

$$E = E^{\circ} - \frac{RT}{nF} \ln Q$$

Text TABLE E  
 Std conditions

NOT AT EQ

AT EQ  
 $Q = K, \Delta G = 0, \Delta E = 0$

$0 = E^{\circ} - \frac{RT}{nF} \ln K$

$$E^{\circ} = \frac{RT}{nF} \ln K$$
 AT EQ

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~~$$E = E^{\circ} - \frac{2.303RT}{nF} \log Q$$~~

~~$$E = E^{\circ} - \frac{0.0592V}{nF} \log Q$$~~

Mar 30-7:38 AM

20.549  $Cu(s) + 2Ag^+ \rightarrow Cu^{+2} + 2Ag^{\circ}$

$E^{\circ} = \frac{RT}{nF} \ln K$

$0.462 = \frac{(8314)(298)}{2(96500)} \ln K$

$\ln K = 35.9892669113$

$K = 4.265 \times 10^{15}$

$Cu(s) \rightarrow Cu^{+2} + 2e^- \quad E^{\circ}_{ox} = 0.337V$

$2Ag^+ + 2e^- \rightarrow 2Ag^{\circ} \quad E^{\circ}_{red} = 0.799V$

$E^{\circ} = 0.462$

Mar 30-8:11 AM

20.62  $3\text{Ce}^{4+} + \text{Cr}^0 \rightarrow 3\text{Ce}^{+3} + \text{Cr}^{+3}$

$\text{Cr}^0 \rightarrow \text{Cr}^{+3} + 3\text{e}^- \quad +0.74$

$3\text{Ce}^{4+} + 3\text{e}^- \rightarrow 3\text{Ce}^{+3} \quad +1.61$

Table E  $E^\circ = +2.35\text{V}$

$E = E^\circ - \frac{RT}{nF} \ln Q$

$E = 2.35 - \frac{(8.314)(298)}{3(96500)} \ln(3.7 \times 10^{-7})$

$2.35 + 0.12673 = 2.48\text{V}$

$E = E^\circ - \frac{RT}{nF} \ln Q$

$Q = \frac{[\text{Ce}^{+3}]^3 [\text{Cr}^{+3}]}{[\text{Ce}^{4+}]^3 [1]}$

$Q = \frac{(0.1)^3 (0.1)}{(3)^3}$

$Q = 3.7 \times 10^{-7}$

Mar 30-8:20 AM

F m d e H  $\text{Zn/H cell @ 298K} \quad E^\circ = 0.45\text{V}$

H  $E^\circ_{\text{red}} = 0$

Zn  $E^\circ_{\text{red}} = -0.763\text{V} \rightarrow \Delta E_{\text{ox}}$

When  $[\text{Zn}^{+2}] = 1.0\text{M}$

$P_{\text{H}_2} = 1\text{atm}$

$2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2(\text{g}) \quad E^\circ_{\text{red}} = 0$

$\text{Zn}^0 \rightarrow \text{Zn}^{+2} + 2\text{e}^- \quad E^\circ_{\text{ox}} = +0.763\text{V}$

$2\text{H}^+ + \text{Zn}^0 \rightarrow \text{H}_2(\text{g}) + \text{Zn}^{+2}(\text{aq}) \quad E^\circ_{\text{cell}} = +0.763\text{V}$

$E = E^\circ - \frac{RT}{nF} \ln \frac{[\text{H}_2] [\text{Zn}^{+2}]}{[\text{H}^+]^2 [1]}$

$0.45 = 0.763 - \frac{(8.314)(298)}{2(96500)} \ln \frac{(1)(1)}{[\text{H}^+]^2}$

$-0.313 = - \frac{8.314(298)}{2(96500)} \ln \left[ \frac{1}{[\text{H}^+]^2} \right]$

$24.38233 = \ln \left( \frac{1}{[\text{H}^+]^2} \right)$

$38825335146.8 = \frac{1}{[\text{H}^+]^2}$

$2.5756 \times 10^{-8} = (\text{H}^+)^2$

$5.075 \times 10^{-4} = \text{H}^+$

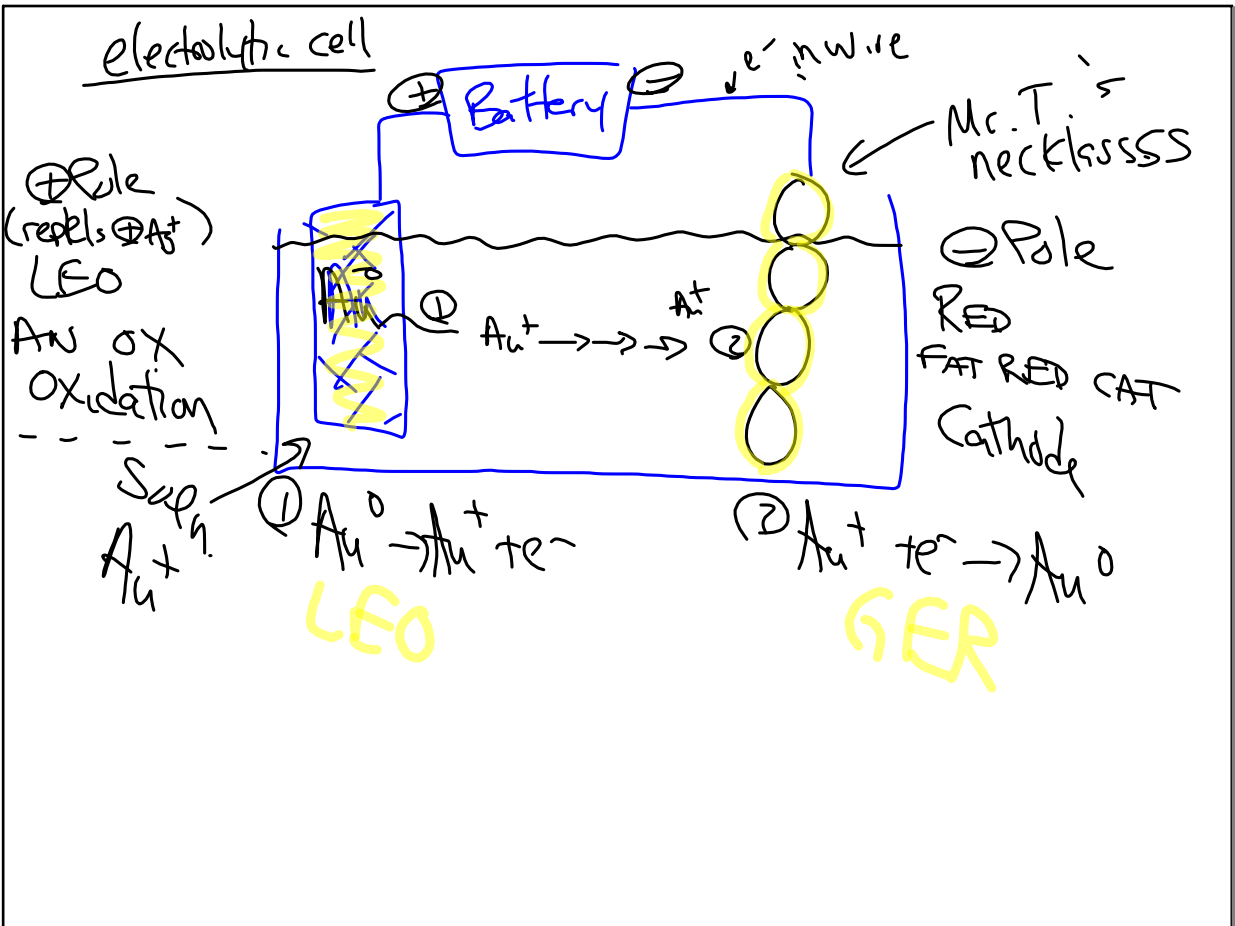
$\text{pH} = -\log(\text{H}^+)$

$\text{pH} = 5.29$

Mar 30-8:37 AM

Electrolysis  
Non-spontaneous Needs an outside  
 source of energy (Battery) to occur.  
Electroplating

Mar 30-8:59 AM



Mar 30-9:03 AM

$\text{LFO}$   
 $\text{AN OX}$   
 $\ominus$  Anode

$\text{RER}$   
 $\text{FAT RED CAT}$   
 $\oplus$  Cathode

$\text{Cu}^{+2} + 2e^- \rightarrow \text{Cu}^0 \quad 0.337$   
 $\text{Zn}^0 \rightarrow \text{Zn}^{+2} + 2e^- \quad +0.763$

$\text{Zn } E^{\circ}_{\text{red}} = -0.763$   
 $\text{Cu } E^{\circ}_{\text{red}} = +0.337$

Electrochemical

Mar 30-9:09 AM

PS 20-1 # 1-16

#15 choice F ← write in ans.

Mar 30-9:16 AM