

Chapter 22 The Solubility Product Expression

Select the expression or number that completes each statement and write its letter in the space at the right.

1. The mass action expression for the reaction $\text{Al(OH)}_3(\text{s}) \rightleftharpoons \text{Al}^{3+}(\text{aq}) + 3\text{OH}^{-}(\text{aq})$ is
 (A) $[\text{Al}^{3+}] \times [\text{OH}^{-}]^3$ (B) $[\text{Al}^{3+}] \times [\text{OH}^{-}]$
 (C) $\frac{[\text{Al}^{3+}] \times [\text{OH}^{-}]^3}{[\text{Al(OH)}_3]}$ (D) $\frac{[\text{Al(OH)}_3]}{[\text{Al}^{3+}] \times [\text{OH}^{-}]^3}$ 1. _____
2. The solubility product constant for Mg(OH)_2 is equal to (A) $[\text{Mg}^{2+}] \times [\text{OH}^{-}]$
 (B) $[\text{Mg}^{2+}] \times [\text{OH}^{-}]^2$ (C) $\frac{[\text{Mg}^{2+}] \times [\text{OH}^{-}]^2}{[\text{Mg(OH)}_2]}$ (D) $\frac{[\text{Mg(OH)}_2]}{[\text{Mg}^{2+}] \times [\text{OH}^{-}]^2}$ 2. _____
3. Among the following the substance that is the most soluble is (A) FeS ; $K_{\text{sp}} = 4 \times 10^{-19}$
 (B) CuI ; $K_{\text{sp}} = 1.1 \times 10^{-12}$ (C) AgI ; $K_{\text{sp}} = 8.5 \times 10^{-17}$ (D) BaCO_3 ; $K_{\text{sp}} = 2.0 \times 10^{-9}$ 3. _____
4. The solubility product of AgBr at 25°C is 5.0×10^{-13} . In a given solution the concentration of Br^{-} is 0.050 M . The maximum concentration of Ag^{+} that can be present at 25°C is
 (A) $1.0 \times 10^{-11} \text{ M}$ (B) $1.0 \times 10^{-15} \text{ M}$ (C) 0.05 M (D) $0.25 \times 10^{-13} \text{ M}$ 4. _____
5. At 25°C the solubility product of CaSO_4 is 2.4×10^{-5} . The solubility of CaSO_4 at this temperature is (A) $24 \times 10^{-3} \text{ M}$ (B) $4.9 \times 10^{-3} \text{ M}$ (C) $24 \times 10^{-6} \text{ M}$ (D) $4.0 \times 10^{-3} \text{ M}$ 5. _____
6. The solubility of PbCl_2 at 25°C is $1.6 \times 10^{-2} \text{ M}$. At the same temperature, the solubility product of PbCl_2 is (A) 2.0×10^{-4} (B) 1.6×10^{-5} (C) 4.0×10^{-6} (D) 1.6×10^{-6} 6. _____
7. At 25°C , the value of K_{sp} for SrCO_3 is 1.6×10^{-9} . The molar concentration of a saturated solution of SrCO_3 is (A) 4.0×10^{-5} (B) 1.6×10^{-3} (C) 4.0×10^{-3} (D) 1.6×10^{-5} 7. _____
8. If the solubility product constant for CaSO_4 is 2.4×10^{-5} at 25°C , then precipitation at 25°C will occur in a solution made by mixing 1.0 L of a $1.0 \times 10^{-2} \text{ M}$ solution of CaCl_2 with 1.0 L of a solution of Na_2SO_4 that has a concentration of (A) $9.6 \times 10^{-5} \text{ M}$ (B) $9.6 \times 10^{-4} \text{ M}$
 (C) $9.6 \times 10^{-3} \text{ M}$ (D) $9.6 \times 10^{-2} \text{ M}$ 8. _____

Chapter 22 The Solubility Product Expression

Select the expression or number that completes each statement and write its letter in the space at the right.

1. The mass action expression for the reaction $\text{Ag}_2\text{SO}_4(\text{s}) \rightleftharpoons 2\text{Ag}(\text{aq}) + \text{SO}_4^{2-}(\text{aq})$ is
(A) $[\text{Ag}^+]^2 \times [\text{SO}_4^{2-}]$ (B) $[\text{Ag}^+] \times [\text{SO}_4^{2-}]$
(C) $\frac{[\text{Ag}^+]^2 \times [\text{SO}_4^{2-}]}{[\text{Ag}_2\text{SO}_4]}$ (D) $\frac{[\text{Ag}_2\text{SO}_4]}{[\text{Ag}^+]^2 \times [\text{SO}_4^{2-}]}$ 1. _____
2. The solubility product constant for $\text{Fe}(\text{OH})_3$ is equal to
(A) $[\text{Fe}^{3+}] \times [\text{OH}^-]^3$ (B) $[\text{Fe}^{3+}] \times [\text{OH}^-]$
(C) $\frac{[\text{Fe}^{3+}] \times [\text{OH}^-]^3}{[\text{Fe}(\text{OH})_3]}$ (D) $\frac{[\text{Fe}(\text{OH})_3]}{[\text{Fe}^{3+}] \times [\text{OH}^-]^3}$ 2. _____
3. Among the following, the least soluble substance is (A) BaSO_4 ; $K_{\text{sp}} = 1.5 \times 10^{-9}$
(B) CdS ; $K_{\text{sp}} = 1.0 \times 10^{-28}$ (C) PbCrO_4 ; $K_{\text{sp}} = 2 \times 10^{-16}$ (D) AgCl ; $K_{\text{sp}} = 1.7 \times 10^{-10}$. 3. _____
4. The solubility product of FeS at 25°C is 4×10^{-19} . In a given solution, the concentration of Fe^{2+} is 0.02 M. The maximum concentration of S^{2-} that can be present at 25°C is (A) 1×10^{-17} M
(B) 2×10^{-19} M (C) 0.02 M (D) 2×10^{-17} M. 4. _____
5. The solubility product of PbCl_2 is 1.6×10^{-5} at 25°C . The solubility of PbCl_2 at this temperature is (A) 4.0×10^{-3} M (B) 1.6×10^{-2} M (C) 4.0×10^{-2} M (D) 1.6×10^{-1} M. 5. _____
6. The solubility of PbCrO_4 at 25°C is 2.0×10^{-8} M. At the same temperature, the solubility product of PbCrO_4 is (A) 2.0×10^{-16} (B) 4.0×10^{-8} (C) 4.0×10^{-16} (D) 2.0×10^{-8} . 6. _____
7. The value of K_{sp} for CdS at 25°C is 1.0×10^{-28} . The molar concentration of a saturated solution of CdS at 25°C is (A) 1.0×10^{-7} (B) 1.0×10^{-14} (C) 1.0×10^{-21} (D) 1.0×10^{-28} . 7. _____
8. If the solubility product constant for BaCO_3 is 2.0×10^{-9} at 25°C , then precipitation at 25°C will occur in a solution made by mixing 1.0 L of a 1.00×10^{-3} molar solution of Na_2CO_3 with 1.0 L of a solution of BaCl_2 that has a concentration of
(A) 0.50×10^{-6} M
(B) 2.0×10^{-6} M
(C) 4.0×10^{-6} M
(D) 8.0×10^{-6} M 8. _____

Copyright by Allyn and Bacon, Inc.
Reproduction of this master is restricted to duplication for classroom use only.