Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

M.Sc (Physics) (Sem.–3)

CONDENSED MATTER PHYSICS

Subject Code : MSPH-531-21

M.Code : 92535

Date of Examination : 12-12-22

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) Define Madelung constant.

b) How is strain in a crystal analysed?

c) Explain linear monatomic lattice.

d) Define thermal expansion.

e) Write the significance of negative effective mass.

f) Define Fermi surface.

g) Explain electronic mobility.

h) Define Hall coefficient.

i) What is pyro electricity?

j) Write different types of polarization.

SECTION-B

2. Describe the characteristics of strain-stress relation in cubic crystal.

3. Derive an expression for the specific heat of a linear continuous chain of atoms according to the Debye theory.

4. Discuss Kronig-Penney model for the energy band structure of solids.

5. Derive Clausius-Mossotti relation.

6. What is piezoelectric effect? Explain the origin of the effect.

SECTION-C

7. Calculate the Cohesive energy of inert gas crystals. Explain why do these crystals exist only at very low temperatures and not at room temperature.

8. How lattice vibrations are quantized? Describe the inelastic scattering of neutrons for the experimental determination of phonon spectra.

9. What is an extrinsic semiconductor? What are impurity states and what role they play in determining the electrical conductivity of a doped semiconductor?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.