Code :R5100103

R5

B.Tech I Year (R05) Supplementary Examinations, May 2011
ENGINEERING PHYSICS
(Common to Civil Engineering, 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) Explain the different methods by which ultrasonics can be generated.
   (b) Discuss the important physical properties of ultrasonic waves.
   (c) The velocity of ultrasonic beam in a medium is 350 m/sec. If the frequency is 5 MHz, find wavelength of the beam.
3. (a) Define "reverberation" and "reverberation time" of a hall.
   (b) Derive Sabine's formula for reverberation time.
   (c) Find the reverberation time of a hall with dimensions 7 m length, 4 m width and 4 m height with the sound absorption coefficients: 0.30 for walls, 0.04 for ceiling and 0.10 for floor.
4. (a) Explain the characteristics of a laser beam.
   (b) Mention any two applications of laser, each in the field of scientific research, engineering and medicine.
   (c) Describe the construction and working of a Ruby laser.
5. (a) Derive expressions for numerical aperture and acceptance angle of an optical fibre.
   (b) What is the principle of optical fibre communication? Explain.
6. (a) Define magnetization and show that B = μ_0 (H + M).
   (b) Give an account of ferro-magnetic materials.
   (c) Calculate change in magnetic moment of a circulating electron in an applied field of 2 tesla acting perpendicular to the plane of the orbit.
   Given r = 5.29×10^{-11} m for the radius of the orbit.
7. (a) Sketch the planes with Miller indices (123) and (221) in the case of a simple cubic structure.
   (b) Derive Bragg's law for X-ray diffraction in crystals.
   (c) When a beam of X-rays of λ=1.8 A.U. is incident on a crystal surface, the second order maximum is obtained at a glancing angle of 15^o. Calculate the corresponding inter-planar spacing.
8. (a) Explain Schottky and Frenkel defects with the help of suitable figures.
   (b) Explain the significance of Burgers vector.

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