

## FACULTY OF SCIENCE

M. Sc. III – Semester (CBCS / Non-CBCS) Examination, December 2013

Subject : Physics and Applied Electronics

Paper – II (A) : Advanced Solid State Physics

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)

Write notes on the following:

1. ✓ Fermi surfaces
2. ✓ Periodic zone scheme
3. ✓ Local field
4. ✓ Spontaneous polarization
5. ✓ Origin of paramagnetic moment
6. ✓ Bloch wall
7. ✓ Type I and Type II superconductors
8. ✓ London's penetration depth

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

- 9.(a) Describe Harrison's method of constructing Fermi Surface discuss construction of Fermi surfaces for mono and divalent metals in 2-dimensions.

OR

- (b) Discuss the effect of magnetic field on Fermi surfaces.

- 10.(a) Derive and discuss Clausius-Mosotti expression. Discuss various sources of polarization in molecules.

OR

- (b) Describe the classification of ferroelectric crystals. Discuss dipole theory of ferroelectricity.

- 11.(a) Give an account of Weiss theory of ferromagnetism . On the basis of this theory explain hysteresis effect and Curie point.

OR

- (b) Discuss quantum theory of paramagnetism and obtain expression for susceptibility.

- 12.(a) Give an account of BCS theory of superconductivity.

OR

- (b) Write a brief not on:  
(i) Persistent currents (ii) Isotope effect (iii) Superconducting energy gap

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