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III Semester M.Sc. Degree Examination March/April - 2025

PHYSICS

Condensed Matter Physics (General)
(CBCS New Scheme 2019-21 Onwards)

Paper : PHY304



Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates: Answer All questions.

1. a) Explain point and space groups in crystals.
b) Discuss the nomenclature of crystal directions and crystal planes. (5+10)

(OR)

2. a) What are multiplicity factor and R factor? Explain.
b) Discuss the method of analysis of X-ray diffraction pattern from crystals. (5+10)
3. a) Explain the concept of zero resistance and persistence current in superconductors.
b) Discuss the thermodynamic properties of superconductors arrive at an expression for thermal conductivity. (5+10)

(OR)

4. a) Explain the band structure of semiconductors.
b) Obtain an expression for carrier concentration in extrinsic semiconductors. (5+10)
5. a) Explain the method of determination of dielectric constant.
b) Obtain an expression for orientation polarizability. (5+10)

(OR)

6. a) Explain the Langevin theory of paramagnetism.
b) Discuss Heisenberg-exchange interaction theory of Ferromagnetism.

(7+8)

[P.T.O.]



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(5×5=25)

7. Answer any Five of the following questions.

- a) Explain the fundamental types of lattice in 2 dimensions.
 - b) Obtain spacing formula of X-ray diffraction.
 - c) Write a note on High temperature superconductors.
 - d) Obtain expression for conductivity in extrinsic semiconductor.
 - e) Write a note on piezoelectricity.
 - f) Write a note on ferromagnetic domains.
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