

UNIVERSITY DEPARTMENT OF PHYSICS
DR. SHYAMA PRASAD MUKHERJEE UNIVERSITY, RANCHI
M.SC. PHYSICS
SEMESTER - II
PAPER – 202: SOLID STATE PHYSICS

MODEL QUESTIONS

GROUP A

SHORT ANSWER TYPE QUESTIONS

1. Explain wave motion in Monoatomic and Diatomic Lattice vibrations.
2. What is semiconductor? Explain its types with band structure.
3. Explain diamagnetism and para magnetism in solids.
4. Discuss the Fermi level and density of state in semiconductor.
5. Derive an expression for the carrier concentration in intrinsic semiconductor.
6. What are phonons? Explain phonon frequency and density of state?
7. What is Meissner effect? Explain type I and type II superconductors.

GROUP B

LONG ANSWER TYPE QUESTIONS

1. Discuss the quantum theory of ferromagnetic solids.
2. a. Derive an expression for London's equation.
b. What is effective mass of e^- or hole derive its expression.
3. a. Explain BCS theory of superconductors and derive expression for superconductivity energy gap.
b. Derive and explain law of mass action in semiconductors.
4. Discuss the Debye's theory of solid state physics in detail.
5. Discuss the thermal expansion and thermal conductivity of solids
6. Discuss the quantum theory of diamagnetism in solid state physics.
7. Explain Kronig-penny model and derive relation between energy and momentum.
