iClicker Quiz

Equilibrium → no net e^- flow → $0 = V = \text{Potential} = \Delta G$

$\Delta G = -nF\mathcal{E}$

n = # electrons in reaction, look for oxidation/reduction

$\mathcal{E}$ = Potential

$\mathcal{E} = \mathcal{E}^\circ - \frac{0.0591}{n}\log(Q)$ ← assuming 298 K

Remove products → shift right → higher voltage

$Cu(s) \,|\, Cu^{2+}(aq)\ (0.001\ M) \,||\, Cu^{2+}(aq)\ (1\ M) \,|\, Cu(s)$

Anode ↑ Cathode ↑

$Cu(s) + Cu^{2+}(aq) \rightarrow Cu(s) + Cu^{2+}(aq)$

1 M ↑ 0.001 M ↑

$\mathcal{E}^\circ = .34 - .34 = 0$

$\mathcal{E} = \mathcal{E}^\circ - \frac{0.05916}{2}\log\left(\frac{.001}{1}\right) = +8.87 \times 10^{-2}\ V$

Worksheet

1. $Q = \frac{[K^+_{out}]}{[K^+_{in}]} = 1$ at resting potential

2. $\mathcal{E}^\circ = 0$

3. $\mathcal{E} = \mathcal{E}^\circ - \frac{0.0591}{1}\log(Q)$

4. ↑ use equation 93 mV

Galvanic/Voltaic: Spontaneous
$+\mathcal{E}$
$-\Delta G$

Electrolitic: Non-Spontaneous
Must input voltage
$+\Delta G$

Sodium will spontaneously ~~oxidize~~ combust in water

1. Cathode: $Al^{3+} + 3e^- \rightarrow Al$
   Anode: $C + 2O^{2-} \rightarrow CO_2 + 4e^-$

   $4Al^{3+} + 3C + 6O^{2-} + 12e^- \rightarrow 4Al + 3CO_2 + 12e^-$

2. 1 Kg Al → moles → ×3 electrons → × 96485 C = 1.07×10^7 C

3. $\frac{1.07 \times 10^7}{3600\ s} = 2972\ A$

4. They'll post the rest of the answers ...