Roll No. ....   Total Pages : 2

BT-2/M-13   **8202**

PHYSICS-II

(2005 to Onwards)

Paper—PHY-102-E

Time Allowed : 3 Hours]   [Maximum Marks : 100

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

UNIT-I

1. (a) Discuss the powder X-ray diffraction method for the crystal structure analysis.   10

    (b) What do you mean by Miller indices of a plane? Explain the method to find Miller indices of a plane with a suitable example.   10

2. (a) Discuss the various types of point defects present in the crystal.   10

    (b) Explain the different types of bonding in the solids.   10

UNIT-II

3. (a) What were the limitations of classical physics? How quantum mechanics overcome them?   10

    (b) Derive the expression for time independent Schrödinger wave equation.   10

4. (a) Explain the terms group velocity and phase velocity. Find relation between them.   10

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    (b) Discuss the quantum theory of free electrons and obtain the relation for the density of states.   10

UNIT-III

5. (a) Explain the Kronig Penney model and give its physical significance.   15

    (b) In which region the effective mass of electron is negative and why?   5

6. (a) What do you mean by Fermi energy and how does it vary with temperature?   10

    (b) Define Brillouin zone. Draw the first Brillouin zone for BCC and FCC lattices.   10

UNIT-IV

7. (a) Discuss the phenomena of photoconductivity and explain its variation with illumination.   10

    (b) Explain the principle and working of photovoltaic cell. How its power conversion efficiency can be found from its J-V characteristics.   10

8. (a) Define magnetic susceptibility and find the expression for magnetic susceptibility of paramagnetic material.   10

    (b) Write a short note on the superconductivity and explain the Meissner effect in superconductors.   10

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