

25/10/13

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B.E. (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2013

Materials Science Branch

FOURTH SEMESTER

2

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.
2. What is Heisenberg's uncertainty principle?. Write the equations relating uncertainty in Position - Momentum and Energy – Time.
3. Write the expression for Fermi distribution function.
4. Write the expression for effective mass of an electron.
5. What is Claussius – Mosotti relation?.
6. What are the various types of polarization?
7. What is the reason for magnetism?
8. What are domains?
9. What are Cooper pairs in superconductivity?
10. What is Coherence length?

(P.T.O)

Part – B (5 × 16 = 80 Mark)

11 Explain the theory of particle in a one dimensional box (16 marks)

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

(OR)

b) i) Explain Hall effect in semiconductors and mention its applications. (10 marks).

ii) Explain effective mass and how is it different from rest mass? (6 marks)

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

(OR)

b) i) Explain internal field of Lorentz (8 marks)

ii) Briefly write the Devonshire theory (8 marks)

14. a) Explain Larmor diamagnetism (16 marks)

(OR)

b) Explain NMR

15. a) Explain BCS theory (16 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)