

2.8 30302 ELECTRICAL DEVICE AND CIRCUIT

UNIT-1 VACUUM TUBES:

- 1.1 Types of emissions.
- 1.2 Brief idea of construction, characteristics, working and applications of
 - 1.2.1 Diode Valve.
 - 1.2.2 Triode Valve.
 - 1.2.3 Tetrode Valve.
 - 1.2.4 Pentode Valve.
 - 1.2.5 Photo Tube.

UNIT-2 SEMICONDUCTOR AND PN JUNCTION:

- 2.1 Metal, non metals and semiconductors and their Energy Band Diagram.
- 2.2 Intrinsic and Extrinsic Semiconductors.
- 2.3 Effect of temperature on extrinsic semiconductor
- 2.4 Energy band diagram of extrinsic semiconductor
- 2.5 Fermi Level and fermidirac distribution
- 2.6 Drift and diffusion current
- 2.7 Hall effect
- 2.8 P-N Junction Diode
 - 2.8.1 Space charge region, Barrier potential and effect of temperature
 - 2.8.2 Energy band diagram
 - 2.8.3 Biasing of diode.
 - 2.8.4 V-I characteristics
 - 2.8.5 Static and dynamic resistance
 - 2.8.6 Transition and diffusion capacitance
 - 2.8.7 Zenner and Avalanche breakdown
- 2.9 Working, characteristics and application of
 - 2.9.1 Tunnel diode
 - 2.9.2 Zener diode
 - 2.9.3 Varactor diode
 - 2.9.4 Photo diode
 - 2.9.5 Light emitting diode (LED)
- 2.10 Photo conductors
- 2.11 Cds photo conductive cells and photo voltaic cell.

UNIT-3 BIPOLAR JUNCTION TRANSISTOR (BJT):

- 3.1 Constructional details of PNP and NPN transistors
- 3.2 Working of a transistor
 - 3.2.1 Charge transport phenomenon
 - 3.2.2 Transistor amplifying action
 - 3.2.3 Relation between different currents in a transistor

- 3.2.4 Simple problems
- 3.3 Configuration of transistor (CB, CE and CC)
- 3.4 Behavior of BJT in Active, Cut off and Saturation regions
 - 3.4.1 Transistor as a switch
 - 3.4.2 Transistor as an amplifier

UNIT-4 TRANSISTOR BIASING AND BIAS STABILITY:

- 4.1 D.C. and A.C. Load line.
- 4.2 Operating point and its stability
- 4.3 Factors affecting bias stability
- 4.4 Stability factors
- 4.5 Bias stabilization
- 4.6 Calculation of operating point and stability factor for
 - 4.6.1 Fixed Bias Circuit.
 - 4.6.2 Collector to base biasing.
 - 4.6.3 Voltage Divider biasing (Self bias)
- 4.7 Bias Compensation techniques using
 - 4.7.1 Diode.
 - 4.7.2 Thermistor and Sensistor.
- 4.8 Thermal stability and Thermal runaway

UNIT-5 SMALL SIGNAL TRANSISTOR AMPLIFIER:

- 5.1 CB, CE and CC amplifier and their low frequency small signal equivalent circuit using hybrid parameters.
- 5.2 Calculation of voltage gain, current gain, input impedance, output impedance and power gain for resistive loads. (A_v , A_i , Z_i , Z_o , A_{vs} , A_{is} , and A_p)
- 5.3 Analysis of emitter follower circuit
- 5.4 Approximate analysis of CE amplifier with and without RE, Emitter follower circuits
- 5.5. Classification of amplifiers

UNIT-6 FIELD EFFECT TRANSISTOR:

- 6.1 Construction, operation and characteristics of JFET, E and D MOSFET
- 6.2 Biasing of FET
- 6.3 Small signal model of JFET
- 6.4 Terminology used with JFET
- 6.5 Precaution for handling of MOSFETs

UNIT-7 RECTIFIERS AND POWER SUPPLIES:

- 7.1 Working of rectifiers
 - 7.1.1 Half wave rectifier
 - 7.1.2 Centre tap full wave rectifier
 - 7.1.3 Bridge rectifier
- 7.2 Analysis of rectifiers (for all type)

- 7.2.1 Calculations for average and RMS values
- 7.2.2 PIV of diodes
- 7.2.3 Ripple factor
- 7.2.4 Regulation and efficiency
- 7.3 Calculation of ripple factor and working of following filters:
 - 7.3.1 Capacitance filter
 - 7.3.2 Inductance filter
 - 7.3.3 L-C and p (Pie) filters
- 7.4 Voltage Multipliers
- 7.5 Regulated power supply using zener diode
 - 7.5.1 Simple problems on zener regulator.

Reference Books:

1. Electronic Devices & Circuits Millman & Halkias
2. Electronic Devices & Circuits G.K. Mittal
3. Electronic Devices & Circuits A.Mottershed
4. Functional Electronics K.V. Ramanan
5. Electronic Devices & Circuits Mathur, Kulshrestha & Chadda
6. Electronic Devices & Circuits Sanjeev Gupta

