Con. 3690-09.

F.E.(All Branch) Sem I (R)
Applied Physics - I

SP–8465

(2 Hours)

[Total Marks : 75

15/12/09

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Q. No. **2** to **7**.
(3) Assume **suitable data** and **symbols** if **required**.
(4) Figures to the **right** indicate **full** marks.

1. Attempt any **five** :—
   (a) Describe phase measurement by using CRO.   3
   (b) Draw following planes in Cubic Unit Cell $(\bar{1}\,1\,\bar{1})\,(1\,0\,\bar{1})\,(\bar{1}\,0\,1)$ 3
   (c) Describe working of liquid Crystal display.   3
   (d) State applications of Hall effect.   3
   (e) State applications of Super Conductivity.   3
   (f) Explain Industrial applications of x-rays.   3

2. (a) A loudspeaker emits energy in all directions at the rate of 1·5 J/sec. What is the intensity   5
   level in dB at a distance of 20 m ?
   (Standard intensity level of sound = 10^{-12} w/m^2).
   (b) What are Crystal imperfections ? How they are formed ? What is their Significance ?   10

3. (a) State Sabines formula. Explain the terms involved in it. How Sabines formula can be made   5
   applicable to acoustics of auditorium ?
   (b) Show that the ratio of Hall electric field E_H to the electric field E which is responsible for   10
   the Current in n-type Semiconductor water kept in a Uniform magnetic field B is given
   by—

$$\frac{E_H}{E} = \frac{B}{ne\rho}$$

4. (a) Sodium is a BCC Crystal. It's density is $9\cdot6 \times 10^2$ kg/m^3 and atomic weight is 23. Calculate   5
   the lattice Constant for Sodium Crystal.
   (b) What is Super Conductivity ? Describe Type-I and Type -II Super conductors and prove   10
   that Super Conductors are perfect diamagnetic.

5. (a) What is fermi energy and fermi-dirac distribution function ? Show that in intrinsic Semiconductors   10
   fermi level lies midway between Conduction band and valance band.
   (b) Estimate the number of Frankel defects per mm^3 in Silver chloride if energy of formation   5
   of Frankel defects is 1·5 ev at 700°k. The molecular weight of AgCl is 0·143 kg/mol and
   Specific density is 5·56.

6. (a) How ultrasonic waves are produced ?   10
   Illustrate any two applications of Ultrasonics.
   (b) Explain the concept of Electrostatic focussing in electron optics.   5

7. Write short notes on any **three** :—   15