Subject Code : SELA

PAPER - I : SEMICONDUCTOR DEVICES AND ELECTRONIC CIRCUITS – I

Unit I - DIODES

PN Junction theory – V- I characteristics of a PN junction diode – forward and reverse – diode current equation – Effect of temperature – The Ideal diode – static and dynamic resistance – real diode – power ratings. Zener diode characteristics – specification – equivalent circuit, Tunnel diode – varactor diode, Schottky diode – step recovery diode – PIN diode, LED, LCD, Photodiodes.

Unit II - BJT AND ITS BIASING

Transistor – Basic ideas – characteristics (CB,CE,CC) – DC load line – stability factor – methods of transistor biasing – base bias – Base bias with emitter feedback – Base bias with collector feedback – voltage divider bias – Emitter bias – stability factor of different biasing methods.

Unit III – RECTIFIERS, FILTERS AND POWER SUPPLIES

Half wave rectifier – full wave rectifier – Bridge rectifier – Average values of voltage and current –peak inverse voltage – Frequency of output – ripple factor – efficiency – comparison. Filters – Inductor filter – capacitor filter – LC filter – Pi-filter – voltage regulator – voltage regulation – Zener diode regulator – Transistor series and shunt regulator.

Unit IV – TRANSISTOR MODELS AND AMPLIFIER

Notations – Ebers Moll model of a transistor – Approximate and accurate model – CE configuration – Low frequency small signal model. Transistor as an amplifier, CE amplifier – AC load analysis – CE amplifier – Parameters – Gain stability – Swamped amplifiers and parameters – CB amplifier – CC amplifier.

Unit V – JFETs AND MOSFETs

Introduction – JFET – formation of depletion region, operation – characteristics – Effect of gate to source voltage – parameters – expression for transconductance – comparision of FET and BJT – MOSFETs – depletion and enhancement type – working – characteristics – circuit symbol – MOSFET as a resistor. Biasing the JFET – gate bias self-bias – setting Q point – DC load line – voltage divider bias – Biasing the depletion and enhancement type MOSFET.

Books for Study :

1. Sedha, R.S., A Text book of Applied Electronics. (2nd Edn) (New Delhi : S.Chand & Co. 1999)

Books for Reference:

1. Malvino, A.P. Electronic Principles (5th edn) (New Delhi : Tata McGraw Hill, 1997)
2. Theraja, B.L. and Theraja, A.K. : Electronics Devices & Circuits (1st edn) (New Delhi : S.Chand & Co., 1999)