

Roll No.

Total Pages : 03

BT-2/M-17

8227

APPLIED PHYSICS-II

AS-102-N

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 Diamond structure. Calculate its packing fraction. 7
(b) What do you mean by point defects in solids ? Derive an expression for concentration of Schottky defects in a crystal. 8
2. (a) Discuss in brief crystal structure of sodium chloride and cesium chloride. 8
(b) What are Miller Indices ? For a simple cubic lattice, find the ratio of spacing of (110) and (111) planes. 7

Unit II

3. (a) What are De-Broglie waves ? Show that the De-Broglie group velocity associated with the wave packet is equal to the velocity of the particle. 7

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- (b) Derive Schrödinger time dependent equation for matter waves. Give physical significance of the wave function. 8
4. (a) State Uncertainty Principle and discuss its various applications. 7
(b) Discuss the shortcomings of the classical physics and derive the Planck's radiation Law. 8

Unit III

5. (a) What is Hall Effect ? Mention applications of Hall Effect. 7
(b) What is meant by Fermi Energy ? Calculate its value for free electron gas at 0K. 8
6. (a) Discuss the origin of energy bands in solids on the basis of Kronig-Penney Model. 7
(b) Discuss briefly :
(i) E-K diagram
(ii) Brillouin Zone. 4×2=8

Unit IV

7. (a) What is Meissner effect ? Explain. 8
(b) Discuss various properties of nanomaterials. 7

L-2166

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8. (a) Explain sol-gel method for synthesis of nanomaterials with its advantages and disadvantages.

7

- (b) Derive the London's equation with reference to superconductivity.

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