Electronics for research

MODERN ELECTRONICS: A Practical Guide for Scientists and Engineers. By H. De Waard, D. Lazarus. 358 pp. Addison-Wesley, Reading, Mass., 1966. $9.75

by H. J. Hagger

Modern research without electronic devices cannot be performed. Thus research workers not specially trained in this field can get an understanding of basic electronics with this book, which can also serve as a text for a first course in electronics for undergraduates in science and engineering. The reader should be familiar with the behavior of very simple dc and ac circuits.

In the first chapter the authors discuss the statistical phenomena of electrons in metals and solids, as well as the behavior of electrons when emitted from a solid. Contact problems are also considered. Even though this chapter is a very short one, it gives just the essentials of basic electron physics in a very concise manner. In chapter 2 the reader is introduced to the theoretical aspect of electron tubes, from thermionic emission from cathodes to all the classical electron tube configurations. The next section is devoted to semiconductor devices, applying the electron physics of chapter 1. Point-contact, p-n junctions, barrier rectifiers, zener diodes and tunnel diodes are discussed together with frequency limitations of these devices. In the second part transistors and their characteristics as well as the limitations in power and frequency are described. Some remarks on the fabrication process are included. This chapter finishes up with a description of special semiconductor devices, for example avalanche transistors, field-effect and unijunction transistors and integrated circuits.

In chapter 4 basic amplifier circuits using electron tubes and transistors are discussed from the same root. High and low frequency characteristics and transient response are discussed. The next section is devoted to feedback amplifiers and their stability criteria. In chapter 6 special amplifier circuits with frequency compensation, distributed amplification and tuned circuits and differential amplifiers are considered. In a second part of this chapter we find discussions on dc and low frequency power amplifiers. In chapter 7 power supplies, dc voltage filtering and regulation both for electron tube and transistor circuits are considered.

The next chapter deals with low and high frequency oscillators and frequency stabilization. The handling of pulses is the subject of chapter 9, where attenuation, differentiation, integration and delay of pulses are discussed. A quite detailed description of astable, monostable and bistable multivibrators as well as of blocking oscillators is given. In the last chapter the problem of noise in passive and active devices is considered. In two appendices we find remarks on complex notation for ac circuits and some typical tube and transistor characteristics. Problems, a selected bibliography to each chapter and a subject index are included.

As a whole the authors can be congratulated for having written this book on modern electronics. It is an excellent introduction into electronic circuitry, giving all the essentials needed for a good understanding of the problems. It may be noted that the authors have undertaken the task of discussing electronic circuits for electron tubes and transistors in parallel, an approach we very rarely find in such a basic book. It can not only be recommended as an undergraduate text, but also for self study by readers wishing to understand basic electronics and to be able later on to read and understand more specialized publications.

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Waves in gases

NICHTSTATIONÄRE PROBLEME DER GASDYNAMIK. By Robert Sauer. 195 pp. Springer-Verlag, Berlin, 1966. DM 36

by Rolf Landshoff

Integration of a system of nonlinear partial differential equations so that the solution fits a prescribed set of initial and boundary conditions is not only laborious, but it is usually impos-