

18 • Electrochemistry**OXIDATION-REDUCTION EQUATIONS**

The Half-Reaction Method for Acidic and Basic Solutions:

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1. Write separate equations for the oxidation and reduction half-reactions.
2. For each half-reaction:
 - a. balance all the elements except hydrogen and oxygen.
 - b. balance oxygen using H_2O .
 - c. balance hydrogen using H^+ .
 - d. balance the charge using electrons.
3. If necessary, multiply one or both balanced half-reactions by an integer to equalize the number of electrons transferred in the two half-reactions.
4. Add the half-reactions, and cancel identical species.
5. (For Basic solution) Add OH^- ions to each side of the equation to neutralize H^+ ions. Cancel H_2O molecules.
6. Check that the elements and charges are balanced.

