

Core theory course (Disciplinary)

CPH-702: SOLID STATE PHYSICS-II AND ELECTRONICS-II

UNIT- I

Imperfections in Crystals:

Point Imperfections, Line Imperfections: Dislocations, Stress fields of Dislocations, Planar Imperfections: grain boundaries, Role of dislocation in Crystal growth, Strength of alloys.

UNIT- II

Magnetism:

Diamagnetism, Paramagnetism, Magnetic resonance: ESR, NMR, Spin relaxation, Weiss theory of Ferromagnetism, The exchange interaction, The Heisenberg model, Ferromagnetic domains: The Bloch wall, Origin of domains, Neel model of Anti ferromagnetism, Neel model of Ferrimagnetism, Spin waves: Magnons in Ferromagnets, The Bloch $T^{3/2}$ law, Magnons in antiferromagnets.

Basic Reference:

Elements of Solidstate Physics by J.P Srivastava, PHI-New Delhi. (For U-I&II)

UNIT- III

FET Amplifiers:

FET parameters, biasing the FET , basic FET amplifier, FET small signal, common source amplifier, The common drain or source follower, common gate amplifier, general treatment of low frequency common source and common drain amplifier.

Basic reference:

Handbook of Electronics 30th revised edition 2002 by Gupta and Kumar (P. P. M) Chapter: 13

Power supplies (Electronic regulation):

Basic blocks of linear voltage regulation, Basic voltage regulation building blocks, protection circuitry, Adjustable type 723 regulator, Typical regulator circuit using 723 IC , Three terminal voltage regulator, General feature, Threeterminal fixed voltage regulator ICs, and their design

Basic reference:

Integrated circuits 9th Edition First Print 1997 By K.R.Botkar, Khanna Publishers Delhi.

UNIT-IV

Tuned voltage amplifiers:

Introduction , Tuned amplifiers, Resonance, Series resonant circuit, Parallel resonant circuit, Advantage of tuned amplifiers, voltage gain and Frequency response curve, Doubled tuned voltage amplifiers.

Basic reference:

Electronic & radio engineering 9th Edition reprint 2002 by M.L.Gupta(D R publi-Shers co.)

IC Fabrication:

IC Technology, Advantages and limitations of ICs, Basic monolithic IC technology, Basic processes used in monolithic technology, Monolithic integrated components, Transistors of monolithic ICs, Monolithic diodes.

Basic reference :

Handbook of Electronics by Gupta and Kumar, Pragati prakashan, Meerut,30th revised edition 2002.

Other references :

1. Introduction to Solid state Physics by Kittel C.,Wiley Eastern
2. Fundamentals of Solid State Physics by Saxena,- Gupta- Saxena, Pragati Prakashan
3. Integrated Electronics by Milmann and Halkais
4. Electronic devices and circuits by Y.N.Bapat