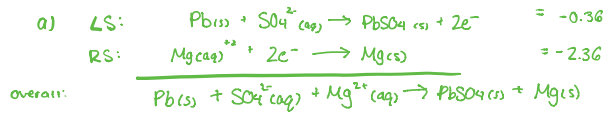
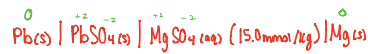


Question 1



b)  $E = -2.08V$   
 $\delta^\pm MgSO_4 = ?$   
 $Mg^{2+} \quad SO_4^{2-}$

$$I = \frac{1}{2} [(Mg^{2+})(2)^2 + (SO_4^{2-})(2)^2]$$

$$= \frac{1}{2} [(0.015)(4) + (0.015)(4)]$$

$$= 0.06 \text{ mol/kg}$$

$$\log \delta^\pm = -A |z_1 z_2| \sqrt{I}$$

$$= -0.5092 (2 \times 2) \sqrt{0.06}$$

$$= -0.4987$$

$$\delta^\pm = 0.317$$

c)

$$E_{cell} = E^\circ_{cell} - \frac{RT}{zF} \ln Q$$

$$= E^\circ(R) - E^\circ(L) - \frac{RT}{zF} \ln \left( \frac{1}{(\delta^\pm MgSO_4) \left( \frac{m_{Mg^{2+}}}{m^\circ} \right)} \right)$$

$$= (-2.36) - (-0.36) - \frac{(8.314)(298.15)}{2(96485)} \times \ln \left( \frac{1}{(0.015)(0.317)} \right)$$

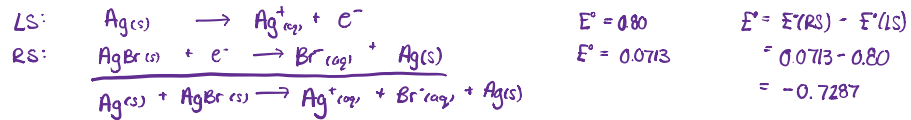
$$= (-2) - (0.012846)(5.3486)$$

$$= -2.07$$

$\therefore$  difference  
 $= \text{theoretical} - \text{measured}$   
 $= -2.08 - (-2.07)$   
 $\Delta = -0.01$

Question 2

$K_{sp}$  for  $AgBr$ ?



$$\Delta G = -zFE^\circ$$

$$= -(1)(96485 \frac{C}{mol})(-0.7287)$$

$$= 70308.62 \text{ J/mol}$$

$$= 70.3 \text{ kJ/mol}$$

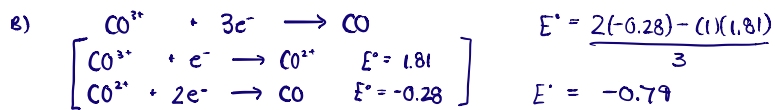
$$\Delta G = -RT \ln K_{sp}$$

$$K_{sp} = e^{-\Delta G/RT}$$

$$= e^{-70308.62 / (8.314 \times 298.15)}$$

$$K_{sp} = 4.82 \times 10^{-12}$$

Question 3



$\therefore$  a  $1e^-$  reduction

of  $\text{Co}^{3+}$  will be favored. This is because when  $E^\circ > 0$ , the half cell has a greater tendency to be reduced. When  $E^\circ < 0$ , the half cell has a lower tendency to be reduced.