

# CONTENTS

|                                                                         |            |
|-------------------------------------------------------------------------|------------|
| PREFACE .....                                                           | ix         |
| ACKNOWLEDGMENTS .....                                                   | xi         |
| INTRODUCTION .....                                                      | xiii       |
| <b>CHAPTER 1</b> Basics of biotechnology .....                          | 1          |
| <b>CHAPTER 2</b> DNA, RNA, and protein.....                             | 33         |
| <b>CHAPTER 3</b> Recombinant DNA technology .....                       | 59         |
| <b>CHAPTER 4</b> DNA synthesis <i>in vivo</i> and <i>in vitro</i> ..... | 93         |
| <b>CHAPTER 5</b> RNA-based technologies .....                           | 125        |
| <b>CHAPTER 6</b> Immune technology .....                                | 173        |
| <b>CHAPTER 7</b> Nanobiotechnology .....                                | 205        |
| <b>CHAPTER 8</b> Genomics and gene expression .....                     | 231        |
| <b>CHAPTER 9</b> Proteomics.....                                        | 269        |
| <b>CHAPTER 10</b> Recombinant proteins.....                             | 305        |
| <b>CHAPTER 11</b> Protein engineering.....                              | 329        |
| <b>CHAPTER 12</b> Environmental biotechnology .....                     | 349        |
| <b>CHAPTER 13</b> Pathway engineering .....                             | 371        |
| <b>CHAPTER 14</b> Transgenic plants and plant biotechnology .....       | 397        |
| <b>CHAPTER 15</b> Transgenic animals .....                              | 425        |
| <b>CHAPTER 16</b> Inherited defects .....                               | 457        |
| <b>CHAPTER 17</b> Gene therapy.....                                     | 477        |
| <b>CHAPTER 18</b> Molecular biology of cancer.....                      | 499        |
| <b>CHAPTER 19</b> Noninfectious diseases.....                           | 523        |
| <b>CHAPTER 20</b> Aging and apoptosis.....                              | 549        |
| <b>CHAPTER 21</b> Bacterial infections.....                             | 579        |
| <b>CHAPTER 22</b> Viral and prion infections.....                       | 597        |
| <b>CHAPTER 23</b> Biowarfare and bioterrorism .....                     | 619        |
| <b>CHAPTER 24</b> Forensic molecular biology.....                       | 645        |
| <b>CHAPTER 25</b> Bioethics in biotechnology.....                       | 665        |
| <b>BIOTECHNOLOGY Multiple-choice answer key.....</b>                    | <b>695</b> |
| <b>GLOSSARY .....</b>                                                   | <b>697</b> |
| <b>INDEX .....</b>                                                      | <b>739</b> |