

Applied Physics – I

F.E. Sem. I

EVALUATION SYSTEM

	Time	Marks
Theory Exam	2 Hrs.	75
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	25

SYLLABUS

1. Crystallography & X-rays :

- Lattice, basis, crystal axes, unit cells, lattice parameters & crystal systems, SC, BCC, FCC, diamond, NaCl, zinc blend and HCP crystal structures, Miller indices, planes & directions, Liquid crystals & phases, LCD display & its specifications.
- X-rays – origin of x-rays and x-ray spectra, x-ray diffraction & Bragg's law and determination of crystal structure.
- Real crystals – Crystal imperfections, point defects and dislocations.

2. Physics of Semiconductors :

- Classification of solids, Fermi–Dirac statistics, concept of Fermi level and its variation with temperature, impurity and applied voltage.
- Intrinsic and extrinsic carrier concentrations, carrier drift, mobility, resistivity and Hall effect, carrier diffusion, Einstein's relations, current density and continuity equations.
- Energy band diagrams of p–n junction, formation of depletion region, derivation for depletion layer width.

3. Super conductivity :

- Critical temperature, Critical magnetic field, Type I Type II super conductors, high T_c super conductors.
- Meissner effect, Josephson effect.
- SQUIDS, plasma confinement, Maglev.

4. Acoustics :

- Acoustics of Building, Absorption, Importance of Reverberation Time, Units of Loudness, Decibel, Phon.
- Conditions for Good Acoustics methods of Designs for Good Acoustics, Determination of Absorption coefficient, Noise Pollution.

5. Ultrasonics :

- Principles of production, piezoelectric and magnetostriction effect.
- Piezoelectric and magnetostriction oscillator; ultrasonic materials – quartz and ferroelectric materials, cavitation effect.
- Applications based on cavitation effect and echo sounding, ultrasonic imaging and medical diagnosis.

6. Electron optics :

- Electrostatic and Magnetostatic focusing system.
 - Construction and working of CRT, CRO and its applications.
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Reference:

1. Solid State Physics – (*Charles Kittel*), EEE Pbl.
2. Physics of Semiconductors – (*S.M. Sze*), Wiley Eastern
3. Engineering Physics – (*Gaur & Gupta*), Dhanpat Rai & Co.
4. A textbook of Engineering Physics – (*Kshirsagar & Avadhanulu*), S. Chand Pbl.
5. Modern Engineering Physics – (*Vasudeva*), S. Chand Pbl.
6. Concepts of Modern Physics – (*Arther Beiser*), Tata Mcgraw Hill.

