

# BASIC SKILLS

## CHAPTER 17

### ELECTROCHEMISTRY

1. Diagram, label, and explain the operation of a **galvanic** or **electrolytic** cell which includes: anode, cathode, salt bridge, oxidation, reduction, oxidizing agent, reducing agent, half-reactions, electromotive force, line notation, volt, and direction of electron flow.

2. Using **standard reduction potentials**, determine the  $E^\circ$  value for a given oxidation-reduction reaction.

$$E^\circ_{\text{total}} = E^\circ_{\text{reduction}} + E^\circ_{\text{oxidation}}$$

3. Convert between the free energy of a reaction and the cell voltage for the same reaction.

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

4. Use the **Nerst equation** to calculate the cell voltage at nonstandard conditions and the equilibrium constant from cell voltages.

$$E_{\text{cell}} = E^\circ_{\text{cell}} - \frac{0.0592}{n} \log(Q) \quad (@ 25^\circ\text{C})$$

5. Use **Faraday's constant** and the stoichiometric relationships in a reaction to relate current flow and time to the extent of the reaction.