

This question paper contains 2 printed pages]

**W—116—2018**

**FACULTY OF SCIENCE**

**B.Sc. (Third Year) (Fifth Semester) EXAMINATION**

**OCTOBER/NOVEMBER, 2018**

**(CGPA/New Pattern)**

**PHYSICS**

**Paper XIII**

**(Solid State Physics)**

**(Wednesday, 24-10-2018)**

**Time : 10.00 a.m. to 12.00 noon**

**Time—2 Hours**

**Maximum Marks—40**

**N.B. :— (i) All questions are compulsory.**

**(ii) All questions carry equal marks.**

**(iii) Use of Non-programmable calculators is allowed.**

**(iv) Figures to the right indicate full marks.**

**1. Attempt any *four* of the following : 8**

**(i) Define point lattice/space lattice.**

**(ii) What are ionic crystals ?**

**(iii) State Dulong and Petit's law of specific heat.**

**(iv) Write down the mathematical statement of electrical conductivity ( $\sigma$ ).**

**(v) What is packing fraction ?**

**2. Answer any *two* of the following : 8**

**(a) Explain the structure of a Diamond.**

**(b) Explain how hydrogen bond plays an important role in the formation of ice and water.**

**(c) Derive an expression for thermal conductivity of metals.**

**P.T.O.**

3. Attempt any *two* of the following : 8
- (a) Explain the interatomic forces which binds the atoms together to form the crystal.
  - (b) Explain the two contributions of specific heat, when certain amount of energy is added to a solid.
  - (c) Explain in brief Drude Lorentz theory of free electron.
4. Answer any *one* of the following : 8
- (i) What are symmetry operations. Explain rotation symmetry operation.
  - (ii) Explain Debye's model of lattice specific heat.
5. Write notes on the following : 8
- (a) Inter atomic forces and types of Bonding
  - (b) Electrical conductivity.