

CHM152 Bring Back Quiz 7 25 Pts Fall 2008 Name: \_\_\_\_\_

Show all work to receive credit. Due Tuesday November 18.

1. Calculate the fluoride ion concentration (in M) in a 1.0-L aqueous solution containing 0.40 mol of HF and 0.10 mol of HCl. ( $K_a$  for HF =  $6.8 \times 10^{-4}$ )
2. The pH of a solution containing 0.818 M acetic acid ( $K_a = 1.76 \times 10^{-5}$ ) and 0.172 M sodium acetate is \_\_\_\_\_.
3. Calculate the pH of a solution prepared by dissolving 0.25 mol of benzoic acid ( $C_7H_5O_2H$ ) and 0.15 mol of sodium benzoate ( $NaC_7H_5O_2$ ) in 1.00 L of solution.  $K_a = 6.5 \times 10^{-5}$  for benzoic acid.
4. A  $9.0 \times 10^{-4}$  M  $MgCl_2$  solution is gradually made more basic by adding sodium hydroxide. At what pH will magnesium hydroxide begin to precipitate? ( $K_{sp}$  of  $Mg(OH)_2 = 9 \times 10^{-12}$ .)
5. For  $Cu(OH)_2$ ,  $K_{sp} = 2.6 \times 10^{-19}$ . What is the molar solubility of  $Cu(OH)_2$ ?
6. Calculate the solubility product constant for lead fluoride,  $PbF_2$ . Its molar solubility is  $2.1 \times 10^{-3}$  mole per liter at  $25^\circ C$ .

7. Magnesium hydroxide is a slightly soluble substance. If the pH of a saturated solution of  $\text{Mg}(\text{OH})_2$  is 10.49 at  $25^\circ\text{C}$ , calculate  $K_{\text{sp}}$  for  $\text{Mg}(\text{OH})_2$ .
8. Calculate the molar solubility of aluminum hydroxide at  $25^\circ\text{C}$ .  
Its  $K_{\text{sp}}$  is  $1.9 \times 10^{-33}$ .
9. What mass of  $\text{Zn}(\text{OH})_2$  is contained in 1.0 liter of saturated solution?  
 $K_{\text{sp}} = 4.5 \times 10^{-17}$ .
10. How many grams of  $\text{MgF}_2$  will dissolve in 150 mL of 0.100 M NaF solution?  
 $K_{\text{sp}}$  for  $\text{MgF}_2 = 6.4 \times 10^{-9}$
11. The solubility product for barium chromate,  $\text{BaCrO}_4$ , is  $2.0 \times 10^{-10}$  and the solubility product for lead chromate,  $\text{PbCrO}_4$ , is  $1.8 \times 10^{-14}$ . If solid  $\text{Na}_2\text{CrO}_4$  is added slowly to a solution which is 0.010 M in  $\text{Ba}(\text{NO}_3)_2$  and 0.010 M in  $\text{Pb}(\text{NO}_3)_2$ , what will the concentration of  $\text{Pb}^{2+}$  be just before  $\text{BaCrO}_4$  begins to precipitate? Assume no volume change due to the addition of solid  $\text{Na}_2\text{CrO}_4$ .
12. Calculate the fluoride ion concentration (in M) in a 1.0-L aqueous solution containing 0.40 mol of HF and 0.10 mol of HCl. ( $K_a$  for HF =  $6.8 \times 10^{-4}$ )