P192.4 $K_a^\Theta = \frac{(10^{-5})^2}{0.01} = 10^{-8}$

$\alpha = \frac{10^{-5}}{0.01} = 0.1\%$

稀释主体积2倍后: $K_a^\Theta = 10^{-8}$

$\frac{[c(H^+)]^2}{\frac{0.01}{2}} = 10^{-8}$

$c(H^+)^2 = 2\times10^{-10}\ mol^2/L^2$

$C(H^+) = \sqrt{2}\times10^{-5}\ mol/L$

$PH = 5.15$

$\alpha = \frac{\sqrt{2}\times10^{-5}}{\frac{0.01}{2}} \doteq 0.14\%$

6. $\frac{C^2\alpha^2}{C - C\cdot\alpha} = K_a$

$\Rightarrow \frac{C\cdot\alpha^2}{1-\alpha} = K_a$

$C = 0.1\ mol/L$ 时

$\alpha = 1.3\%$

$C = 0.05\ mol/L$

$\alpha = 1.9\%$

12. $PH = 9.4$

$POH = 4.6$

$C(OH^-) = 10^{-4.6}\ (mol/L)$

$NH_3\cdot H_2O \rightleftharpoons NH_4^+ + OH^-$

$y \qquad x$

$\frac{10^{-4.6}\cdot x}{y} = K^\Theta$

$PH = pK_a^\Theta + lg\frac{n(NH_3)}{n(NH_4^+)}$

$9.4 = 14 + lg(1.8\times10^{-5}) + lg\frac{0.02\times0.5}{n(NH_4^+)}$

$n(NH_4Cl) = 0.0072\ mol$

$m = 0.0072\times53.5 = 0.39(g)$

16. $S_1^2 = 1.77\times10^{-10}$

$S_1 = 1.33\times10^{-5}(mol/L)$

$S_2\cdot(2S_2)^2 = K_2 = 1.46\times10^{-10}$

$S_2 = 3.32\times10^{-4}(mol/L)$

19. $Ag^+ + 2CN^- \rightleftharpoons Ag(CN)_2^-$

$C(CN^-) = \frac{0.6 - 2\times0.2}{2} = 0.1\ (mol/L)$

$Ag(CN)_2^- + I^- \rightleftharpoons AgI + 2CN^-$

$K = \frac{C(CN^-)^2}{[Ag(CN)_2^-]^2\cdot C(I^-)}$

$= 8.3\times10^{-6}$

$J = \frac{C(CN^-)^2}{[Ag(CN)_2^-]^2\cdot C(I^-)}$

$= \frac{0.1^2}{0.1\times0.1} = 1 > K$

不能产生AgI沉淀

$\frac{C(CN^-)^2}{0.1\times0.1} < 8.3\times10^{-6}$

$\therefore C(CN^-) < 2.9\times10^{-4}(mol/L)$

21. $c(AgNO_3) = 0.1 \times \frac{100}{200} = 0.05 (mol/L)$

$c(NH_3) = \frac{60 \times 0.923 \times 0.183}{17 \times 200 \times 10^{-3}} = 2.98 (mol/L)$

$[Ag(NH_3)_2]^+ \rightleftharpoons Ag^+ + 2NH_3$

0.05		$2.98 - 2\times0.05$
$0.05-x$	x	$2.98-2\times0.05+2x$

$\frac{1}{1.1\times10^7} = \frac{x(2.98-2\times0.05+2x)}{0.05-x}$

$x = 5.5\times10^{-10} (mol/L)$

$\therefore c(Ag^+) = 5.5\times10^{-10} (mol/L)$

$c([Ag(NH_3)_2]^+) = 0.05 mol/(mol/L)$

$c(NH_3) = 2.88 (mol/L)$

(2) $c(KCl) = 0.1 \times \frac{20}{200+20} = 9.09\times10^{-3} (mol/L)$

$[Ag(NH_3)_2]^+ + Cl^- \rightleftharpoons AgCl + 2NH_3$

$K = \frac{1}{1.1\times10^7 \times 1.77\times10^{-10}} = 5.1\times10^2$

$J = \frac{c(NH_3)^2}{c([Ag(NH_3)_2]^+) \cdot c(Cl^-)}$ $\therefore c(NH_3) < 0.48 (mol/L)$

$= 1.82\times10^4 > K$

不能生成 AgCl 沉淀

$\frac{c(NH_3)^2}{0.05\times9.09\times10^{-3}} < 5.1\times10^2$