

G-4/439/21

Roll No.

[2]

M.Sc. IV Semester Examination, 2021

PHYSICS

Paper III

(Condensed Matter Physics-II)

Time : 3 Hours]

[Max. Marks : 80

Note : All questions are compulsory. Question Paper comprises of 3 sections. Section A is objective type/multiple choice questions with no internal choice. Section B is short answer type with internal choice. Section C is long answer type with internal choice.

SECTION A

1×8=8

(Objective Type Questions)

Choose the correct answer :

1. The temperature at which a solid converts from a normal conductor to a superconductor is called
2. Electrons in a Cooper pair interact through with each other.
3. Debye equation of gases is related with
4. The latent heat associated with second order phase transition is

P.T.O.

5. Net charge in a p type semiconductor is
6. The value of Fermi function at $0K$ and $E < E_F$ is
7. Energy of a photon is given by formula
8. The thermal expansion in a solid occurs due to vibration of its atoms. (Harmonic /Anharmonic)

SECTION B

6×4=24

(Short Answer Type Questions)

Note : Attempt all questions from each unit with internal choice.

Unit-I

1. What is isotope effect ?

Or

What do you mean by Meissner effect ?

Unit-II

2. What is Lorentz field ?

Or

Explain this phenomena of anti-ferroelectricity.

Unit-III

3. Derive relations for mobility and drift velocity.

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Or

What are super lattices ?

Unit-IV

4. Write down characteristics of interatomic forces among the atoms of a solid.

Or

Discuss the thermal expansion of solids.

SECTION C

12 × 4 = 48

(Long Answer Type Questions)

Note : Attempt all questions.

Unit-I

1. Explain the BCS theory of super conductivity.

Or

What do you mean by high temperature super conductors ? Discuss.

Unit-II

2. Derive Debye equation for gases.

Or

Discuss Landau's theory of phase transition.

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Unit-III

3. What do you mean by intrinsic and extrinsic semiconductors ?

Or

What is meant by quantum well and super lattices.

Unit-IV

4. Discuss the dynamics of diatomic lattices.

Or

What do you mean by quantization of lattice waves ? Discuss.

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