Applied Physics

Important Questions

Unit-1

1. Describe the interference in thin film due to reflection.
2. Explain Newton rings experiment with necessary theory to determine wavelength of monochromatic light.
3. Explain Fraunhofer diffraction due to single slit and give its intensity distribution.
4. Explain Polarization of light due to double refraction.
5. Describe the construction and working of Nicol's prism.

Unit-2

1. Derive the expression for electronic polarizability.
2. Determine the expression for internal field in a solid dielectric. Express Claussius Mosotti equation.
3. Describe the hysteresis loop exhibited by ferromagnetic materials.
4. Write a short note on ferrites.
5. Distinguish between hard and soft magnetic materials.

Unit-3

1. Explain divergence and curl. Give their physical significance.
2. Express Maxwell's equations and give their physical significance.
3. State and prove Poynting theorem. Express Poynting vector.
4. Describe the propagation of electromagnetic waves in an optical fiber.
5. Explain acceptance angle and derive the expression for numerical aperture of an optical fiber.
6. Classify optical fibers based on their refractive index profile.
7. Explain fiber optics communication system.
8. Explain how Optical fiber can be used as temperature sensor.

Unit-4

1. Give the classification of solids based on energy bands.
2. Derive the expression for electron density in the conduction band of an intrinsic semiconductor.
3. What is Fermi energy? Explain the variation of Fermi level with temperature in an intrinsic semiconductor.
4. Describe the dependance of Fermi energy on concentration in N type and P type semiconductors.
5. Explain Hall effect and Hall coefficient. Give its applications.
6. List some applications of semiconductors.

Unit-5

1. Explain Meissner effect.
2. Distinguish between Type I and Type II superconductors.
3. Explain dc Josephson and ac Josephson effect.
4. Give some applications of superconductors. (Importantly- SQUIDS)
5. Explain why nanomaterials exhibit different properties.
6. Explain the preparation of nanomaterials by Ball Milling method (Top down technique).
7. Explain the preparation of nanomaterials by Sol gel method (Bottom up technique)
8. What are CNTs . Give their properties and applications.
9. Describe some applications of nanomaterials.

Note:

Numericals Examples on:

Unit 1- Interference and Diffraction of light.

Unit 2- Electronic polarizability, magnetic permeability and susceptibility

Unit 3- Numerical aperture

Unit 4- Intrinsic concentration , electron density, Hall effect.