Code: RR100203

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

SOLID STATE 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:
(i) Space lattice. (ii) Unit cell. (iii) Lattice parameters. (iv) Coordination number.
(b) Show that FCC is closely packed.

2 (a) What are Miller indices? Explain how they are obtained.
(b) Calculate the average energy of formation of a vacancy in a crystal and get an expression for the number of vacancies at a given temperature.

3 (a) Explain debroglie hypothesis.
(b) Find the wavelength associated with an electron rise to potential of 1600 V.
(c) Explain the physical significance of the wave function.

4 (a) Explain Claussius – Mossotti relation in dielectrics subjected to static fields.
(b) Define magnetic moment. Explain the origin of magnetic moment at the atomic level. What is a Bohr magneton?
(c) Find the relative permeability of a ferromagnetic material if a field of strength 220 A/m produces a magnetization of 3300 A/m in it.

5 (a) Distinguish between intrinsic and extrinsic impurity semiconductors.
(b) Explain hall effect and its importance.

6 (a) Distinguish between type I and type II superconductors.
(b) Explain BCS theory of superconductors.

7 (a) What are Einstein's coefficients? Derive their relationship.
(b) Explain the working of a semiconductor laser with energy band diagram.

8 (a) Explain the principle of optical fibers.
(b) Clarify different types of optical fibers.
(c) Write a note on the applications of optical fibers.

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