Solutions

Each answer shows the steps, then the **result**.

2.1

- cathode: sodium (metal); anode: chlorine

2.2

- $F = Le$

2.3

- cathode: **copper**
- anode: **oxygen**

2.4

- **two** moles of electrons, since $\mathrm{Cu}^{2+} + 2e^- \rightarrow \mathrm{Cu}$

3.1 B

- Cations are reduced at the cathode

3.2 B

- $Q = It = 1.5 \times 200 = 300$ C

3.3

(a)

- $Q = It = 0.50 \times 3600 = 1800$ C

(b)

- mol $\mathrm{e}^- = 1800/96500 = 0.01865$; $\mathrm{Ag}^+ + e^- \rightarrow \mathrm{Ag}$ so mol Ag $= 0.01865$; $m = 0.01865 \times 108 = 2.0$ g

3.4

- sodium is too reactive (very negative electrode potential), so the water/H^+ is reduced instead, releasing hydrogen

3.5

(a)

- $Q = It = 0.50 \times 1930 = \mathbf{965}$ C

(b)

- moles of electrons $= \dfrac{Q}{F} = \dfrac{965}{96\,500} = 0.0100$ mol
- four electrons give one O_2, so moles of oxygen $= \dfrac{0.0100}{4} = 0.00250$ mol
- volume $= n \times 24\,000 = 0.00250 \times 24\,000 = \mathbf{60}$ cm^3

3.6

- $L = \dfrac{F}{e} = \dfrac{96\,500}{1.60 \times 10^{-19}} = \mathbf{6.03 \times 10^{23}}$ mol^{-1}

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