	Marks
• Calculate the molar solubility of silver sulfide, Ag_2S, given that K_{sp} is 8×10^{-51} at 25 °C.	**3**
Answer:	

- Will AgCl precipitate if solutions of 25.0 mL of 2.0×10^{-5} M KCl and 75.0 mL of 1×10^{-5} M $AgNO_3$ are added to one another? Show your reasoning.
  K_{sp} for AgCl = 1.8×10^{-10} at 25 °C.

Marks 2

Answer:

- A saturated solution of lithium carbonate in pure water at 20 °C contains 1.33 g of solute per 100.0 mL of solution. Calculate the aqueous solubility product of lithium carbonate at this temperature. **4**

K_{sp} =

When the temperature of the same solution is raised to 40 °C, the solubility is reduced to 1.17 g per 100.0 mL of solution. What conclusions can be drawn about the sign of the standard enthalpy of dissolution of lithium carbonate?

- A standard test for the presence of chloride ion in water involves the appearance of a precipitate of AgCl upon addition of 0.05 mL of $AgNO_3$ (0.03 M) to 100 mL of sample. What is the minimum concentration of Cl^- detectable by this method? The K_{sp} of AgCl = 1.8×10^{-10}.

3

Answer:

• What is the molar solubility of $Cu(OH)_2$ at 25 °C given its $K_{sp} = 4.5 \times 10^{-21}$ M^3?	**Marks 2**
Answer:	

- The molar solubility of lead(II) fluoride, PbF_2, is found to be 2.6×10^{-3} M at 25 °C. Calculate the value of K_{sp} for this compound at this temperature.

Marks 2

K_{sp} =

	Marks
• The active ingredient in aspirin is the monoprotic acid, acetylsalicylic acid ($HC_9H_7O_4$) that has a K_a of 3.3×10^{-4} M at 25 °C. What is the pH of a solution obtained when a tablet containing 200 mg of acetylsalicylic acid is dissolved in 125 mL of water?	**3**
Answer:	
• A standard test for the presence of chloride ion in water involves the appearance of a precipitate of AgCl upon addition of 1 mL of $AgNO_3$ (0.03 M) to 100 mL of the water sample. What is the minimum concentration of Cl^- detectable by this method? K_{sp} (AgCl) = 1.8×10^{-10} M^2.	**2**
Answer:	

Marks 7

- Uric acid, $C_5H_5N_4O_3$, is a weak diprotic acid with a low solubility of 70 mg L^{-1}. The extremely painful inflammation known as gout occurs when crystals of uric acid are deposited in the joints. Given that the pH of a saturated solution of uric acid is 4.58, calculate the pK_{a1} of uric acid at 25 °C?

Answer:

The monosodium salt of uric acid is slightly more soluble, 8×10^{-4} g mL^{-1}. Calculate the solubility product constant, K_{sp}, of sodium urate at 25 °C. Assume no hydrolysis of the urate ion occurs.

Answer:

Suggest a possible reason why the pH of blood plasma remains near 7.4 even when saturated with uric acid.