 0.115 M NaOH solution. The titration curve above was obtained. The unknown compound is _____.

A) a strong acid
B) a strong base
C) a weak acid
D) a weak base
E) neither an acid nor a base



6. 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 Kb for methylamine is 4.40×10^{-4}. (Assume the final volume is 1.00 L.)

A) 1.66
B) 2.86
C) 10.28
D) 11.14
E) 10.61

7. The solubility of lead (II) chloride ($PbCl_2$) is 1.6×10^{-2} M. What is the Ksp 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}

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

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

9. Consider a solution containing 0.100 M fluoride ions and 0.126 M hydrogen fluoride. The concentration of hydrogen fluoride after addition of 9.00 mL of 0.0100 M HCl to 25.0 mL of this solution is _____ M.

A) 0.0953
B) 0.0900
C) 0.130
D) 0.122
E) 0.00976

10. The pH of a solution prepared by mixing 55.0 mL of 0.183 M KOH and 10.0 mL of 0.145 M $HC_2H_3O_2$ is _____.

A) 9.97
B) 7.74
C) 0.878
D) 13.122
E) none of the above