PH 8151 ENGINEERING PHYSICS

Important 13mark questions

Unit I

1. Derive an expression for the rigidity modulus using torsion pendulum.
2. Compare uniform and non-uniform bending.
3. Appraise the properties and applications of I shape griders.
4. Derive an expression for couple per unit twist for a cylinder.
5. Show that it is higher for a hollow cylinder made of the same material, mass and length.

Unit II

1. Derive the equation of motion. With appropriate figures.
2. Demonstrate the working of any one type of fiber optic pressure sensor.
3. Derive an expression for Acceptance angle and Numerical aperture of an optical fiber. Bring out the differences between step index and graded index fiber.
4. Derive Einstein's relations for spontaneous and stimulated emission of radiation.
5. Compare a homojunction semiconductor laser with a hetero junction semiconductor laser and detail their features.

Unit III

1. With a neat sketch, explain the Forbe's method of thermal conductivity determination.
2. Compare the thermal expansion in solids and liquids.
3. How will you determine the thermal conductivity of a poor conductor using Lee's disc method. Give the necessary theory.
4. How are heat exchangers helpful in refrigerators of the surroundings is 32^0 C?
5. Relate the linear and volume thermal expansion coefficients for an isotropic solid.

Unit IV

1. Derive the time-independent and time dependent Schrodinger wave equations.
2. Derive an expression for black body radiation using Planck's theory of radiation.
3. What is Compton effect? Give the theory of Compton effect and show that the Compton shift. $\lambda' - \lambda = \frac{h}{m_0 c}(1 - cos\theta)$
4. Derive an equation for Plank's quantum theory of radiation.
5. What are the draw backs of classical free electron theory? Derive Schroedinger time dependent and time independent wave equations.

Unit V

1. Derive the packing factor for HCP, SC, BCC, and FCC.
2. Describe the steps to determine Miller indices and also mention its importance.
3. Write a note on point imperfections in crystals. Discuss in detail a suitable method to grow single crystal of semiconducting materials.
4. Explain any one experimental method of growing single crystal.
5. Explain various crystal systems with neat diagrams.