Total No. of Pages : 02

Total No. of Questions : 09

B.Sc (Non-Medical) (Sem.–6) SOLID STATE PHYSICS Subject Code : BSNM-603-18 M.Code : 79495 Date of Examination : 06-01-2023

Time: 3 Hrs.

Max. Marks : 50

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE 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 atomic form factor.
 - (b) Why the reciprocals of intercepts of the lane are taken to find Miller indices?
 - (c) Why only X-rays are used for crystal structure analysis?
 - (d) Why Vander Waals bonds are the weakest?
 - (e) What is the difference between Photons and Phonons?
 - (f) State Wiedemann Franz law.
 - (g) Discuss physical meaning of Fermi energy.
 - (h) What are Brillouin zones?
 - (i) Why valence electrons are called conduction electrons?
 - (j) Why conductivity of a metal decreases with rise in temperature?

SECTION-B

- 2. Explain the concept of Miller indices. How are they calculated? How the orientation of a plane is specified by Miller indices?
- 3. Describe the standard experimental X-ray diffraction method for study of crystal structure.
- 4. State Lenard Jones two body potential and use it to obtain expression for the cohesive energy of an inert gas crystal.
- 5. Obtain an expression for thermal conductivity of a metal on the basis of free electron theory.
- 6. Discuss the formation of Brillouin zones for a linear lattice and also for two dimensional lattice.

SECTION-C

- 7. Derive the vibrational modes of a diatomic linear lattice. Name the different branches of the dispersion relation curve. What is the difference between the two branches?
- 8. Derive an expression for electron specific heat in metals.
- 9. Discuss the periodicity character of potential in a crystal. State and prove Bloch theorem in this reference.

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.