

PH2111 – ENGINEERING PHYSICS – I

UNIT – I CRYSTAL PHYSICS

1. Define the term Coordination number, Atomic radius and Packing factor. Determine the Coordination number, Atomic radius and Packing factor for Simple Cubic (SC) & Body Centered Cubic (BCC) Structures (or) Calculate the parameters of Simple Cubic (SC) & Body Centered Cubic (BCC) Structures.
2. Determine the Coordination number, Atomic radius and Packing factor for Face Centered Cubic (FCC) Structure (or) Calculate the parameters of Face Centered Cubic (FCC) Structure.
3. Determine the Coordination number, Atomic radius and Packing factor for Hexagonally Closely Packed (HCP) Structure (or) Calculate the parameters of Hexagonally Closely Packed (HCP) Structure.
4. Derive an expression for the interplanar spacing for (hkl) planes of a cubic structure.
5. What is meant by Crystal defects? Describe in detail the Point, Line and Surface defects.

UNIT – II PROPERTIES OF MATTER AND THERMAL PHYSICS

1. Obtain an expression for the depression at the loaded end of a cantiliver.
2. Derive an expression for the internal bending moment of a beam on terms of radius of curvature.
3. Derive an expression for the amount of linear heat flow through a rod.
4. Describe a method of finding thermal conductivity of a cardboard and rubber.

UNIT – III QUANTUM PHYSICS

5. Based on quantum concepts derive the Planck's radiation formula.
6. Discuss Compton Effect and derive the expression for Compton Shift.
7. Derive Schroedinger time dependent and the time independent wave equations.
8. Apply Schroedinger wave equation to a particle in one dimensional box and calculate the eigen value and eigen function.
9. Based on quantum concepts derive the Planck's radiation formula.
10. Discuss Compton Effect and derive the expression for Compton Shift.
11. Derive Schroedinger time dependent and the time independent wave equations.
12. Apply Schroedinger wave equation to a particle in one dimensional box and calculate the eigen value and eigen function.

UNIT – IV ULTRASONICS AND ACOUSTICS

1. Define Magnetostriction Effect. Explain how ultrasonic waves can be produced by using Magnetostriction Oscillator.
2. Describe the Principle, construction and working of the Piezoelectric Oscillator for producing ultrasonic waves.
3. What is acoustic grating? With a neat diagram, explain the theory and use of it to determine the ultrasonic velocity in a liquid.
4. Draw a block diagram of ultrasonic flaw detector. Describe the working of ultrasonic flaw detector for non-destructive testing by reflection mode.
5. Derive Sabine's formula.

UNIT – V PHOTONICS AND FIBRE OPTICS

PHOTONICS

1. For atomic transitions, derive Einstein relations and hence derive the expressions for the ratio of spontaneous emission rate to the stimulated emission rate.
2. Describe the construction and working of Nd-YAG Laser with energy level diagram.
3. Describe the vibrational modes of CO₂ molecule. Describe the construction and working of CO₂ Laser with energy level diagram.

FIBRE OPTICS

1. Derive an expression for numerical aperture and acceptance angle of an optical fiber.

2. Describe the classification of optical fibers based on materials, propagation modes and refractive index profile.
3. Explain the working of optical fiber communication system using block diagram.
4. Give an account of fiber optic temperature sensor and fiber optic displacement sensor.

THERE IS NO SUBSTITUTE FOR HARD WORK

ALL THE BEST