Roll No									

B.E. (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2011

MECHANICAL ENGINEERING BRANCH

FOURTH SEMESTER

ML 9255 – SOLID STATE PHYSICS

(REGULATIONS 2008)

Time : 3 hr Max Mark : 100

Answer ALL Questions

Part – A (10 × 2 = 20 Mark)

1. What are matter waves?. Write the expression relating wavelength and momentum for matter waves.
2. What is Heisenberg's uncertainity principle?. Write the equations relating uncertainty in position - momentum and Energy – time.
3. What is Weidmann – Franz ratio?.
4. What is Fermi distribution function and write its expression.
5. Name the different types of polarization processes.
6. What is Claussius – Mosotti relation?.
7. What is reason for alignment in ferromagnetism?
8. Write the Bloch equations?
9. What are Cooper pairs in superconductivity?
10. What is Isotope effect in superconductivity?

(P.T.O)

Part – B (5 × 16 = 80 Mark)

11 Derive Schrodinger's time independent and dependent equations. **(16 marks)**

12 **a)** i) Derive the expression for Density of states **(16 marks)**

(OR)

b) Explain Kronig - Penny model **(16 marks)**

13. **a)** **a)** Derive the expression for electronic, ionic and orientational polarizability of moleculaes. **(16 marks)**

(OR)

b) i) Derive Clausius – Mosotti relation **(8 marks)**

ii) Briefly write the Devonshire theory **(8 marks)**

14. **a)** Explain NMR**(16 marks)**

(OR)

b) Explain Domain theory of Ferromagnetism **(16 marks)**

15. **a)** **i)** Explain Meissner effect **(4 marks)**

ii) Elements of BCS theory **(12 marks)**

(OR)

b) Briefly write about

i) Meissner effect **(4 marks)**

ii) Gaiver tunneling **(4 marks)**

iii) Isotope effect **(4 marks)**

(iv) Josephson effect in superconductors **(4 marks)**