BT-2/M-11
PHYSICS-II (2005 Onwards)
Paper : Phy-102(E)

Time : Three Hours] [Maximum Marks : 100

Note : Attempt five questions in all, selecting at least one question from each Unit.

UNIT-I

1. (a) What are Miller indices ? Give their significance. How would you determine the Miller indices of a plane in a crystal ? 12

(b) Explain bonds in Solids. 8

2. (a) What are X-rays ? Explain the mechanism of the origin of continuous and characteristic X-rays. Explain Laue method for crystal structure determination. 12

(b) Explain point defects in solids. 8

UNIT-II

3. (a) Explain Group velocity and Phase velocity. Derive expression for time dependant Schrödinger wave equation. 12

(b) What is Planck's constant ? Explain its significance. How it can be determined ? 8
4. (a) Define Fermi energy. Give the expression for Fermi-Dirac distribution law, clearly explaining the symbols used.

(b) What is Thermionic work function? Derive the expression for Richardson’s equation.

UNIT-III

5. (a) Discuss the origin of energy bands in solids. How can you distinguish between metals, semiconductors and insulators on the basis of energy bands?

(b) Explain E-K diagrams and Brillouin zones.

6. Write notes on the following:
   (i) Hall effect.
   (ii) Effective mass.

UNIT-IV

7. (a) Distinguish between Diamagnetism and Paramagnetism, and obtain the expression for Langevin’s equation for Paramagnetism susceptibility.

(b) Discuss Photo-voltaic cells and their characteristics.

8. Write notes on any two of the following:
   (i) Superconductivity.
   (ii) Photo-conductivity.
   (iii) London equation.