

TABLE OF CONTENTS

Licensing

1: Reduction and Oxidation Reactions

- 1.1: Oxidation State
- 1.2: Redox Reactions
- 1.3: Reduction Potential
- 1.4: Reduction Potential and Energy Levels
- 1.5: Factors Influencing Redox Potential
- 1.6: Reduction of Ores
- 1.7: Reduction in Batteries
- 1.8: Balancing Redox Reactions
- 1.9: Outer Sphere Electron Transfer
- 1.10: Inner Sphere Electron Transfer
- 1.11: Cyclic Voltammetry
- 1.12: Organic Redox
- 1.13: Potential and Concentrations
- 1.14: Solutions to Selected Problems

2: Reduction Potentials of Metal Ions in Biology

- 2.1: Introduction
- 2.2: The Effect of Charge (Local Effects)
- 2.3: Effect of Charge- Distal Effects, or Effects of the Medium
- 2.4: The Effect of pH
- 2.5: Hard and Soft Acid and Base Considerations
- 2.6: Effect of Geometry
- 2.7: Magnetic Measurements
- 2.8: Solutions for Selected Problems

3: Understanding Mechanism

- 3.1: Intermediates
- 3.2: Energetics
- 3.3: Arrow Conventions
- 3.4: Solutions to Selected Problems

4: Oxygen Binding and Reduction

- 4.1: Introduction
- 4.2: Oxygen Binding
- 4.3: Oxygen Reduction
- 4.4: Metal Oxos
- 4.5: Solutions to Selected Problems

5: Nitrogen Reduction

- 5.1: Introduction to Nitrogen Reduction
- 5.2: The Haber-Bosch Process
- 5.3: Nitrogenase
- 5.4: Model Studies for Nitrogen Binding

- 5.5: Model Studies for Nitrogen Reduction
- 5.6: Solutions for Selected Problems

6: Radical Reactions

- 6.1: Introduction to Radicals
- 6.2: Radical Initiation- Bond Homolysis
- 6.3: Radical Initiation- Radical Stability
- 6.4: Radical Initiation- Single Electron Transfer
- 6.5: Radical Propagation
- 6.6: Radical Termination
- 6.7: Radical Substitution
- 6.8: Radical Addition
- 6.9: Radical Polymerization
- 6.10: Living Radical Polymerisation
- 6.11: Detection of Unpaired Electrons
- 6.12: Solutions for Selected Problems

7: Oxidative Phosphorylation

- 7.1: Introduction to Oxidative Phosphorylation
- 7.2: Complex I
- 7.3: Complex II
- 7.4: Complex III
- 7.5: Complex IV
- 7.6: Complex V
- 7.7: Solutions for Selected Problems

8: Photochemical Reactions

- 8.1: Absorbance
- 8.2: Rules of Absorbance
- 8.3: Fluorescence and Phosphorescence
- 8.4: Photolysis
- 8.5: Atmospheric Photochemistry- Ozone
- 8.6: Applications of Photochemistry- Photoredox Catalysis
- 8.7: Photoredox Catalysis in Organic Chemistry
- 8.8: Solutions to Selected Problems

9: Photosynthesis

- 9.1: Solutions to Selected Problems
- 9.2: Introduction to Photosynthesis
- 9.3: Photosystem II- Harvesting the Photons
- 9.4: Photosystem II- Electron Transfer
- 9.5: Photosystem II - The Oxygen-Evolving Complex
- 9.6: Adding a Proton Pump- Cytochrome b6f Complex
- 9.7: Harvesting the Photons- Photosystem I
- 9.8: ATP Synthase
- 9.9: Carbon Capture and Carbohydrate Pool
- 9.10: Additional Problems

10: Reactions Under Orbital Control

- 10.1: Introduction
- 10.2: Cope and Claisen Rearrangements
- 10.3: The Diels Alder Reaction
- 10.4: Regiochemistry in Diels Alder Reactions
- 10.5: Endo and Exo Products
- 10.6: Photochemical Cycloaddition
- 10.7: Facial Selectivity
- 10.8: Alkene Oxidations
- 10.9: Decarboxylations
- 10.10: Olefin Metathesis
- 10.11: Sigma Bond Metathesis
- 10.12: Solutions to Selected Problems

11: Electrophilic Rearrangement

- 11.1: Introduction
- 11.2: Pinacol Rearrangement
- 11.3: Baeyer-Villiger Rearrangement
- 11.4: Beckmann Rearrangement
- 11.5: Wolff Rearrangement
- 11.6: Solutions

[Index](#)

[Glossary](#)

[Detailed Licensing](#)