

# AMI09 ELECTRICAL & ELECTRONICS ENGINEERING MATERIALS

## UNIT-1 ATOMIC BONDING

- 1.1 Crystallinity, Miller Indices, X-ray crystallography,
- 1.2 Structural imperfections, crystal growth.
- 1.3 Free electron theory of metals, factors affecting electric conductivity of metals,
- 1.4 Thermal conductivity of metals, heat developed in current Carrying conductors,
- 1.5 Thermos electric effect, super conductivity

## UNIT-2 POLARIZATION MECHANISM AND DIELECTRIC CONSTANT

- 2.1 Behavior of polarization under impulse and frequency switching,
- 2.2 Dielectric loss, spontaneous polarization, piezoelectric effect.
- 2.3 Origin of permanent magnetic dipoles in materials,
- 2.4 Classifications, diamagnetism, paramagnetism, ferromagnetism,
- 2.5 Magnetic Anisotropy magnetostriction.

## UNIT-3 ENERGY BAND THEORY

- 3.1 Classification of materials using energy band theory,
- 3.2 Hall Effect, drift and diffusion currents, continuity equation,
- 3.3 P-N diode, volt-amp equation and its temperature dependence.
- 3.4 Properties and applications of electrical conducting,
- 3.5 Semiconducting, insulating and magnetic materials

## UNIT IV SPECIAL PURPOSE MATERIALS

- 1.1 Nickel iron alloys, high frequency materials, permanent magnet materials,
- 1.2 Feebly magnetic materials, Ageing of a permanent magnet,
- 1.3 Effect of impurities, Losses in Magnetic materials

### Reference Books:

1. Ian P. Hones, 'Material Science for Electrical & Electronics Engineers', Oxford University Press
2. K. M. Gupta – Electrical Engineering Materials, Umesh Publication, 2nd edition 2003