

PH 8151 Engineering Physics-I

Important 13mark questions

Unit -I

1. What is torsion pendulum? Explain how it is used to determine the moment of inertia and rigidity modulus of the material of a thin wire?
2. Give the theory and experimental method of finding Young's modulus of a cantilever?
3. Describe Stokes' method of determining the coefficient of viscosity of a transparent, high viscous liquid?
4. Derive an expression for the deflection produced at the free end of a rectangular cantilever subjected to point load at free end. What will be the deflection produced at the free end, with same load if the cantilever is of circular cross section?
5. What is uniform bending? Derive an expression for the elevation at the centre of a beam which is loaded at both ends. Describe an experiment to determine young's modulus of a beam by uniform bending?

Unit -II

1. Define damped oscillation. Derive the differential equation of damped oscillation and give its general solution?
2. With suitable diagram explain the construction and working of homojunction Ga-As laser?
3. How are fibres classified? Explain the classification in detail?
4. What are the different types of fibre optic sensors? Explain the working of any two sensors?
5. For atomic transitions, derive Einstein relations and hence deduce the expressions for the ratio of spontaneous emission rate and stimulated emission rate?

Unit -III

1. Describe with theory Lee's disc method of determination of thermal conductivity of a bad conductor?
2. Derive an expression for the heat conduction through a compound made of two layers when bodies in series and parallel?

3. Write short note on expansion joints and bimetallic strips?
4. Derive an expression for the flow of heat through the compound media?
5. Explain the concept of thermal insulation. What is solar power? Describe the working of solar water heater?

Unit-IV

1. Solve Schrodinger wave equation for a particle in a one- dimensional box. Sketch the wave function and probability distribution function of the particle?
2. Explain with a neat diagram the working of scanning tunnelling microscope?
3. Obtain the eigen value and eigen function for an electron enclosed in a one- dimensional potential box?
4. Explain Planck's quantum hypothesis?
5. Calculate the minimum energy an electron can possess in an infinitely deep potential well of width 4 nm.

Unit-V

1. Explain Czochralski method of growing crystal. Mention the merits and demerits?
2. Explain any two crystal growing techniques?
3. Describe any one method of growing single crystal from melt along with advantages and limitations of the method?
4. Define the terms atomic radius packing factor. Calculate the above for SC, BCC and FCC structures?
5. What are miller indices? Explain how they are determined?