Contents

Preface vii

A: Introduction: Selectivity
1. Planning Organic Syntheses: Tactics, Strategy and Control 3
2. Chemoselectivity 9
3. Regioselectivity: Controlled Aldol Reactions 27
4. Stereoselectivity: Stereoselective Aldol Reactions 43
5. Alternative Strategies for Enone Synthesis 55
6. Choosing a Strategy: The Synthesis of Cyclopentenones 71

B: Making Carbon–Carbon Bonds
7. The Ortho Strategy for Aromatic Compounds 91
8. σ-Complexes of Metals 113
9. Controlling the Michael Reaction 127
10. Specific Enol Equivalents 139
11. Extended Enolates 155
12. Allyl Anions 173
13. Homoenoates 189
14. Acyl Anion Equivalents 203

C: Carbon–Carbon Double Bonds
15. Synthesis of Double Bonds of Defined Stereochemistry 223
16. Stereo-Controlled Vinyl Anion Equivalents 255
17. Electrophilic Attack on Alkenes 277
18. Vinyl Cations: Palladium-Catalysed C–C Coupling 307
19. Allyl Alcohols: Allyl Cation Equivalents (and More) 339

D: Stereochemistry
20. Control of Stereochemistry – Introduction 371
21. Controlling Relative Stereochemistry 399
22. Resolution 435
23. The Chiral Pool — Asymmetric Synthesis with Natural Products as Starting Materials — 465
24. Asymmetric Induction I Reagent-Based Strategy 505
27. Asymmetric Induction IV Substrate-Based Strategy 599
## Contents

28. Kinetic Resolution 627
29. Enzymes: Biological Methods in Asymmetric Synthesis 651
30. New Chiral Centres from Old — Enantiomerically Pure Compounds & Sophisticated Syntheses — 681
31. Strategy of Asymmetric Synthesis 717

### E: Functional Group Strategy

32. Functionalisation of Pyridine 749
33. Oxidation of Aromatic Compounds, Enols and Enolates 777
34. Functionality and Pericyclic Reactions: Nitrogen Heterocycles by CycloadDITIONS and Sigmatropic Rearrangements 809
35. Synthesis and Chemistry of Azoles and other Heterocycles with Two or more Heteroatoms 835
36. Tandem Organic Reactions 863

### General References 893

### Index 895