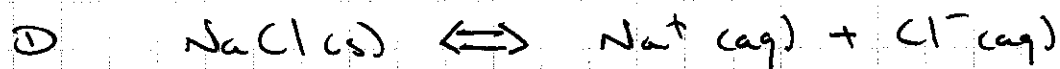
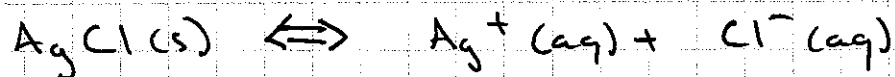


Common Ion Effect



$$[\text{Cl}^-] = [\text{NaCl}] = 0.10 \text{ mol/L}$$



I	-	0	0.1
C	-	+x	+x
E	-	x	0.1+x

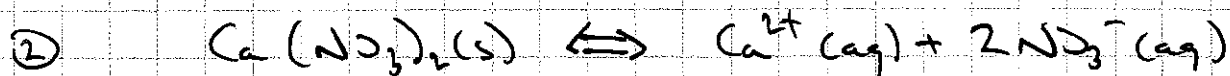
$$K_{sp} = [\text{Ag}^+][\text{Cl}^-]$$

$$1.8 \times 10^{-10} = (x)(0.1+x)$$

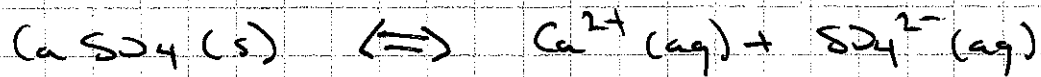
$$1.8 \times 10^{-10} = (x)(0.1)$$

$$x = 1.8 \times 10^{-9}$$

Solubility of $\text{AgCl}(s)$ is $1.8 \times 10^{-9} \text{ mol/L}$



$$[\text{Ca}^{2+}] = [\text{Ca}(\text{NO}_3)_2] = 0.01 \text{ mol/L}$$



I	-	0.01	0
C	-	+x	+x
E	-	0.01+x	x

$$K_{sp} = [\text{Ca}^{2+}][\text{SO}_4^{2-}]$$

$$7.1 \times 10^{-5} = (0.01 + x)(x)$$

$$7.1 \times 10^{-5} = 0.01x + x^2$$

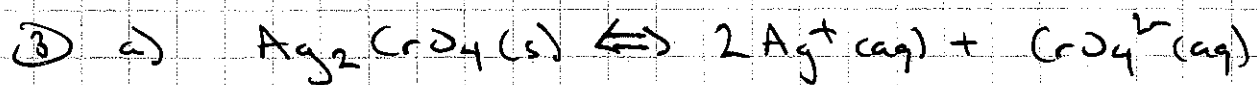
$$x^2 + 0.01x - 7.1 \times 10^{-5} = 0$$

$$x = \frac{-0.01 \pm \sqrt{0.01^2 - 4(1)(-7.1 \times 10^{-5})}}{2(1)}$$

$$x = 4.8 \times 10^{-3} \quad \text{or} \quad -1.4 \times 10^{-2}$$

(not possible)

\therefore Solubility of CaSO_4 is $4.8 \times 10^{-3} \text{ mol/L}$



I	-	0	0
C	-	+2x	+x
E	-	2x	x

$$K_{sp} = [\text{Ag}^+]^2 [\text{CrO}_4^{2-}]$$

$$1.1 \times 10^{-12} = (2x)^2 (x)$$

$$= 4x^3$$

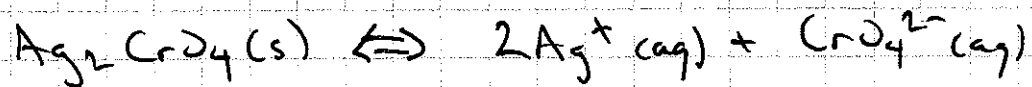
$$x = \sqrt[3]{\frac{1.1 \times 10^{-12}}{4}}$$

$$x = 6.5 \times 10^{-5}$$

Solubility is $6.5 \times 10^{-5} \text{ mol/L}$



$$[\text{CrO}_4^{2-}] = [\text{Na}_2\text{CrO}_4] = 0.1 \text{ mol/L}$$



I	—	0	0.1
C	—	+2x	+x
E	—	2x	0.1+x

$$K_{sp} = [\text{Ag}^+]^2 [\text{CrO}_4^{2-}]$$

$$1.1 \times 10^{-12} = (2x)^2 (0.1+x)$$

$$= 4x^2 (0.1)$$

$$= 0.4x^2$$

$$x = \sqrt{\frac{1.1 \times 10^{-12}}{0.4}}$$

$$x = 1.66 \times 10^{-6}$$

Solubility is $1.66 \times 10^{-6} \text{ mol/L}$

④ Anything with either Ba^{2+} or SO_4^{2-} in it.
e.g. BaCl_2 Na_2SO_4

⑤ Anything with Cu^{2+} or CO_3^{2-} in it.
e.g. CuCl_2 Na_2CO_3