General Chemistry II-Jasperse Name:
Buffers-Titrations-Acid/Base Additions-Solubility Quiz: Due:

1. When placed in 1 L of water, which of the following combinations would give a buffer solution? (Remember, in some cases they might react with each other…)

   1) 0.5 mol HClO and 0.5 mol NaClO
   2) 0.5 mol HBr and 0.5 mol NaF
   3) 0.5 mol HBr and 1.0 mol NaF
   4) 0.5 mol HBr and 1.0 mol NaOH

   a) 1 only
   b) 1 and 2 only
   c) 1 and 3 only
   d) 3 and 4 only
   e) all would give buffer solutions

2. What reaction occurs when hydrochloric acid solution is added to a solution containing equal concentrations of acetic acid and sodium acetate?

   a. $CH_3COOH + H^+ \rightarrow CH_3COOH_2^+$
   b. $CH_3COO^- + H^+ \rightarrow CH_3COOH$
   c. $CH_3COOH + HCl \rightarrow CH_3COO^- + H_2Cl^+$
   d. $2CH_3COO^- + 2H^+ \rightarrow CH_3COO + H_2$
   e. $CH_3COOH + H^+ \rightarrow CH_3CO^+ + H_2O$

3. Calculate the pH of a solution containing 0.40 mol fluoride anion and 0.30 mol of hydrogen fluoride (HF). (HF, $K_a = 7.2 \times 10^{-4}$)?

   No multiple choice options here. Just write in the pH.

4. Calculate the pH of a solution originally containing 0.20 mol of cyanic acid HCNO following addition of 80 mL of 1.00 M NaOH. (K_a of HCNO = 3.5 x 10^{-4}). The initial volume of the cyanic acid solution was 920 mL, so the final combined volume at the end is 1.0 L.

   a) 3.28
   b) 3.39
   c) 3.46
   d) 3.64
   e) none of the above

5. Consider a solution initially containing 0.40 mol fluoride anion and 0.30 mol of hydrogen fluoride (HF). If 0.20 mol of HCl are added to this solution, which of the following statements is **FALSE**?

   a) You will still have a buffer solution at the end, since you'll still have both weak base and conjugate weak acid
   b) The pH will have shifted to a lower pH
   c) You'll have more moles of HF at the end than what you began with
   d) You will no longer have a buffer solution, since all of the weak base will have reacted with the HCl.
   e) none of the above

6. A solution of hydrochloric acid (HCl, 40.00 mL) was titrated to the equivalence point with 22.0 mL of 0.320 *M* sodium hydroxide. What was the concentration of the hydrochloric acid?

a. 0.07048 *M*
b. 0.178 *M*
c. 0.282 *M*
d. 0.0353 *M*
e. None of the above

7. What volume of 0.80 *M* NaOH will be required to titrate a 20.0 mL solution of 0.60M hydrochloric acid to the equivalence point?

a. 15 mL
b. 20 mL
c. 25 mL
d. 30 mL
e. None of the above

8. When the following chemicals are mixed, each in 1 liter of water, which would give a **basic pH** at the end?

a) 1 mole of KOH and 1 mole of HF
b) 1.0 mole of KOH and 1.0 mole of HCl
c) 1 mole of HCl and 1 mole of NH_3
d) 0.5 mole of KOH and 1.0 mole of HCl

9. If you start with 80.0 mL of 0.40 M HNO_3, calculate the pH following addition of 50.0 mL of 0.80 M KOH.

a) 3.4
b) 7.0
c) 12.8
d) 13.1
e) none of the above

10. The K_{sp} of AgBr is 5.4×10^{-13} mol/L. What is the solubility of AgBr?

a) 5.4×10^{-13}
b) 7.3×10^{-7}
c) 9.5×10^{-5}
d) 3.0×10^{-10}
e) none of the above

11. What is the solubility of barium sulfate in otherwise pure water? The K_{sp} value for barium sulfate is 1.1×10^{-10}.

a. 7.4×10^{-6} *M*
b. 5.5×10^{-11} *M*
c. 1.0×10^{-5} *M*
d. 2.2×10^{-9} *M*
e. 1.1×10^{-10} *M*

12. As the **pH decreases**, the solubility of _____ would **increase**.

a. lead(II) chloride
b. silver(I) iodide
c. calcium carbonate
d. mercury(I) bromide
e. silver(I) chloride