**BT-2/M-20**                    **32002**

PHYSICS-II

Paper–PHY-102E

Time : Three Hours]                    [Maximum Marks : 100

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

### UNIT–I

**1.** (a) Explain the terms : Lattice translation vectors, symmetry operations, space lattice and basis.        12

   (b) Draw sodium chloride structure.        8

**2.** (a) Discuss different types of bonding in solids.        14

   (b) Write note on powder method.        6

### UNIT–II

**3.** (a) Derive the relation between phase velocity and group velocity.        10

   (b) Develop time independent Schrödinger wave equation.        10

**4.** (a) Discuss classical free electron theory of metals and its limitations.        10

   (b) Derive an expression for density of states.        10

## UNIT–III

**5.** (a) Discuss origin of energy bands in solids on the basis of Kroniz-Penney model. 12

(b) What are Brillouin zones ? Construct one-dimensional Brillouin zones. 8

**6.** (a) Discuss effective mass of an electron and explain its physical significance. 10

(b) Based on band theory of solids, distinguish between conductors, seminconductors and insulators. 10

## UNIT–IV

**7.** (a) What is photoconductivity ? Explain photoconductivity in insulating crystal. 10

(b) What is Meissner effect ? 5

(c) Mention applications of superconductivity. 5

**8.** (a) What is Paramagnetism ? Discuss classical theory of Paramagnetism. 14

(b) Explain hysteresis on the basis of domain theory of Ferromagnetism. 6

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