AME14 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 No 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 UNIJUNCTION 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, mp 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