

Chem12 Solutions : Exam Problems #2-130

1) Which one of the following statements is true about the result of mixing equal volumes of 0.020 M CaCl_2 and 0.00040 M Na_2SO_4 ? (K_{sp} for $\text{CaSO}_4(\text{s}) = 2.4 \times 10^{-5}$

- a) trial ion product is $< K_{\text{sp}}$ and a precipitate will form.
- b) trial ion product is $> K_{\text{sp}}$ and a precipitate will form.
- c) trial ion product is $< K_{\text{sp}}$ and a precipitate will not form.
- d) trial ion product is $> K_{\text{sp}}$ and a precipitate will not form.

2) Some solid NaCH_3COO is added to a saturated AgCH_3COO solution in contact with AgCH_3COO crystals. Which of the following occurs.

- a) The NaCH_3COO solid does not dissolve
- b) More AgCH_3COO dissolves
- c) AgCH_3COO precipitates
- d) There is no change in the amount of dissolved AgCH_3COO

3) Phosphate ions, PO_4^{3-} , form a compound of low solubility with

- a) NH_4^+
- b) K^+
- c) H^+
- d) Ca^{2+}

4) The K_{sp} for PbS is 3.4×10^{-28} . What is the $[\text{S}^{2-}]$ in a saturated solution of PbS ?

- a) 4.4×10^{-10} M
- b) 5.9×10^{-12} M
- c) 1.8×10^{-14} M
- d) 1.7×10^{-28} M.

5) Calculate the value of the K_{sp} for SrF_2 if the solubility is 0.122 g/L.

6) Which is the most soluble of the silver salts shown ?

- a) AgBr $K_{\text{sp}} = 5.0 \times 10^{-13}$
- b) AgBrO_3 $K_{\text{sp}} = 4.0 \times 10^{-5}$
- c) AgCl $K_{\text{sp}} = 1.7 \times 10^{-10}$
- d) AgIO_3 $K_{\text{sp}} = 4.0 \times 10^{-8}$

7) Which of the following anions in a concentrated solution will form a precipitate with 0.10 M Pb^{2+} but will not form a precipitate with 0.10 M Ba^{2+} .

- a) CO_3^{2-} b) SO_4^{2-} c) PO_4^{3-} d) Cl^-

8) When crystals of ammonium chloride are added to water, the crystals dissolve readily, and the temperature decreases. The dissolving of ammonium chloride in water is therefore

- a) endothermic and spontaneous b) exothermic and spontaneous
c) endothermic/not spontaneous d) exothermic/not spontaneous

9) The K_{sp} for PbSO_4 is 1.3×10^{-8} at 25°C . Calculate the mass in grams of PbSO_4 which could be dissolved in 5.0 L of water at 25°C .

10) The K_{sp} for PbCO_3 is 3.2×10^{-14} . What is solubility of PbCO_3 in mol/L.

- a) 1.6×10^{-14} b) 1.8×10^{-7} c) 2.0×10^{-5} d) 1.0×10^{-27}

11) A solution of SrCl_2 is added to a solution of FeSO_4 and $\text{Pb}(\text{NO}_3)_2$. A precipitate forms. According to the solubility table provided, the precipitate is:

- a) SrSO_4 b) FeCl_2 c) PbCl_2 d) $\text{SrSO}_4 + \text{PbCl}_2$

12) 20.0 mL of 0.012 M AgNO_3 is added to 20.0 mL of 0.018 M NaBrO_3 . The K_{sp} for AgBrO_3 is 5.8×10^{-5} . Which of the following statements is correct ?

- a) The trial ion product is 2.2×10^{-4} and a precipitate will form.
b) The trial ion product is 2.2×10^{-4} and a precipitate will not form.
c) The trial ion product is 5.4×10^{-5} and a precipitate will form.
d) The trial ion product is 5.4×10^{-5} and a precipitate will not form.

13) If 7.8×10^{-2} g of BaC_2O_4 is found to dissolve in 1.0 L of water to give a saturated solution, what is the K_{sp} for BaC_2O_4 ?

14) The K_{sp} value for the salt MA_2 is 4.0×10^{-6} . What is the concentration, $[\text{M}^{2+}]$, in a saturated solution formed by dissolving $\text{MA}_2(\text{s})$ in water ?

- a) 1.0×10^{-3} b) 2.0×10^{-3} c) 1.0×10^{-2} d) 1.6×10^{-2}

15) The process by which ions are surrounded by water molecules is called

a) hydration b) ionization c) hydrolysis d) dissociation

Answers : 1) c, 2) c, 3) d, 4) c, 5) 3.66×10^{-9} , 6) b, 7) d, 8) a, 9) 0.17, 10) b, 11) d, 12) d, 13) 1.2×10^{-7} , 14) c, 15) a.