

B.SC. PHYSICS

SEMESTER – V

ELECTIVE II - SOLID STATE PHYSICS

IT I : CRYSTAL STRUCTURE

Crystal lattice - primitive and unit cell – crystal systems – Bravais lattice - Miller indices – Structure of Crystal - Simple Cubic, Body Centered Cubic, Face Centered Cubic and Hexagonal Close Packed structure, Sodium chloride structure, Zinc blende structure and Diamond structure.

IT II : CRYSTALLOGRAPHY AND CRYSTAL IMPERFECTIONS

X ray Spectrum - Moseley's law - diffraction of X-rays by crystals -Bragg's law in one dimension - Experimental method in X-ray diffraction – Laue's method, rotating crystal method – powder photograph method - point defects – line, surface and volume defects- effects of crystal imperfections.

IT III : MAGNETIC PROPERTIES

Different types of magnetic materials (dia- , para- , ferro – and antiferro) – Langevin's theory of diamagnetism - Langevin's theory of paramagnetism - Weiss theory of paramagnetism - quantum theory of ferromagnetism - ferrites - general properties of superconductors –type I & type II superconductors.

IT IV : DIELECTRIC PROPERTIES

Fundamental definition in dielectrics - different types of electric polarization - frequency and temperature effects on polarization -dielectric loss - Claussius - Mosotti relation - determination of dielectric constant - dielectric breakdown - properties of different types of insulating materials.

IT - V: MODERN ENGINEERING MATERIALS

Polymers - ceramics - super strong materials – cermets– high temperature materials – thermoelectric materials - electrets – nuclear engineering materials – plastics - metallic glasses - optical materials -fiber optic materials & uses.

OKS FOR STUDY:

- C. Kittel, Introduction to Solid State Physics, John Wiley (2004)
- M. Arumugam, Material Science, Anuradha Agencies, (2004)
- G. Vijayakumari, Engineering Physics, Vikas Publications
- Hugh D. Young and Roger A. Freedman, Sears & Zemansky's University Physics with?
- 14th Edition (2015)

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OKS FOR REFERENCE:

- Raghavan, Materials Science and Engineering, (2004).
- Azaroff, Introduction to Solids, (2004).
- A.J. Decker, Solid State Physics, (2004).