

Roll No.

Total No. of Pages : 2

BT-2/JX

8257

Physics II- (2005 to onward)

Paper : Phy-102 E

Time : Three Hours]

[Maximum Marks : 100

Note :- The Students are required to attempt **FIVE** questions in all, selecting at least **ONE** from each Unit.

UNIT-I

1. (i) Describe three dimensional crystal systems and their Bravais lattices.
- (ii) Discuss briefly the method for determination of structure of finely powdered polycrystalline material. 10, 10
2. (i) What is meant by point defects in crystal lattice ? What are different types of point defect ? How are they caused ? Differentiate between Frenkel & Schottky defect ?
- (ii) Write various types of bonds in solids and explain any four bonds with example. 10, 10

UNIT-II

3. (i) What are shortcomings of old quantum theory ?
- (ii) Show that group velocity and wave velocity are same in a non-dispersive medium.
- (iii) Write note on Plank's constant. 5,8,7

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4. State the difference between quantum and classical theories of free electron. Obtain Richardson equation of thermionic equation. 20

UNIT-III

5. (i) What are the Brillouin Zones ? Illustrate by constructing two Brillouin Zones for a square lattice.
- (ii) Discuss effective mass of an electron and explain its physical significance. 10, 10
6. (i) Derive an expression for the carrier concentration in extrinsic semiconductors. What would be the position of Fermi level ? Explain.
- (ii) In a n-type semi conductor, the Fermi level lies 0.3 eV below the conduction band at 300k. If the temperature is increased to 330k. Find the new position of Fermi level. 12, 8

UNIT-IV

7. (i) Define photoconductivity and photosensitivity. Describe a model for photoconductor with traps.
- (ii) Describe in detail the construction, working, characteristics and uses of a solar cell. 10,10
8. (i) Discuss the domain structures in ferromagnetic materials.
- (ii) Describe Meissner effect. Distinguish between type I and type II superconductors.
- (iii) Write three name of High Tc Superconducting Material.

8,6,6