Code: R5100203

R05

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

APPLIED PHYSICS

(Common to EEE, ECE, CSE, EIE, BME, IT, E.Con.E, ECC & CSS)

Time: 3 hours Max Marks: 80

Answer any FIVE questions
All questions carry equal marks
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1 (a) Define coordination number, nearest neighbor distance, atomic radius and packing fraction.
(b) Obtain expressions for atomic radius and packing fraction for SC, BCC and FCC lattices.

2 (a) State and explain Bragg's law of x-ray diffraction.
(b) Explain the principle, procedure and advantages of Debye-Scherrer method of x-ray diffraction.
(c) The distance between (110) planes n a BCC structure is 0.203 nm. What is the size of the unit cell? What is the radius of the atom?

3 (a) Explain the de Broglie hypothesis.
(b) Explain the physical significance of wave function.
(c) Show that the energies of a particle in a potential box are quantized.

4 (a) Explain Fermi - Dirac distribution for electrons in a metal. Discuss its variation with temperature.
(b) Explain the terms 'Mean Free Path', 'Relaxation Time' and 'Drift Velocity' of an electron in a metal.
(c) Discuss the origin of electrical resistance in metals.

5 (a) Derive expression for internal field seen by an atom in a dielectric material.
(b) Briefly explain Ferroelectricity and Piezoelectricity.

6 (a) What is superconductivity? Discuss the parameters that destruct the superconductivity.
(b) Explain Josephson's effect of superconductivity.

7 (a) Explain the characteristic properties of laser.
(b) With the help of suitable diagrams, explain the principle, construction and working of a He – Ne laser.
(c) Mention some important applications of lasers.

8 (a) Explain the principle behind the functioning of optical fiber.
(b) Derive expression for acceptance angle of 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.

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