

Chapter I

Semiconductor Physics and Rectifiers

1.1 Introduction

The branch of engineering which deals with current conduction through a vacuum or gas or semiconductor is known as electronics. Electronics essentially deals with electronics devices and their utilization, an electronic device is that in which the current flows through a vacuum or gas or semiconductor. This chapter will cover the physics behind the operation of semiconductor devices and show how these principles are applied in several different types of semiconductor devices.

1.2 History of Electronics

In 1904 scientist J.A. Fleming invented Vacuum tube that allows the currents to flow through it in only one direction this tube is known as "Fleming valve" or "Vacuum Tube" and which can rectify the signal. Then in 1907 Lee De Forest developed an amplifying device named vacuum Triode.

The Solid State Electronics began after the invention of the transistor; it was invented at 1948 by John Bardeen at Bells Laboratory in America. And then subsequently the solid state devices like FET, BJT are developed. These devices are having wide applications in the field of electronics. In 1959 Noyce gave idea for developing multiple components on a single chip that can reduce the size of the electronic devices. This monolithic circuit is named as Integrated Circuit (IC). The Small Scale Integration (SSI) technique developed in 1961, the Middle Scale Integration (MSI) in 1966, Large Scale Integration (LSI) in 1970 and the Very Large Scale Integration technique (VLSI) developed in 1980.

1.3 Electronics Components

For the formation of electronic devices it uses various components. The components are characterized as given below.

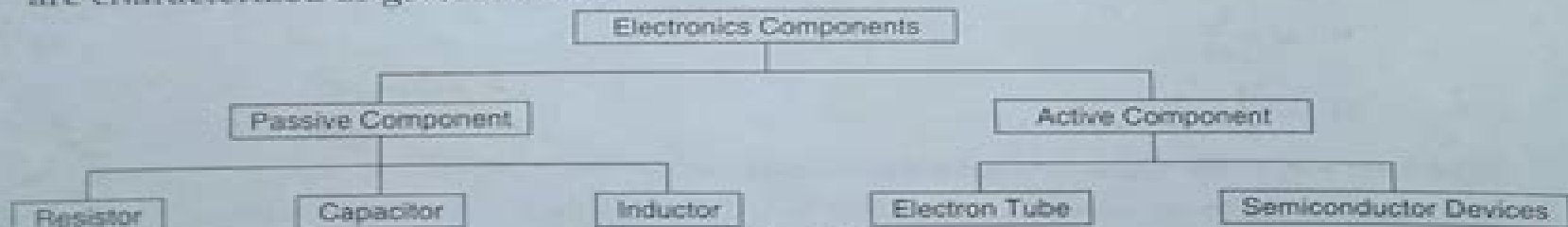


Fig. 1.1

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D. K. Harrison, D. J. Petty



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Instructor's Solutions Manual to Accompany Basic College Mathematics: an Applied Approach, Sixth Edition
[by] **Aufmann, Barker, Lockwood**, 1999 **Fundamentals of Telecommunication Networks, Solutions Manual**

Tarek N. Saadawi, Mostafa H. Ammar, 1995-10-12 Comprehensive authoritative practical and essential guide to the design and operation of telecommunication networks The past decade has seen what can only be described as an evolutionary leap in the field of telecommunication networks The penetration of data networks the emergence of the integrated services digital network ISDN and Broadband ISDN and the development of fast packet switching are just some of the dramatic developments that have emerged over the past few years alone This book was designed to function as a practical introduction to the core concepts techniques and methodologies underlying each of these developments and common to the design and operation of all forms of existing telecommunications networks Key topics covered include The physical layer of the OSI reference model Performance evaluation techniques Queueing theory fundamentals and their applications to networks Layers 2 and 3 of the OSI reference model including an in depth discussion of protocol standards routing algorithms and flow and congestion control techniques LAN theory standards and technology and multiple access communications techniques Network interconnection and the transport layer ISDN Broadband ISDN and fast packet switching theory and architecture Fundamentals of Telecommunication Networks is an invaluable resource for systems developers engineers and managers responsible for dealing with telecommunications networks and systems An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department **Networking Fundamentals** Kaveh Pahlavan, Prashant Krishnamurthy, 2009-04-20 Focusing on the physical layer Networking Fundamentals provides essential information on networking technologies that are used in both wired and wireless networks designed for local area networks LANs and wide area networks WANs The book starts with an overview of telecommunications followed by four parts each including several chapters Part I explains the principles of design and analysis of information networks at the lowest layers It concentrates on the characteristics of the transmission media applied transmission and coding and medium access control Parts II and III are devoted to detailed descriptions of important WANs and LANs respectively with Part II describing the wired Ethernet and Internet as well as cellular networks while Part III covers popular wired LANs and wireless LANs WLANs as well as wireless personal area network WPAN technologies Part IV concludes by examining security localization and sensor networking The partitioned structure of the book allows flexibility in teaching the material encouraging the reader to grasp the more simple concepts and to build on these foundations when moving onto more complex information Networking Fundamentals contains numerous illustrations case studies and tables to supplement the text as well as exercises with solutions at the end of each chapter There is also a companion website with password protected solutions manual for instructors along with other useful resources Provides a unique holistic approach covering wireless communication

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substantial engineering. In engineering efforts, a sense of community with the others and some sense of stability when in a dynamic state or a stationary state are useful. The more frequent situation is the case in which this nesting environment is formed by organizations located in a common region although geography is not a major facet when cooperation is supported by computer networks.

Telecommunications John D. Spragins, Joseph L. Hammond, Krzysztof Pawlikowski, 1991. This book explores a wide variety of problems encountered in designing computer communications networks and presents the common techniques to solve them. The emphasis is on basic principles and motivations for design. To demonstrate the practical application of the concepts, eight telecommunication architectures are considered at length.

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