Practice Quiz Ionic Equilibria

1. What is the pH of a buffer that consists of 0.45 M CH_3COOH and 0.35 M CH_3COONa?
$K_a = 1.8 \times 10^{-5}$
A. 4.49   B. 4.64   C. 4.85   D. 5.00   E. 5.52

2. Which of the following aqueous mixtures would be a buffer system?
A. HCl, $NaCl$ B. HNO_3, $NaNO_3$
C. H_3PO_4, $H_2PO_4^-$ D. H_2SO_4, CH_3COOH E. NH_3, $NaOH$

3. What is the $[H_3O^+]$ in a solution that consists of 1.2 M $HClO$ and 2.3 M $NaClO$?
$K_a = 3.5 \times 10^{-8}$
A. $7.8 \times 10^{-9}\ M$ B. $1.8 \times 10^{-8}\ M$
C. $6.7 \times 10^{-8}\ M$ D. $1.6 \times 10^{-7}\ M$ E. None of these choices is correct.

4. A formic acid buffer containing 0.50 M $HCOOH$ and 0.50 M $HCOONa$ has a pH of 3.77. What will the pH be after 0.010 mol of NaOH has been added to 100.0 mL of the buffer?
A. 3.67   B. 3.78   C. 3.81   D. 3.85   E. 3.95

5. What mass of NaF must be added to 50.0 mL of a 0.500 M HF solution to achieve a pH of 3.25? For HF, $K_a = 7.2 \times 10^{-4}$
A. 1.3 g   B. 0.69 g   C. 6.9 g   D. 23 g   E. 1.5 g

6. The indicator propyl red has $K_a = 3.3 \times 10^{-6}$. What would be the approximate pH range over which it would change color?
A. 3.5 to 5.5   B. 4.5 to 6.5
C. 5.5 to 7.5   D. 6.5 to 8.5   E. None of these choices is correct.

7. A 35.0-mL sample of 0.20 M LiOH is titrated with 0.25 M HCl. What is the pH of the solution after 23.0 mL of HCl have been added to the base?
A. 1.26   B. 1.67   C. 12.33   D. 12.74   E. 13.03

8. Write the ion product expression for silver sulfide, Ag_2S.
A. $[Ag^+][S^{2-}]$ B. $[Ag^+][S^{2-}]^2$

C. $\dfrac{[Ag^+]^2[S^{2-}]}{[Ag_2S(s)]}$ D. $\dfrac{1}{[Ag^+][S^{2-}]^2}$ E. $[Ag^+]^2[S^{2-}]$

9. The solubility of silver chromate is 0.0287 g/1.0 L of solution. What is the K_{sp} for Ag_2CrO_4?
A. 9.5×10^{-5} B. 2.4×10^{-5}
C. 2.6×10^{-12} D. 6.5×10^{-13} E. $< 1.0 \times 10^{-13}$

10. Use the following information to calculate the solubility product constant, K_{sp}, for $PbCl_2$. A saturated solution of $PbCl_2$ in water was prepared and filtered. From the filtrate, 1.0 L was measured out into a beaker and evaporated to dryness. The solid $PbCl_2$ residue recovered in the beaker amounted to 0.0162 moles.
A. $K_{sp} = 6.9 \times 10^{-8}$ B. $K_{sp} = 4.3 \times 10^{-6}$
C. $K_{sp} = 1.7 \times 10^{-5}$ D. $K_{sp} = 2.6 \times 10^{-4}$ E. $K_{sp} = 3.2 \times 10^{-2}$

Answers: B, C, B, E, A, B, C, E, C, C