Roll No. ..... Total Pages : 2

BT-2/M-20 **32022**

APPLIED PHYSICS-II
Paper–AS-102 N
Opt. (i)

Time : Three Hours] [Maximum Marks : 75

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

UNIT–I

1. (a) Explain various types of crystal system with example. 7

(b) What is Frenkel Defect? Derive the relation to show that Frenkel defect in ionic crystal depend on temperature. 8

2. (a) Explain the characteristics of the following unit cells with examples : SC, BCC and FCC. 8

(b) Explain hcp structure and find its packing fraction. 7

UNIT–II

3. (a) What do you mean by wave packet? Show that the De-Broglie group velocity associated with the wave packet is equal to the velocity of the particle. 8

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

4. (a) What is the need and origin of quantum mechanics? 7

(b) Explain why electron cannot exist inside the nucleus using Heisenberg's Uncertainty Principle. 8

UNIT–III

5. (a) Discuss Drude's electron gas model to explain electrical conduction in metals. 8

(b) What are Brillion Zones? Explain. 7

6. (a) Based on band theory of solids, distinguish between conductors, semiconductors and insulators. 8

(b) What is Hall Effect? Mention applications of Hall Effect. 7

UNIT–IV

7. (a) Explain BCS theory of Superconductivity. 7

(b) Discuss various applications of non-materials. 8

8. (a) Explain the following :

(i) Type-1 and Type-Il Superconductors.

(ii) Meissner effect. 4×2=8

(b) Explain Top-down and Ball milling method for synthesis of nanomaterials. 7