

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN  
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)  
Chromepet, Chennai — 600 044.

M.Sc. - END SEMESTER EXAMINATIONS APRIL - 2022

SEMESTER - IV

20PPHCT4010 - CONDENSED MATTER PHYSICS

Total Duration : 3 Hrs.

Total Marks : 60

**Section A**

Answer any **SIX** questions ( $6 \times 5 = 30$  Marks)

1. Explain about symmetry operations in crystals.
2. Describe Umklapp process.
3. Discuss about direct and indirect band gap.
4. Give the theory of antiferro magnetism.
5. Brief on SQUIDS.
6. Discuss Debye's theory of lattice heat capacity.
7. State and explain Wiedemann-Franz law.
8. Discuss about type-I and type-II superconductors.

**Section B**

**Part A**

Answer any **TWO** questions ( $2 \times 10 = 20$  Marks)

9. (a) What is atomic form factor?  
(b) Obtain the structure factor for BCC and FCC.
10. Discuss the quantisation of lattice vibrations and arising of various types of phonons.
11. (a) What is Bloch theorem? (b) Discuss Kronig-Penney model.
12. Discuss the quantum theory of ferromagnetism.

**Part B**

Compulsory question ( $1 \times 10 = 10$  Marks)

13. Explain with necessary theory and derive London's equations.

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