

## BOOK REVIEWS

**Elements of Electronics for Physical Scientists.** By R. L. Havill and A. K. Walton, English Language Book Society and Macmillan, 1978, XII + 322 pp; ELBS paper-back edition. £1.50.

This is a good book which satisfies the objectives of the authors, namely, to provide an introductory course in electronic circuitry for the University students (equivalent to final year B.Sc. or first year M.Sc.). The physics students require an acquaintance with the physical processes in semiconductor materials and devices, taught in the Solid State Physics Course, and with the basic ideas of electronic circuitry. It is the latter need which is tackled by the present authors with considerable success.

A quick look at the material presented in the book gives an idea of the way in which the authors have systematically developed their theme. Chapter 1 gives a brief introduction to the physical principles of semiconductors and the working of  $p-n$  junctions, at a simplified but adequate level. This chapter is followed by the use of diodes, not only as rectifiers but also in wave shaping, AM/FM demodulation and even in phase sensitive detection. The third chapter gives the basic principles and construction of transistors, followed by a chapter on the equivalent circuits for small signals. The stage is set for the next two chapters on single and multi-stage transistor amplifiers. Chapter 7 discusses the various types of feedbacks and their diverse applications. Then one goes to switching circuits, essentially the various types of multivibrators, with the digital circuits forming chapter 9. The next Chapter deals with the problems of d.c. amplification.

All the above have been concerned with bipolar transistors. The next chapter deals briefly with unipolar field effect transistors and thermionic valves viewed as voltage-driven devices. Chapter 12 is a brief account of the negative resistance devices, optoelectronic devices and integrated circuits. After dealing with all the building blocks in the 12 chapters, there is a short chapter on small systems like regulated power supplies or decade counters. The next chapter contains a description of the laboratory exercises useful in teaching the subject. Chapter 15 gives some comments and solutions to the laboratory exercises. The book ends with three appendices on a variety of mathematical accessories.

The above description merely conveys the quantity of the coverage in the book. The quality of the material is equally worthy of comment. The material is logically developed and the book makes pleasant reading. In a vast subject like electronics, every author has his or her own bias and room exists for differing points of view. What one should check is whether the authors are successful with the point of view chosen by them. The answer is clearly positive in this case. The paper-back edition is a good buy for the money.

E. S. R. GOPAL

**Introduction to Classical Mechanics**, By R. G. Takwale. and P. S. Puranik, Tata McGraw-Hill Publishing Company Ltd., New Delhi 110 002., 1979, 414, pp ; Rs. 18.

The science of motion, or mechanics, has been a basic subject for nearly four centuries now, starting with Galileo and Newton in the early days and coming to Einstein in recent times. The adjective classical is used to describe that part of the mechanics which deals largely with macroscopic sized objects, to differentiate it from the quantum description suited to microscopic elementary particles. Thus classical mechanics becomes a jumping board from where one starts a discussion of quantum phenomena or electrodynamics or celestial mechanics. Every serious student of physics or mathematics has to be acquainted with the basic principles of the subject and has a choice of many good text books from which the subject can be learnt.

In a sense, the present book follows a traditional path, starting with the mechanics of single particles and systems of particles. It then goes on to discuss the motion in central fields, small oscillations, Lagrangean formulation, Hamiltonian mechanics, canonical transformation and ends with the mechanics in the framework of the special theory of relativity. There is an appendix on the different coordinate systems. Indeed the first two chapters on vector algebra and on vector analysis would normally be treated as appendices in most books on mechanics. The authors are quite correct in their statement that the book could be used, with a suitable choice of the topics, at the B.Sc. level or at the M.Sc. level of most Indian universities. When judged by the goal set in this fashion, the book has undoubtedly fulfilled the objectives.

Because of this appeal to a wide class of students, the book is likely to be well received. In addition, the book is also well written and bears the mark of being tested on many batches of students, for instance, in the manner in which examples are worked out. Each chapter has a set of concept-based short questions as well as a collection of more detailed problems. This is also an attraction of the book. The preparation of the book has been assisted by a UGC programme and the printing has been subsidized by the National Book Trust. Thus the book is priced Rs. 18, which makes it a good value for the money spent.

Because of these plus points, the book is likely to go in for a reprinting soon. This likelihood makes one suggest a few items for the authors to ponder about. They have noted in time many typographical slips and have inserted an errata sheet. They should also consider whether a short chapter on the elements of solid and liquid mechanics (elasticity and hydrodynamics) would give a sense of completeness. They could also consider the possibility of providing answers to a few of the problems at the end of each chapter, in order to allow the students to check their progress. In the bibliography at the end of the book, one expects to find the book of Sudarshan and Mukunda "Classical Dynamics : A Modern Perspective" (Wiley - Interscience, New York, 1974). Although the book is beyond the level of our general M.Sc. students, it has become a classic in interpreting classical mechanics in a modern framework. The section on Compton effect seems out of place in a chapter dealing with relativistic mechanics. It could be

accepted in a place dealing with collision phenomena. In a chapter on relativistic mechanics, one may find some developments of the invariance properties of Thomas precession or other specific effects of special relativity. As mentioned earlier these suggestions are for future considerations.

The book leaves a pleasing impact and can certainly be recommended for our students.

E. S. R. GOPAL