

Code No. 3986 / CBCS / Non-CBCS

FACULTY OF SCIENCE**M.Sc. III - Semester (CBCS/Non-CBCS) Examination, December 2014**

Subject: Physics / Applied Electronics
Paper – II: Advance Solid State Physics (Common)
(Thermal, Electrical and Magnetic Properties of Solids)

Time: 3 hours

Max. Marks: 80

Note : Answer all questions from Part - A and Part - B.
Each question carries 4 marks in Part - A and 12 marks in Part - B.

PART – A (8 x 4 = 32 Marks)
(Short Answer Type)

- 1 What is Fermi surface and on what factors the degree of disorder of Fermi surface depends?
- 2 Show that radius of Fermi surface of monovalent metal is 0.798 times the distance of zone boundary.
- 3 ✓ Derive an expression for local field in a dielectric material.
- 4 ✓ Write a note on classification of ferroelectric materials.
- 5 ✓ How quantum theory overcomes the drawbacks of Langevin's theory?
- 6 ✓ What is paramagnetic cooling? Explain.
- 7 ✓ What is Meissner effect? Explain.
- 8 ✓ Write note on high temperature superconductors.

PART – B (4 x 12 = 48 Marks)
(Essay Answer Type)

- 9 a) ✓ Discuss extended and periodic zone schemes.
OR
 b) Enumerate various experimental methods for the determination of Fermi surface of a metal. Explain in detail how cyclotron resonance studies help to determine Fermi surface.
- 10 a) ✓ Discuss the sources of polarization in a dielectric.
 b) ✓ Derive classical Mosotti relation and discuss its importance.
OR
 c) Write a note on ferroelectrics hysteresis.
 d) Explain the ferroelectric behaviour of BaTiO₃.
- 11 a) ✓ Discuss nature and origin of Weiss molecular field. How this theory explains the magnetic theory of ferromagnetics?
OR
 b) What is the block wall? Discuss Neel's theory of anti ferromagnetism.
- 12 a) ✓ Give basic ideas of BCS theory of superconductors.
OR
 b) Write about i) Giaver tunneling and ii) Josephson effect.
