

AMEC14 SEMICONDUCTOR DEVICES

UNIT-1 FIELD EFFECT TRANSISTORS AMPLIFIERS

- 1.1 Advantages and Disadvantages of the FET, Basic Construction of the JFET, Characteristic Curves of the JFET, Principles of Operation of the JFET,
- 1.2 Effect of VDS on Channel Conductivity, Channel Ohmic Region and Pinch-Off Region, Characteristic Parameters of the FET, Effect of Temperature on FET,
- 1.3 Common-Source AC Amplifier, Fixed Bias with Self-Bias, The Common-Drain or Source Follower, The Common-Gate FET Amplifier,
- 1.4 Frequency Response of the FET Amplifier, Other Amplifier Configurations, Summary,

UNIT-2 MOSFETS AND OTHER APPLICATIONS OF FETS

- 2.1 The Depletion MOSFET, The Enhancement MOSFET, Differences Between JFETs and MOSFETs, Handling Precautions for MOSFETs, Dual-Gate MOSFETs,
- 2.2 Integral Gate Protection, Testing Field-Effect Transistors, Application of a Dual-Gate MOSFET in an AGC Amplifier,
- 2.3 Other Applications of FETs, The Field-Effect Diode, Summary

UNIT-3 LINEAR INTEGRATED CIRCUITS: OPERATIONAL AMPLIFIERS

- 3.1 The Operational Amplifier, The Inverting Differential Operational Amplifier, Analog Computer Solution of Linear Equations,
- 3.2 Increasing Input Impedance in an Inverting Amplifier, The Non-inverting Differential Operational Amplifier,
- 3.3 The Differential Amplifier A General Purpose IC Operational Amplifier, Common-Mode Rejection Ratio, Emitter Coupled Differential Amplifier,
- 3.4 High-Performance Operational Amplifier, Increased Differential Input Impedance,
- 3.5 Applications of Differential Operational Amplifiers, IC Audio Power Amplifier, Summary.

UNIT-4 AN INTRODUCTION TO THE FABRICATION OF INTEGRATED CIRCUITS

- 4.1 Evolution of Integrated Circuits, The Monolithic Integrated Circuit, Integrated Circuit Components, Methods of Fabricating Integrated Circuits,
- 4.2 Complementary Symmetry MOS Integrated Circuit COS/MOS, Large-Scale Integration (LSI), Summary.

UNIT-5 NON LINEAR INTEGRATED CIRCUITS I: COMBINATIONAL DIGITAL CIRCUITS

- 5.1 The Binary Concept, Basic Logic Gates, De Morgan's Law, NAND and NOR Logic Gates Comparison of Logic Families,
- 5.2 Implementing Logic Circuits with NAND-NOR Gates, the Meaning of Logic Implementation, Summary.

UNIT-6 NONLINEAR INTEGRATED CIRCUITS II: SEQUENTIAL DIGITAL CIRCUITS

- 6.1 The Basic R-S Flip-Flop , Clock Pulses , The Clocked R-S Flip-Flop, The Clocked J-K Flip-Flop DTL, TTL ,The Clocked J-K Flip-Flop RTL ,
- 6.2 Other Types of Flip-Flops , Clock Pulse Requirements , The Monostable Multivibrator (One-Shot) , The Schmitt Trigger,
- 6.3 Applications of Flip-Flops in Binary Counters, Some Basic Applications of Counters, Summary.

UNIT-7 HIGH VOLTAGE AND MAGNETIC MEASUREMENTS, TESTING OPTOELECTRONIC DEVICES

- 7.1 Fundamentals of Light, Photoconductive Sensors, Applications of Photodiodes and Phototransistors, Photovoltaic Sensors, Photo emissive Sensors, Light Emitters, Alpha Numeric Displays, Photo couplers, Summary.

UNIT-8 THYRISTORS AND THE UNIUNCTION TRANSISTOR

- 8.1 The Silicon Controlled Rectifier (SCR), The Triac, Triggering Devices, Typical Diac-Triac Phase-Control Circuit, The Unijunction Transistor (UJT), Summary.

UNIT-9 BASIC CHARACTERISTICS OF THE TRIODE AMPLIFIER

- 9.1 Triode Construction, Triode Characteristics, Tube Properties, Relationship Between μ , m_p gr, Permissible Area of Operation, Operation of the Triode as a DC Amplifier,
- 9.2 Theory of Operation of an AC Amplifier: Bias, Gain of an AC Amplifier, Maximum Output Voltage Available from an Amplifier, Use of a Blocking Capacitor,
- 9.3 Equivalent Circuit for a Small Signal AC Amplifier Grounded Cathode, Summary.

UNIT-10 ANALYSIS OF CLASS A TRIODE AMPLIFIERS

- 10.1 Evolution of Self Bias, Bypass Capacitor, Grid-Leak Resistor, Determination of Operating Point, Bias Line, AC Load Line, Effect of an AC Load,
- 10.2 Effect of Coupling Capacitor, Performance Calculations for a Class A Triode Amplifier, Other Amplifier Configurations, Cathode Follower, Grounded-Grid Amplifier, and Summary.

Reference Books:

1. Complete Guide to Semiconductor Devices by Kwok K Ng
2. Communication Systems by Simon Haykin
3. Optical Fibre Communication by Kaiser