Code: R5100103

R05

B. Tech I Year (R05) Supplementary Examinations, May 2012

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) Define interference of light.
(b) Derive an expression for fringe width in interference pattern and show that the fringes are uniformly spaced with relevant ray diagram.
(c) 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 do you mean by polarization?
(b) Distinguish between polarized and unpolarised lights.
(c) Discuss the construction and action of Nicol prism.

3 (a) What is Meissner effect? Show that superconductors exhibit perfect diamagnetism.
(b) Describe Josephson effects.
(c) Explain the applications of Josephson effect.

4 (a) Explain the following:
(i) Life time of an energy level. (ii) Optical pumping process.
(b) Explain the need of a cavity resonator in a laser.
(c) With the help of suitable diagrams, explain the principle, construction and working of a ruby laser.

5 (a) Explain the principle behind the functioning of optical fiber.
(b) Derive expression for acceptance angle for an optical fiber. How is it related to numerical aperture?
(c) Calculate the numerical aperture and acceptance angle for an optical fiber with core and cladding refractive indices being 1.48 and 1.45 respectively.

6 (a) What is primitive cell? How does it different from unit cell?
(b) Illustrate the SC, BCC and FCC crystal structures.
(c) Derive the expression for density of the crystal in terms of lattice constant.

7 (a) What are Miller indices? How are they obtained?
(b) Derive expression for interplanar spacing between two adjacent planes of Miller indices (h, k, l) and lattice constant ‘a’.
(c) Draw the (001) and (120) planes of a cubic cell.

8 (a) Write notes on Frenkel and Schottky defects.
(b) Derive the expression for energy of formation of vacancy.

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