

# Chapter 7

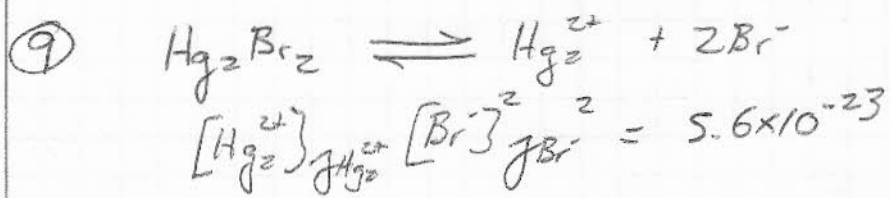
① As ionic strength increases, each ion in solution is surrounded by more ions of the opposite charge. The ion's charge is shielded from other ions ~~that~~ and therefore, reduces the frequency of interactions that lead to precipitation.

② a. true      b. true      c. true

③ a. 0.0087 M

b.  $\frac{1}{2}[(0.0002 \cdot 3^2) + (0.0006 \cdot 1^2)] =$   $1.2 \times 10^{-3} M$

④ a. 0.660      b. 0.54      c. 0.18      d. 0.83



$\mu = 0.00100 M$        $\gamma_{Hg_2^{2+}} = 0.867$        $\gamma_{Br^-} = 0.964$

I	$Hg_2^{2+}$	$Br^-$
	0	0.001M
C	x	$2x + 0.00100$
E	x	$2x + 0.00100$

$(x)(0.867) \left( \frac{2x}{0.00100} \right)^2 (0.964)^2 = 5.6 \times 10^{-23}$

~~$\frac{4x^3}{10} = 6.95 \times 10^{-23}$~~

$x = 7.0 \times 10^{-17} M = [Hg_2^{2+}]$

$$\textcircled{11} \quad \mu = \underset{\text{HCl}}{0.010\text{M}} + \underset{\text{KClO}_4}{0.040\text{M}} = 0.050\text{M}$$

$$\gamma_{\text{H}^+} = 0.86$$

$$\text{pH} = -\log\{0.010 \cdot 0.86\} = \boxed{2.07}$$

$$\textcircled{12} \quad \mu = \underset{\text{NaOH}}{0.010\text{M}} + \underset{\text{LiNO}_3}{0.0120\text{M}} = 0.0220$$

$$\text{without activity: } \text{pOH} = 2 \rightarrow \boxed{\text{pH} = 12}$$

$$\text{with activity: } \text{pH} = -\log\{[\text{H}^+] \gamma_{\text{H}^+}\} = -\log\left(\frac{10^{-14}}{[\text{OH}^-] \gamma_{\text{OH}^-}}\right)$$

$\gamma_{\text{OH}^-}$  (at  $\mu = 0.0220$ ) = interpolate from table

$$\frac{0.81 - x}{0.81 - 0.900} = \frac{0.05 - 0.0220}{0.05 - 0.01}$$

$$x = 0.873 = \gamma_{\text{OH}^-}$$

$$\text{pH} = -\log\left(\frac{10^{-14}}{(0.010)(0.873)}\right) = \boxed{11.94}$$