1. Introduction


2. Electron Emission

Electron emission—Types of electron emission—Thermionic emission—Thermionic emitter—Commonly used thermionic emitters—Cathode construction—Field emission—Secondary emission—Photo electric emission.

3. Gas-Filled Tubes

Gas-filled tubes—Conduction in a gas—Cold-cathode gas diode—Characteristics of cold-cathode diode—Applications of glow tubes—Hot-cathode gas diode—Thyratron—Applications of Thyratron.
4. Atomic Structure 48—54
Bohr's atomic model—Energy levels—Energy bands—Important energy bands in solids—Classification of solids and energy bands—Silicon.

5. Semiconductor Physics 55—75
Semiconductor—Bonds in semiconductors—Crystals—Commonly used semiconductors—Energy band description of semiconductors—Effect of temperature on semiconductors—Hole current—Intrinsic semiconductor—Extrinsic semiconductor—n-type semiconductor—p-type semiconductor—Charge on n-type and p-type semiconductors—Majority and minority carriers—pn-junction—Properties of pn-junction—Applying D.C. voltage across pn junction—Volt-ampere characteristics of pn-junction—Important terms—Limitations in the operating conditions of pn-junction.

6. Semiconductor Diode 76—124
Semiconductor diode—Crystal diode as a rectifier—Resistance of crystal Diode—Equivalent circuit of crystal diode—Crystal diode equivalent circuits—Important terms—Crystal diode rectifiers—Half-wave rectifier—Output frequency of Half-wave rectifier—Efficiency of half-wave rectifier—Full-wave rectifier—Centre-tap full-wave rectifier—Full-wave bridge rectifier—Output frequency of full-wave rectifier—Efficiency of full-wave rectifier—Faults in centre-tap full-wave rectifier—Nature of rectifier output—Ripple factor—Comparison of rectifiers—Filter circuits—Types of filter circuits—Voltage multipliers—Half-wave voltage doubler—Voltage stabilisation—Zener diode—Equivalent circuit of zener diode—Zener diode as voltage stabiliser—Solving zener diode circuits—Crystal diodes versus vacuum-diodes.

7. Special-Purpose Diodes 125—140
8. Transistors


9. Transistor Biasing

Faithful amplification—Transistor biasing—Inherent variations of transistor parameters—Stabilisation—Essentials of a transistor biasing circuit—Stability factors—Methods of transistor biasing—Base resistor method—Emitter bias circuit—Circuit analysis of emitter bias—Biasing with collector feedback resistor—Voltage divider bias method—Stability factor for potential divider bias—Design of transistor biasing circuits—Mid-point biasing—Which value of β to be used—Miscellaneous bias circuits—Silicon versus germanium—Instantaneous current and voltage waveforms—Summary of transistor bias circuits.

10. Single Stage Transistor Amplifiers

11. Multistage Transistor Amplifiers

12. Transistor Audio Power Amplifiers
Transistor audio power amplifier—Small-signal and large-signal amplifiers—Output power of amplifier—Difference between voltage and power amplifiers—Performance quantities of power amplifiers—Classification of power amplifiers—Expression for collector efficiency—Maximum collector efficiency for series-fed class A amplifier—Maximum collector efficiency of transformer coupled class A power amplifier—Important points about class A power amplifier—Thermal runaway—Heat sink—Mathematical analysis—Stages of a practical power amplifier—Driver stage—Output stage—Push pull amplifier—Maximum efficiency for class B operation—Complementary-symmetry amplifier.

13. Amplifiers With Negative Feedback

14. Sinusoidal Oscillators
Sinusoidal oscillator—Types of sinusoidal oscillations—Oscillatory circuit—Undamped oscillations from tank circuit—Positive feedback amplifier—Oscillator—Essentials of transistor oscillator—Explanation of Barkhausen criterion—Different types of transistor oscillators—Tuned collector oscillator—Colpitt's

15. Transistor Tuned Amplifiers


16. Modulation And Demodulation


17. Regulated D.C. Power Supply

18. Solid-State Switching Circuits


19. Field Effect Transistors

Types of field effect transistors—Junction field effect transistor (JFET)—Principle and working of JFET—Schematic symbol of JFET—Importance of JFET—Difference between JFET and bipolar transistor—J FET as an amplifier—Output characteristics of JFET—Salient features of JFET—Important terms—Expression for drain current—Advantages of JFET—Parameters of JFET—Relation among JFET parameters—Variation of transconductance ($g_m$ or $g_{fs}$) of JFET—JFET biasing—JFET biasing by bias battery—Self-bias for JFET—JFET with voltage-divider bias—J FET connections—Practical JFET amplifier—D.C. and A.C. equivalent circuits of JFET—D.C. load line analysis—Voltage gain of JFET amplifier (with source resistance $R_s$)—J FET applications—Metal oxide semiconductor FET (MOSFET)—Types of MOSFET—Symbols for D-MOSFET—Circuit operation of D-MOSFET—D-MOSFET transfer characteristic—Transconductance and input impedance of D-MOSFET—D-MOSFET biasing—Common source D-MOSFET—a MOSFET amplifier—D-MOSFETs versus JFETs—E-MOSFETs versa E-MOSFETs.

20. Silicon Controlled Rectifiers

Silicon Controlled rectifier (SCR)—Working of SCR—Equivalent circuit of SCR—V-I characteristics of SCR—SCR in normal operation—SCR as a switch—SCR switching—SCR half-wave rectifier—SCR full-wave rectifier—Single-phase SCR inverter circuit—Applications of SCR—Light-activated SCR.
21. Power Electronics

22. Electronic Instruments

23. Integrated Circuits
Integrated circuits-Advantages and disadvantages of integrated circuits-Inside an IC package-IC classifications-Making monolithic IC-Fabrication of components on monolithic IC-Simple monolithic ICs-IC packings-IC symbols-Scale of integration-Some circuits using ICs.

24. Hybrid Parameters
Hybrid parameters-Determination of $h$ parameters-$h$ parameter equivalent circuit-Performance of a linear circuit in $h$ parameters-The $h$ parameters of a transistor-Nomenclature for transistor $h$ parameters-Transistor circuit performance in $h$ parameters-Approximate hybrid formulas for transistor amplifier-Experimental determination of transistor $h$ parameters-Limitations of $h$ parameters.
25. Operational Amplifiers 662—728


26. Digital Electronics 729—773

Analog and digital signals—Digital circuit—Binary number system—Place value—Decimal to binary conversion—Binary to decimal conversion—Octal number system—Hexadecimal number system—Binary-coded decimal code (BCD code)—Logic gates—Three basic logic gates—OR gate—AND gate—NOT gate or inverter—Combination of basic logic gates—NAND gate as a universal gate—Exclusive OR gate—Encoders and decoders—Advantages and disadvantages of digital electronics—Boolean algebra—Boolean theorems—De Morgan’s theorems—Operator precedence—Combinational logic circuits—Boolean expressions for combinational logic circuits—AND and OR operations in Boolean expression—Truth table from logic circuit—Developing logic circuit from its Boolean expression—Sum-of-products form—Simplification of Boolean expressions—Binary addition—Electronic adders—Flip-flops.

Index 775—778

(xiv)