Table of Contents

- A note on units p. xv
- List of abbreviations p. xvii
- Chapter 1 Introduction p. 1
- 1.1 Aims of this book p. 1
- 1.2 Historical aspects p. 1
- 1.3 Remarkable properties of enzymes as catalysts p. 4
- 1.4 Cofactors p. 7
- 1.5 Nomenclature and classification of enzymes p. 8
- 1.6 The contents of this book p. 13
- References p. 14
- Chapter 2 The purification of enzymes p. 15
- 2.1 Introduction p. 15
- 2.2 Why isolate enzymes? p. 15
- 2.3 Objectives and strategy in enzyme purification p. 16
- 2.4 Choice of source p. 17
- 2.5 Methods of homogenization p. 20
- 2.6 Methods of separation p. 21
- 2.7 How to judge the success of a purification procedure p. 34
- 2.8 Examples of purification procedures p. 36
- 2.9 Conclusions from the examples of enzyme purification p. 43
- References p. 44
- Chapter 3 The structure of enzymes p. 47
- 3.1 Introduction p. 47
- 3.2 The determination of M[subscript r] p. 48
- 3.3 The determination of amino-acid composition and primary structure p. 54
- 3.4 The determination of secondary and tertiary structure p. 75
- 3.5 The determination of quaternary structure p. 100
- 3.6 The unfolding and folding of enzymes p. 106
- 3.7 Concluding remarks p. 110
- References p. 111
- Appendix 3.1 p. 116
- References for Appendix 3.1 p. 117
- Chapter 4 An introduction to enzyme kinetics p. 118
- 4.1 Outline of the chapter p. 118
- 4.2 How do we obtain kinetic data? p. 119
- 4.3 How do we analyse kinetic data? p. 121
- 4.4 Pre-steady-state kinetics p. 144
- 4.5 Concluding remarks p. 148
- References p. 148
- Appendix 4.1 p. 150
- Appendix 4.2 p. 151
- Appendix 4.3 p. 152
- References for Appendices p. 153
- Chapter 5 The mechanism of enzyme action p. 154

- 5.1 Introduction p. 154
- 5.2 Definition of the mechanism of an enzyme-catalysed reaction p. 154
- 5.3 Background to catalysis p. 155
- 5.4 Experimental approaches to the determination of enzyme mechanisms p. 162
- 5.5 Examples of enzyme mechanisms p. 177
- 5.6 Concluding comments on enzyme mechanisms p. 212
- References p. 212
- Chapter 6 The control of enzyme activity p. 217
- 6.1 Introduction p. 217
- 6.2 Control of the activities of single enzymes p. 218
- 6.3 Control of metabolic pathways p. 237
- 6.4 Examples of control of metabolic pathways p. 249
- 6.5 Concluding remarks p. 266
- References p. 266
- Appendix 6.1 p. 270
- Chapter 7 Enzymes in organized systems p. 273
- 7.1 Introduction p. 273
- 7.2 Organized enzyme systems p. 273
- 7.3 RNA polymerase from E. coli p. 274
- 7.4 The occurrence and isolation of multienzyme proteins p. 281
- 7.5 Phylogenetic distribution of multienzyme proteins p. 282
- 7.6 Properties of multienzyme proteins p. 283
- 7.7 Pyruvate dehydrogenase multienzyme complex and related systems p. 285
- 7.8 Glycine decarboxylase multienzyme complex p. 294
- 7.9 The tryptophan synthase multienzyme complex from E. coli p. 294
- 7.10 Carbamoyl phosphate synthase and the associated enzymes of the pyrimidine and arginine biosynthetic pathways in E. coli, fungi, and mammalian cells p. 300
- 7.11 Multienzyme polypeptides: fatty-acid synthase and the arom complex (AROM enzyme) p. 304
- 7.12 Enzymes involved in DNA synthesis p. 315
- 7.13 The glycogen particle p. 315
- 7.14 Conclusions p. 317
- References p. 317
- Chapter 8 Enzymes in the cell p. 321
- 8.1 Introduction p. 321
- 8.2 Intracellular compartmentation p. 322
- 8.3 Compartmentation of metabolic pathways p. 333
- 8.4 Vectorial organization of enzymes associated with membranes p. 347
- 8.5 The concentrations of enzymes and substrates in vivo p. 355
- 8.6 Conclusions p. 366
- References p. 367
- Chapter 9 Enzyme turnover p. 370
- 9.1 Introduction p. 370
- 9.2 Kinetics of enzyme turnover p. 371
- 9.3 Methods for measurement of rates of enzyme turnover p. 373
- 9.4 Results from measurements of rates of enzyme turnover p. 375

- 9.5 Possible correlations between the rates of turnover and the structure and function of enzymes p. 376
- 9.6 The mechanisms of protein degradation p. 377
- 9.7 The significance of enzyme turnover p. 389
- 9.8 Other processes in which intracellular proteolysis is important p. 394
- 9.9 Conclusions p. 396
- References p. 396
- Appendix 9.1 p. 399
- Chapter 10 Clinical aspects of enzymology p. 400
- 10.1 Introduction p. 400
- 10.2 Determination of enzyme activities for clinical diagnosis p. 401
- 10.3 Clinical enzymology of liver disease p. 404
- 10.4 Clinical enzymology of heart disease p. 406
- 10.5 Other enzyme activities that become elevated in serum in disease p. 408
- 10.6 The detection and significance of enzyme deficiencies p. 411
- 10.7 Enzyme inhibitors and drug design p. 415
- 10.8 The use of enzymes to determine the concentrations of metabolites of clinical importance p. 416
- 10.9 Enzyme therapy p. 424
- 10.10 Conclusions p. 428
- References p. 428
- Chapter 11 Enzyme technology p. 430
- 11.1 Introduction p. 430
- 11.2 Use of microorganisms in brewing and cheesemaking p. 430
- 11.3 Use of microorganisms in the production of organic chemicals p. 433
- 11.4 Use of isolated enzymes in industrial processes p. 433
- 11.5 Immobilized enzymes p. 440
- References p. 449
- Appendix Enzymes referred to in Chapters 1-11 p. 450
- Index p. 471