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Competitive Exams: Chemistry MCQs (Practice_Test 18 of 31)

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1. Which of the following contains TWO anions that form soluble salts with most metal ions and TWO anions that form insoluble salts with most metal ions?
 - a. Sulfate, hydroxide, chromate, sulfide
 - b. Nitrate, hydroxide, chromate, sulfide
 - c. Chloride, hydroxide, chromate, sulfide
 - d. Nitrate, chloride, hydroxide, sulfide
2. Consider an aqueous solution that contains 0.10 M each of Pb^{2+} , Hg^{2+} and Ni^{2+} . If a solution containing 2.0×10^{-20} M S^{2-} is added to the solution containing the metal ions, which sulfides will precipitate from the solution? PbS : $K_{sp} = 8.0 \times 10^{-28}$; HgS : $K_{sp} = 4 \times 10^{-53}$; NiS : $K_{sp} = 3.2 \times 10^{-19}$
 - a. PbS , HgS and NiS
 - b. PbS and HgS
 - c. HgS and NiS
 - d. NiS only
 - e. HgS only
3. How much (in g) barium sulfate ($BaSO_4$, MW = 233.39) will dissolve in 500 mL of water. For $BaSO_4$: $K_{sp} = 1.1 \times 10^{-10}$.
4. Which anions below are expected to form soluble salts with all metal ions?
 - a. S^{2-} , OH^- , NO_3^-
 - b. S^{2-} , Cl^- , NO_3^-
 - c. NO_3^- , ClO_3^- , ClO_4^-
 - d. CO_3^{2-} , PO_4^{3-} , S^{2-}

- e. No response is correct.
5. Which anions below are expected to form insoluble compounds with most metal ions except alkali metal ions and ammonium ion?
- S²⁻, OH⁻, NO₃⁻
 - S²⁻, Cl⁻, NO₃⁻
 - NO₃⁻, ClO₃⁻, ClO₄⁻
 - CO₃²⁻, PO₄³⁻, S²⁻
 - No response is correct.
6. Which of the following salts is the most soluble in pure water?
- AgBr: $K_{sp} = 7.7 \times 10^{-13}$
 - AgI: $K_{sp} = 8.3 \times 10^{-17}$
 - AgCl: $K_{sp} = 1.6 \times 10^{-10}$
 - SrSO₄: $K_{sp} = 3.8 \times 10^{-7}$
 - More information is needed to answer the question.
7. Addition of solid silver sulfate (Ag₂SO₄, $K_{sp} = 1.4 \times 10^{-5}$) to a solution that is already saturated in silver sulfate will cause:
- no change in Ag⁺ or SO₄²⁻ concentrations.
 - more silver sulfate to dissolve.
 - some silver sulfate to precipitate from solution.
 - the silver ion concentration to increase and the sulfate ion concentration to decrease.
 - No response is correct.
8. The solubility of silver chromate (Ag₂CrO₄) in water is 1.3×10^{-4} mol/L; what is the solubility product constant for silver chromate?
9. Calculate the solubility of Ag₄(FeCN)₆ in water assuming no other interfering equilibria. $\text{Ag}_4\text{Fe}(\text{CN})_6 \rightleftharpoons 4\text{Ag}^{++} + \text{Fe}(\text{CN})_6^{4-}$, $K_{sp} = 1.6 \times 10^{-41}$
10. Calculate the solubility of aluminum hydroxide (Al(OH)₃, $K_{sp} = 1.0 \times 10^{-33}$) in a solution buffered at pH 11.
11. What hydroxide ion concentration would be required to start precipitation of manganese hydroxide from a solution that is 0.0031 mol/L in Mn²⁺. For Mn(OH)₂, $K_{sp} = 4.6 \times 10^{-14}$.

12. Milk of magnesia consists of gelatinous $\text{Mg}(\text{OH})_2(\text{s})$ and a small amount of water saturated with $\text{Mg}(\text{OH})_2$. Calculate the pH of the milk of magnesia found in the drug store. $K_{\text{sp}}(\text{Mg}(\text{OH})_2) = 8.9 \times 10^{-12}$. You may neglect the dissociation of water.
13. Gastric juice (i.e., the digestive juice found in our stomach) has a pH of approximately 1.4. Would you expect the solid $\text{Mg}(\text{OH})_2$ found in milk of magnesia to be more soluble in gastric juice or in pure water?
14. Consider a saturated solution of silver bromide, AgBr . If more solid silver bromide were added to this saturated solution, describe what will happen to:
- the concentration of Ag^+ .
 - the concentration of Br^- .
 - the solubility of AgBr .

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