Code No: NR10153

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I B.Tech Supplementary Examinations, June 2005
E N G I N E E R I N G P H Y S I CS
(For 2000 batch only)
(Civil Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Derive an expression for one dimensional wave equation for transverse waves.

   (b) What are Damped vibrations and discuss in detail about the different cases.

2. (a) What is diffraction. Explain the diffraction due to multiple slits and explain how a plane transmission grating can be used to determine the wavelengths of spectral lines.

   (b) The sodium yellow light of λ =5893 A^0 is a doublet of $6A^0$ width. What is the minimum number of lines of grating should have to resolve this doublet in the third order spectrum.

3. (a) Describe the construction and working of He-Ne laser with energy diagram.

   (b) Derive an expression for the Neumerical Aperture for an optical fiber.

   (c) A silica optical fiber has a cose refractive index of 1.59 and a cladding refractive index of 1.47. Determine

      i. the critical angle at the cose cladding interface
      ii. the N.A for the fiber and
     iii. the acceptance angle in air for the fiber.

4. (a) Derive an expression for inter planar distance 'd' for simple cubic crystal.

   (b) Define reciprocal lattice vector. Show that the reciprocal vectors of FCC lattice are the basis vectors of BCC lattice.

   (c) A BCC crystal is used to measure the wave length of some X-rays. The Bragg angle for reflection from (110) planes is 20.2^0. What is the wave length? The lattice parameters of the crystal is 3.15 A^0.

5. (a) Show that the specific heat of a solid is directly proportional to T^3 on the basis of Debye theory.

   (b) Define creep and explain the creep curve in detail.

6. (a) What is Hall effect. Define an expression for Hall coefficient.

   (b) Define Magneto resistance and explain it.

   (c) Define Thermal conductivity and obtain an expression for it. What is Widemann-Franz law.

7. (a) What are Domains? How the Hysteresis curve was explained on the basis of Domain theory?

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    (b) What are soft and Hard Magnetic materials? Discuss their properties with examples.

    (c) Define Magnetic bubble and what are their applications.

8. (a) Define ferroelectric. Explain the various structural transitions involved in Ba Tio3 crystal using its dielectric constant.

    (b) Write a note on frequency dependence of total polorizability of a Dielectric.

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