AMHE06 ELECTRONICS CIRCUITS

UNIT-1 SEMICONDUCTOR DIODES

1.1 Introduction, Semiconductor materials, covalent bond and intrinsic materials,
1.2 Energy levels, extrinsic materials:
1.3 p-type and n-type semiconductors, semiconductor diodes, ideal versus practical diodes,
1.4 Resistance levels, diode equivalent circuits, transition and diffusion capacitance,
1.5 Reverse recovery time, diode specification sheet, zener diode, Light Emitting diode,
1.6 Tunnel diode, schottky diode, varicap diode

UNIT-2 DIODE CIRCUITS INTRODUCTION

2.1 Load –line Analysis, Series Diode configuration,
2.2 Parallel and series-parallel configurations,
2.3 Typical diode circuits, Half-wave & Full wave rectifier, Clippers, Clampers,
2.4 Zener Diode as voltage regulators, Voltage multiplier circuits,
2.5 Practical Applications of diode circuits

UNIT-3 BIPOLAR JUNCTION TRANSISTOR

3.1 Transistor construction, Operation, Common-base configuration & characteristic,
3.2 Transistor Amplifying action, Common-Emitter configuration & characteristic,
3.3 Common collector configuration & characteristic,
3.4 Limits of operation, study of Transistor data sheet

UNIT-4 DC-BIASING OF BIPOLAR JUNCTION TRANSISTORS

4.1 Operating point, Fixed biased configuration, Emitter-bias configuration,
4.2 Voltage divider bias configuration, collector feedback configuration,
4.3 Emitter follower configuration, Miscellaneous configuration,
4.4 Design operations, current mirror circuits, current source circuits, PNP transistors,
4.5 Transistor switching networks, bias stabilization of transistors, Practical applications

UNIT-5 AC ANALYSIS OF BIPOLAR JUNCTION TRANSISTORS

5.1 Application in AC domain, BJT Transistor modeling,
5.2 Re Transistor model of Common-Emitter fixed bias configuration, voltage divider bias,
5.3 CE emitter-bias, Emitter follower,
5.4 Common-base, Collector feedback , Collector DC feedback configuration,
5.5 Current gain, effect of RL and RS Two port System Approach, cascaded systems,
5.6 Darlington connection, Feedback pair, Hybrid equivalent model,
5.7 Approximate hybrid equivalent circuits, Hybrid π model, Practical Applications.

UNIT-6 MOS FIELD-EFFECT TRANSISTORS

6.1 Device Structure and Physical Operation, Current-Voltage Characteristics,
6.2 MOSFET Circuits at DC, The MOSFET as an Amplifier and as a Switch,
6.3 Biasing in MOS Amplifier Circuits, Small Signal Operation and Models,

6.4 Single-Stage MOS Amplifiers,
6.5 The Depletion-Type MOSFET, JFET -construction, operation and characteristics

UNIT-7 FREQUENCY ANALYSIS OF BJT AND FET

7.1 Decibels, general frequency consideration, Normalized Process,
7.2 Low Frequency analysis of BJT and FET, Miller effect capacitance,
7.3 High frequency response of BJT and FET, Square wave testing

UNIT-8 POWER AMPLIFIERS

8.1 Introduction, series –fed Class A amplifier,
8.2 Transformer-Coupled Class A amplifier,
8.3 Class B amplifier operation, Class B amplifier circuits,
8.4 Amplifier distortion, Class C and Class D amplifier,
8.5 Heat sink and its operation

Reference Books:

1. Sedra, Smith, 'Microelectronic Circuits', Oxford University Press, fifth edition, 2004.
2. Paul Horowitz and Winfield Hill, 'The art of electronics', Cambridge university press, third edition, 2011.