Code :R5100103

R5

B.Tech I Year (R05) Supplementary Examinations, December 2010
ENGINEERING PHYSICS
(Common to Civil Engineering and Mechanical Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

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1. (a) With ray diagram discuss the theory of thin films and the condition for constructive and destructive interference in the case of transmitted system.
   (b) Two slits separated by a distance of 0.2 mm are illuminated by a monochromatic light of wavelength 550 nm. Calculate the fringe width on a screen at distance of 1 m from the slits.
2. (a) What is meant by polarization of light?
   (b) Describe an experiment that shows light is not propagated as longitudinal waves.
   (c) What is plane of vibration?
3. (a) Explain in detail the following:
      i. Meissner effect and
      ii. Penetration depth.
   (b) What are hard and soft superconductors?
   (c) Discuss the important applications of superconductors.
4. (a) Explain the characteristics of a laser beam.
   (b) What is population inversion?
   (c) With a neat sketch explain the construction and working of a Ruby laser.
5. (a) Describe the construction of a typical optical fibre and give the dimensions of the various parts.
   (b) Define the acceptance angle and numerical aperture. Obtain an expression for the numerical aperture of an optical fibre.
   (c) Calculate the numerical aperture and acceptance angle for an optical fibre with core and cladding refractive indices being 1.48 and 1.45 respectively.
6. (a) What are paramagnetic and diamagnetic materials? Give examples.
   (b) Discuss the temperature variation of susceptibilities in paramagnetic and diamagnetic materials.
7. (a) State and explain Bragg's law.
   (b) Describe with suitable diagram, the powder method for determination of crystal structure.
   (c) A beam of X-rays of wavelength 0.071 nm is diffracted by (110) plane of rock salt with lattice constant of 0.28 nm. Find the glancing angle for the second order diffraction.
8. (a) Describe edge and screw dislocations. Draw Burgers circuit and slip planes for them.
   (b) Explain the significance of Burgers vector.

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