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B—134—2019

FACULTY OF SCIENCE

B.Sc. (Fifth Semester) EXAMINATION

MARCH/APRIL, 2019

(CBCS Pattern)

PHYSICS

Paper-XIII-A

(Solid State Physics)

(Wednesday, 3-4-2019)

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.

1. Attempt any *four* of the following : 8
 - (i) Define packing fraction.
 - (ii) Define van der Waals' forces (bond).
 - (iii) What is the difference between ionic bond and covalent bond ?
 - (iv) Define lattices heat capacity.
 - (v) State Dulong-Petit's law on the basis of classical theory of specific heat.
 - (vi) Define thermionic emission in metals.
2. Attempt any *two* of the following : 8
 - (a) Explain point groups in solids.
 - (b) Describe the structure of sodium chloride (NaCl) crystal.
 - (c) Explain Bragg's law of X-ray diffraction in crystals.
3. Attempt any *one* of the following : 8
 - (a) Define symmetry operation. Explain rotation and reflection symmetry operations in detail.
 - (b) Explain in brief :
 - (1) Hydrogen bonding
 - (2) van der Waals' bonding.

P.T.O.

4. Attempt any *two* of the following : 8
- (a) Explain specific heat of solids at constant volume and constant pressure in brief.
 - (b) Derive an expression for electrical conductivity of solids.
 - (c) State expression for Debye specific heat formula and discuss it for low and high temperature case.
5. Attempt any *one* of the following : 8
- (a) Obtain the Einstein equation for specific heat of solids. Discuss its variation at low and high temperature.
 - (b) Discuss the thermionic emission and escape of electron in metals.