

PHY2 - 2010- 1

Roll No.

Total No. of Pages : 2

BT-2/JX

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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

- (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
- (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

- (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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Contd.

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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

- (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
- (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

- (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
- (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

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