Year 13 Science: Solubility and Ks

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Write the Ks expression for $PbCl_2$.

2. $Ks(BaSO_4) = 1.1 \times 10^{-10}$ at 25 °C. Calculate its solubility.

3. The solubility of CaF_2 is 2.1×10^{-4} mol L^{-1}. Calculate $Ks(CaF_2)$.

4. What happens to the solubility of AgCl when concentrated ammonia is added, and why?

5. Equal volumes of 2.0×10^{-4} mol L^{-1} $AgNO_3$ and 2.0×10^{-4} mol L^{-1} NaCl are mixed. Does AgCl precipitate? $Ks(AgCl) = 1.8 \times 10^{-10}$.

Exam-style question: zinc hydroxide

Zinc hydroxide, $Zn(OH)_2$, is a sparingly soluble white solid. $Ks(Zn(OH)_2) = 3.0 \times 10^{-17}$ at 25 °C.

6. Write the equation for the equilibrium in a saturated solution, and the Ks expression.

7. Calculate the solubility of $Zn(OH)_2$ in pure water.

8. Calculate its solubility in a solution of pH 12.00, and explain the difference.

9. When concentrated NaOH is added a little at a time, a white precipitate forms and then dissolves. Explain.

10. 10.0 mL of 2.0×10^{-4} mol L^{-1} $ZnSO_4$ is mixed with 10.0 mL of NaOH of pH 9.00. Will a precipitate form?

Fix the mistake

11. Correct this statement: "For PbI_2, $Ks = s \times 2s = 2s^2$."

12. Correct this statement: "Ag_2CrO_4 has a smaller Ks than AgCl, so it must be less soluble."

13. Correct this statement: "Adding NaCl to saturated AgCl lowers Ks."

14. Correct this statement: "Q is worked out from the concentrations of the two solutions before they are mixed."