

M.Sc. (Physics) (NEP Pattern) Semester-II
02MSCPH2 - DSE-II Paper-II - Solid State Physics

P. Pages : 2

Time : Three Hours



GUG/W/24/15416

Max. Marks : 80

Either :

1. a) Explain following terms in detail: 8
i) Diffusion through solids
ii) Ionic conductivity
- b) Write a note on formation of Schottky and Frenkel defects in solids and its applications. 8

OR

- e) Write a detail note on, experimental facts about F-center and F-band spectra. 8
- f) Explain Burger's vector and Burger's circuit in detail. 8

Either:

2. a) State and explain the Meissner effects in detail. Also explain type-I and type-II superconductors. 8
- b) What is coherence length? Discuss BCS theory of superconductors. 8

OR

- e) Explain Electrodynamics of superconducting transition with the help of London equation of superconductivity. 8
- f) Explain high T_c superconductor and superconducting tunneling in detail. 8

Either :

3. a) Discuss Nuclear Magnetic Resonance (NMR) and its applications in detail. 8
- b) Explain ESR spectroscopy and its applications in detail. 8

OR

- e) Explain Nuclear Quadrupole Resonance (NQR) and Ferromagnetic Resonance (FMR) for structural studies. 8
- f) How N.M.R. Spectroscopy is used in the structural studies of compounds. 8
Explain with the help of suitable example.

Either:

4. a) Explain lattice specific heat with the help of Dulong-Petit's law. 8
- b) Explain in detail Einstein and Debye Model (T^3 law). Also explain the Einstein specific heat curve or high temperature range and low temperature range. 8

OR

- e) Explain the following terms: 8
- | | |
|-------------------------|-------------------------|
| i) Thermionic emission | ii) relaxation time and |
| iii) mean free path and | iv) Density of states. |
- f) Describe in brief auger transition and LS and JJ coupling. 8
5. Attempt **all** the following.
- a) Explain de Boer model of F-center. 4
- b) Write a note on Josephson effects. 4
- c) State the application of ESR. 4
- d) Explain in brief about Spectrum of Hydrogen. 4
