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Code: R7100203



B.Tech I Year (R07) Supplementary Examinations, June 2013 **APPLIED PHYSICS**

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

Time: 3 hours

Max Marks: 80

Answer any FIVE questions All questions carry equal marks

- 1. (a) Define crystal lattice, unit cell, and lattice parameter and coordination number.
 - (b) Derive an expression for the inter-planar spacing in the case of cubic structure.
 - (c) Monochromatic 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.
- 2. (a) What are the properties of matter waves? Derive an expression for de-Broglie wavelength.
 - (b) Obtain an expression for the energy of a particle in a one dimensional potential box.
- 3. (a) Define relaxation time and mean free path. Explain the salient features of classical free electron theory.
 - (b) Discuss the motion of electron in a periodic potential
- 4. (a) Explain different polarizations in dielectrics along with their frequency dependencies.
 - (b) What is ferromagnetism? Explain the hysteresis curve on the basis of domains.
 - (c) The magnetic field intensity of ferric oxide is 10^6 amp/mt. If the susceptibility of the material is 1.5×10^{-3} , calculate the magnetization of the material and the flux density.
- 5. (a) Describe drift and diffusion currents. Derive their expressions.
 - (b) What is super conductivity? Explain Meissner effect. What are the applications of super conductors?
- 6. (a) With suitable energy level diagrams, explain the principle, construction and working of a ruby laser.
 - (b) Write application of lasers in four different fields.
- 7. (a) Explain how the optical fibres are classified.
 - (b) What is holography? Explain the construction of a hologram.
 - (c) Calculate the numerical aperture and acceptance angle with core and cladding refractive indices being 1.48 and 1.45 respectively.
- 8. (a) Describe the basic principles of nanomaterials.
 - (b) What are the different fabrication methods of nanomaterials?
