Roll No. Total Pages 2

42033

BT-2/M-22

SEMICONDUCTOR PHYSICS

Papcr-BS-115-A

Time Allowed : 3 Hours] [Maximum Marks : 75

Notc: Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions cany equal marks.

UNIT-I

1. (a) Explain the lattice translation vector and symmetry, operations in a crystal. 7

   (b) What do you mean by point defects.in solids? Derive an expression for concentration of J Frenkel defects in a crystal. 8

2. (a) Explain hep structure. Calculate its packing fraction. 7

   (b) Explain two-dimensional and three-dimensional Bravais lattice. \8

UNIT-II

3. (a) What are De-Broglie waves? What is the relation between De-Broglie group velocity associated with the wave packet and velocity of the particle.^ 8 *

   (b) Derive Schrodinger time independent equation for matter *waves. Give physical significance of the* wave function. 7

4. (a) Explain the non existence of electron in nucleus using Heisenberg's uncertainty principle. 8

(b) Explain the concept of wave particle duality with examples. 7

UMT-HI

e. (a) Based on band theory of solids distinguish between metals, insulators and semiconductor. 8

(b) Explain the electrical conductivity in metals using classical free electron theory. 7

6. (a) Write short notes on the following : 8

(I) Fermi Energy.

(n) Brillion zone.

Co) Explain Hall effect and its applications. 7

UNTT-W

7. (a) Explain me working and characteristics of Bipolar Junction Transistor, S

fo) VEnai do you mean by extrinsic semiconductor? Derive an expression for carrier concentration in extrinsic semiconductor. 7

8. (a) Describe the formation of p-n junction. Discuss its current voltage characteristics. 8

Co) Explain the construction and working of semiconductor laser. 7

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