

How to Use This Book

The best way of understanding the laws of physics and learning how to solve physics problems is through practice. This book features almost three hundred problems and solutions worked out in detail. In Part I, *Problems* are arranged thematically, starting in Chapter 1 with problems about **mechanics**, the branch of physics concerned with the behaviour of physical bodies when subjected to forces or displacements, and the subsequent effect of the bodies on their environment. Chapter 2 offers problems in **thermodynamics**, the study of energy conversion between heat and mechanical work, while the **electrodynamics** problems in Chapter 3 deal with the phenomena associated with moving electrical charges and their interaction with electric and magnetic fields. Chapter 4's problems on **magnetism** seek to understand how materials respond on the microscopic level to an applied magnetic field. Lastly, the **optics** problems in Chapter 5 address the branch of physics that studies the behaviour and physical properties of light.

While the problems are arranged by topic, the problems within a single topic are often arranged by increasing level of difficulty. Indeed, many of these physics problems are difficult – yet we encourage students to try and solve the problems on their own, and to only consult the *Solutions* section in order to compare their own attempts with the correct results. We encourage creativity in problem-solving, and these physics problems are intended as a means of developing the student's knowledge of physics by applying them to concrete problems.