

0.5 M (本試)

$$1 \quad \kappa = 1.576 \times 10^{-4} - 1.519 \times 10^{-4} = 5.700 \times 10^{-6} (\Omega^{-1} \text{m}^{-1})$$

$$\begin{aligned} \Lambda_0 &= \Lambda(\text{Ag}^+) + \Lambda(\text{Br}^-) \\ &= \Lambda(\text{Ag}^+) + \Lambda(\text{NO}_3^-) - \Lambda(\text{NO}_3^-) + \Lambda(\text{Br}^-) + \Lambda(\text{H}^+) - \Lambda(\text{H}^+) \\ &= \Lambda(\text{AgNO}_3) + \Lambda(\text{HBr}) - \Lambda(\text{HNO}_3) \\ &= 133.3 \times 10^{-4} + 151.9 \times 10^{-4} - 144.9 \times 10^{-4} \\ &= 140.3 \times 10^{-4} (\Omega^{-1} \text{m}^2 \text{mol}^{-1}) \end{aligned}$$

$$\Lambda = \frac{\kappa}{1000C} (\Lambda = \Lambda_0) \text{ したがって、}$$

$$C = \frac{5.700 \times 10^{-6}}{140.3 \times 10^{-4} \times 1000} = 4.063 \times 10^{-7} (\text{mol dm}^{-3}) //$$

$$K_{\text{sp}} = C^2 = 1.651 \times 10^{-13} (\text{mol}^2 \text{dm}^{-6}) //$$

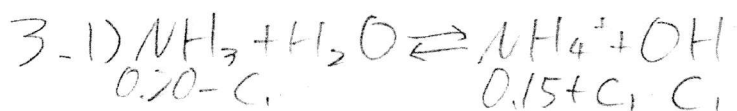
2. 流れた電流の電気量は、

$$\frac{0.8564}{107.9} \times 1 = 7.937 \times 10^{-3} (\text{F})$$

又、陰極室で減少した NO_3^- の物質量は、
 $(0.0500 - 0.0078) \times 0.100 = 4.22 \times 10^{-3} (\text{mol})$

$$\therefore x_- = \frac{4.22 \times 10^{-3}}{7.937 \times 10^{-3}} = 0.532 //$$

$$x_+ = 1 - 0.532 = 0.468 //$$

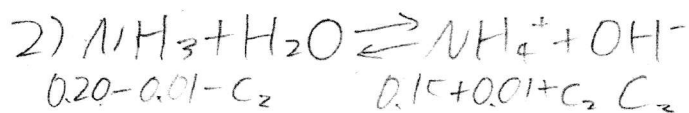


$$K_b = \frac{[\text{NH}_4^+][\text{OH}^-]}{[\text{NH}_3]} = 1.8 \times 10^{-5}$$

$$1.80 \times 10^{-5} = \frac{(0.15 + C_1)C_1}{0.20 - C_1}$$

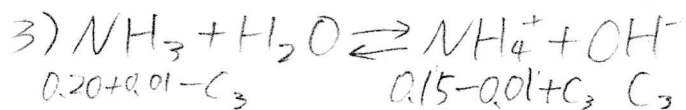
そこで、 $C_1 \ll 0.15$ したがって、近似して、

$$C_1 = [\text{OH}^-] = 1.80 \times 10^{-5} \times \frac{0.20}{0.15} = 2.40 \times 10^{-5} (\text{mol dm}^{-3}) //$$



1) と同様にして、

$$C_2 = [\text{OH}^-] = 1.80 \times 10^{-5} \times \frac{0.19}{0.16} = 2.14 \times 10^{-5} (\text{mol dm}^{-3})$$



1) と同様にして、

$$C_3 = [\text{OH}^-] = 1.80 \times 10^{-5} \times \frac{0.21}{0.14} = 2.70 \times 10^{-5} (\text{mol dm}^{-3})$$

4) i) $T = 298(\text{K})$ のとき Nernst の式は

$$\Delta E = \Delta E^\circ - \frac{0.0591}{n} \log Q$$

数値を代入して、

$$0.753 = \Delta E^\circ - \frac{0.0591}{1} \log \frac{1}{0.0100 \times 0.100}$$

$$\therefore \Delta E^\circ = 0.9303 (\text{V})$$

従って飽和溶液のとき、

$$0.9303 = \frac{0.0591}{1} \log \frac{1}{[\text{Ag}^+][\text{I}^-]}$$

$$= -0.0591 \log K_{sp}$$

$$\therefore \log K_{sp} = -15.74$$

$$\therefore K_{sp} = 10^{-15.74} = 10^{0.26} \cdot 10^{-16} = 1.8 \times 10^{-16} (\text{mol}^2 \text{dm}^{-6}) (\because \text{ii}))$$