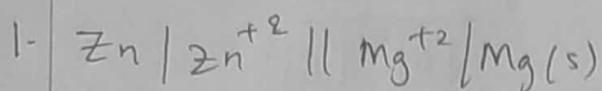


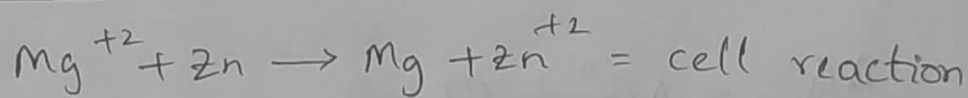
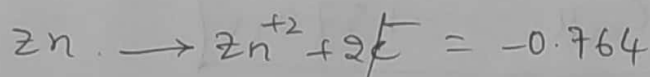
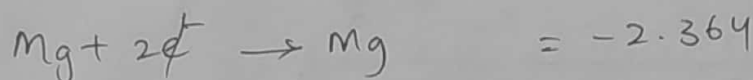
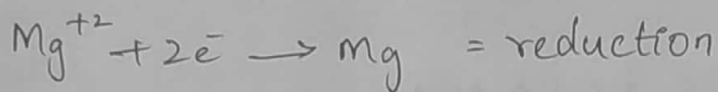
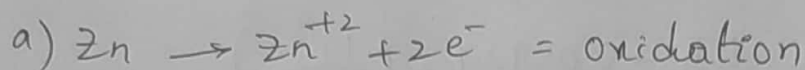
Chemistry Assignment-1

Slot : $H_2 + TH_2$



$$Zn = -0.764 V$$

$$Mg = -2.364 V$$



(b) $E_{\text{cell}}^{\circ} = E_{\text{red}}^{\circ} - E_{\text{oxi}}^{\circ}$

$$E_{\text{cell}}^{\circ} = -2.364 - (-0.764)$$

$$E_{\text{cell}}^{\circ} = -2.364 -$$

$$\boxed{E_{\text{cell}}^{\circ} = -1.6 V}$$

$$\Delta G^{\circ} = -nFE_{\text{cell}}^{\circ}$$

$$= -2 \times 96.5 \times 1.6 V$$

$$= -2 \times 9$$

$$= 308.8 \text{ kJ/mol} (\times \times \times)$$

$$E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0592}{n} \log \frac{[C]^c [D]^d}{[A]^a [B]^b}$$

$$= -1.6 - \frac{0.0592}{2} \log \frac{[Zn^{+2}]}{[Mg^{+2}]}$$

$$= -1.6 - \frac{0.0592}{2} \log \left(\frac{10^{-4}}{10^{-3}} \right)$$

$$= -1.6 + \frac{0.0592}{2}$$

$$\boxed{E_{\text{cell}} = -1.5704 \text{ V}}$$

$$\Delta G = \Delta G^{\circ} + RT \ln Q$$

$$= 308.8 + 8.314 \text{ J/mol} \times 298 \text{ K} \times \ln(10^{-1})$$

$$\Delta G = -2168.7 \times 10^{-3} \text{ J/mol}^{-2}$$

E_{cell} is not greater than zero. So, cell reaction is not spontaneous.

$$2) E_{\text{cell}} = \frac{0.0592}{n} \log \left(\frac{0.123}{0.00162} \right)$$

$$0.02571 = \frac{0.0592}{n} \log (75.9)$$

$$= \frac{0.0592}{n} \times 1.88$$

$$n = \frac{0.0592 \times 1.88}{0.02571}$$

$$\boxed{n = 4.32}$$

$$(3) \text{ a) Given } i = 4.75 \text{ A}$$

$$W = 1.50 \text{ g of Cu}$$

$$\text{no. of moles of Cu} = \frac{W}{\text{G.mwt}} = \frac{1.50}{63.54}$$

$$\boxed{n = 0.0236 \text{ moles}}$$

$$\text{No. of Cu ions} = \frac{6.023 \times 10^{23} \times 1.50}{63.546}$$

$$= \frac{9.03 \times 10^{23}}{63.546}$$

$$\boxed{\text{No. of ions} = 1.423 \times 10^{22} \text{ ions}}$$

$$\text{charge of } 1e^- = 1.60 \times 10^{-19} \text{ C}$$

$$\text{No. of electrons} = \frac{2 \times 9.03 \times 10^{23}}{63.546}$$

$$= \frac{1.806 \times 10^{24}}{63.546}$$

$$= 0.28 \text{ electrons}$$

$$\text{Total charge} = 288,960 \div 63.546$$

$$= \frac{1.60 \times 10^{-19} \times 1.806 \times 10^{24}}{63.546}$$

$$= 4574 \text{ C}$$

$$\Rightarrow 4.75 \times t = 288960 \div 63.546$$

$$t = \frac{288960}{301.8435}$$

$$t = 957 \text{ seconds}$$

$$1 \text{ sec} \rightarrow 0.0167 \text{ min}$$

$$967 \rightarrow x$$

$$t = 15.9819 \text{ min}$$