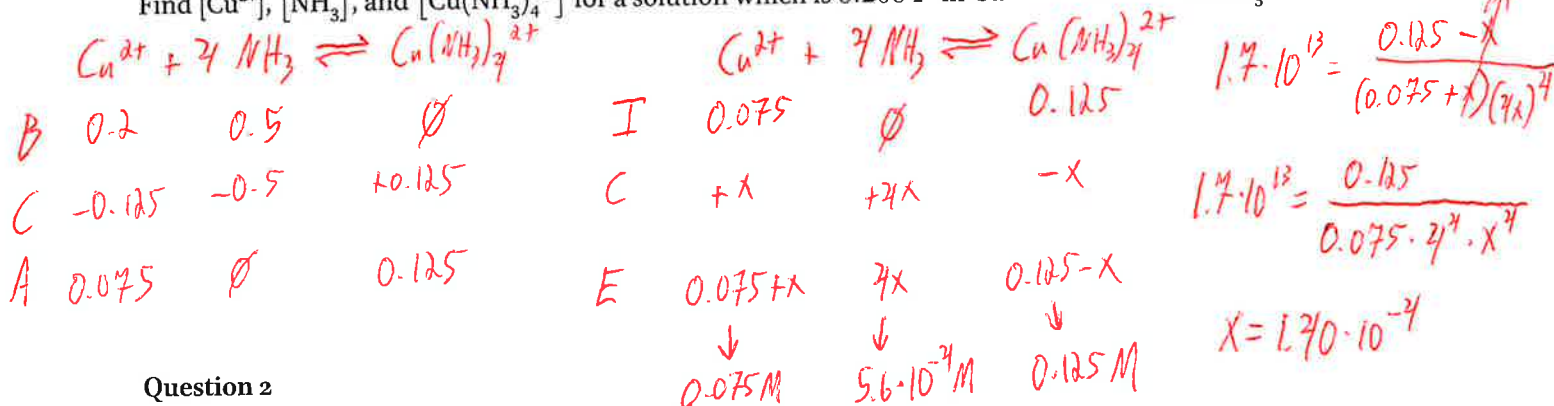


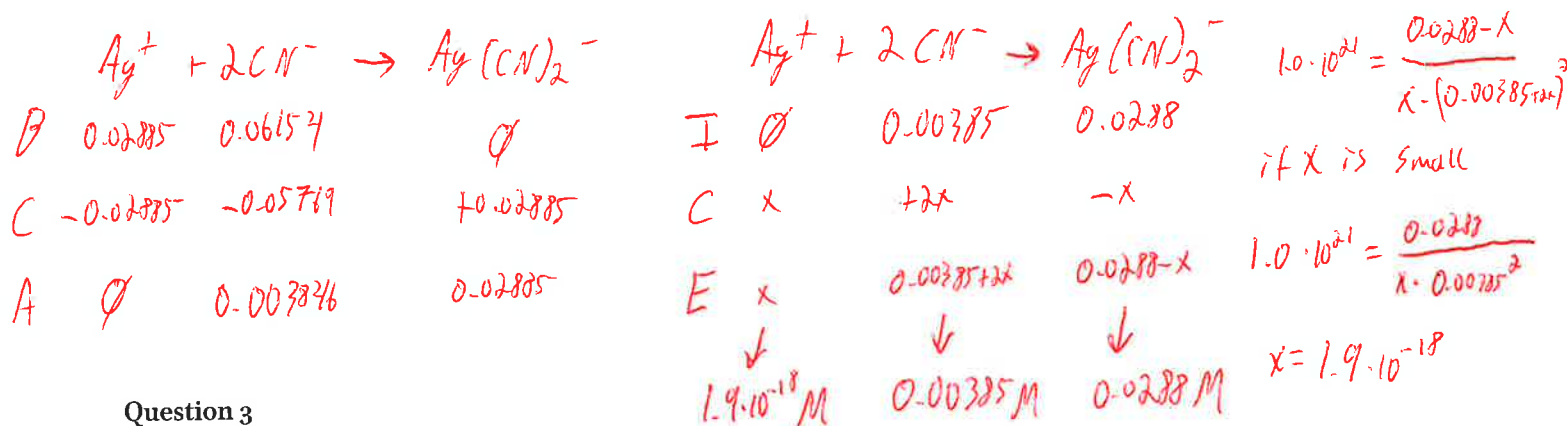
Quiz 15.3 – Formation Reactions

Name: Key

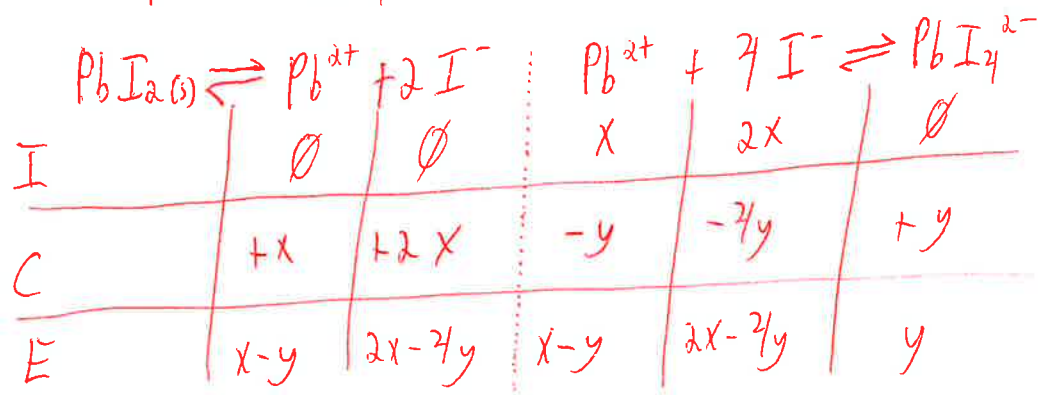
Question 1

Copper(II) ions will form a $\text{Cu}(\text{NH}_3)_4^{2+}$ complex ion with $K_f = 1.7 \times 10^{13}$ Find $[\text{Cu}^{2+}]$, $[\text{NH}_3]$, and $[\text{Cu}(\text{NH}_3)_4^{2+}]$ for a solution which is 0.200 F in Cu^{2+} and 0.500 F in NH_3 

Question 2

Consider the formation of the complex ion $\text{Ag}(\text{CN})_2^-$, with ($K_f = 1.0 \times 10^{21}$)Find $[\text{Ag}^+]$, $[\text{CN}^-]$, and $[\text{Ag}(\text{CN})_2^-]$ in a solution prepared by mixing 25.00 ml of 0.075 M AgNO_3 with 40.00 ml of 0.100 M NaCN \rightarrow 65.00 ml \rightarrow 0.02885 M

Question 3

 PbI_2 is a sparingly soluble salt with $K_{sp} = 9.8 \times 10^{-9}$, while PbI_4^{2-} is a complex ion with $K_f = 3.0 \times 10^4$ What effect does the formation reaction have on the molar solubility of PbI_2 ?(Bonus for the truly adventurous!: Find $[\text{Pb}^{2+}]$, $[\text{I}^-]$, and $[\text{PbI}_4^{2-}]$ if excess $\text{PbI}_2(\text{s})$ is placed in pure water)It will increase solubility as dissolved Pb^{2+} and I^- ions are consumed to produce PbI_4^{2-} 

$$9.8 \cdot 10^{-9} = (x-y)(2x-2y)^2$$

$$3.0 \cdot 10^4 = \frac{y}{(x-y)(2x-2y)^2}$$

2 solutions

$$x = 0.00135$$

$$y = 2.17 \cdot 10^{-9}$$

$$x = 850.34$$

$$y = 850.34$$

$$x-y = 3.39 \cdot 10^{-15}$$