

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

P. Pages : 2

Time : Three Hours



**GUG/S/25/15416**

Max. Marks : 80

---

**Either :**

1. a) Write a note on experimental facts about F-center & F-band spectra. 8
- b) Discuss concentration of Schottky & Frenkel defects as function of temp. 8

**OR**

- e) Explain point defects with impurities, vacancies and interstitials. 8
- f) Discuss different types of defects in details. 8

**Either :**

2. a) Explain entropy and heat capacity of superconductors. 8
- b) Discuss BCS theory of superconductivity in detail. 8

**OR**

- e) Explain DC and AC Josephson effects. 8
- f) Explain Meissner effect and Type I and Type II superconductor. 8

**Either :**

3. a) What is Ferromagnetic resonance? Explain its theory and applications. 8
- b) Give experimental study of Electron Spin Resonance (ESR) and its application. 8

**OR**

- c) Explain in detail Nuclear Magnetic Resonance (NMR). 8
- d) Discuss Nuclear Quadrupole Resonance and write its applications. 8

**Either :**

4. a) Explain Dulong and Petit's law. 8
- b) Discuss in details LS & JJ Coupling. 8

**OR**

e) Discuss Einstein and Debye model ( $T^3$  law). 8

f) Discuss the motion of an electron in 1D periodic square well potential. 8

5. Attempt all the followings.

a) Explain Burger vector and Burger circuit. 4

b) What is Isotope effect? 4

c) Write few applications of NMR. 4

d) Write a note on Auger transition. 4

\*\*\*\*\*