

Roll No.

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 : 06-07-22

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 geometrical structure factor.
- (b) Why the reciprocals of intercepts of the plane 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) Explain the concept of phonon.
- (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. Explain Fermi Dirac distribution function.
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 Kronig Penney model. Using the model, show that the energy spectrum of electron consists of a number of allowed energy bands separated by forbidden regions.

**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.**