This question paper contains **2** printed pages]

# R—108—2017

## FACULTY OF SCIENCE

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

## MARCH/APRIL, 2017

**(New Course)**

PHYSICS

Paper XIII

(Solid State Physics)

**(Saturday, 8-4-2017)** **Time : 10.00 a.m. to 12.00 noon**

*Time—Two Hours* *Maximum Marks*—40

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

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

1. Attempt any *four* : 8

(*a*) Define lattices and bases.

(*b*) What is point group symmetry ?

(*c*) What are covalent crystals ?

(*d*) Define the Debye's temperature.

(*e*) Write any *four* outstanding properties of metals.

(*f*) Define specific heat.

2. Attempt any *two* : 8

(*a*) Explain reflection symmetry operation.

(*b*) Derive an expression for the specific heat at solids by using classical theory.

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

P.T.O.

3. Attempt any *two* : 8

(*a*) Obtain the packing fraction of FCC lattice.

(*b*) Enlist salient features of Einstein's theory of lattice heat capacity. How does it differ from the classical theory ?

(*c*) Derive an expression for the energy of a free electron in a box using quantum theory.

4. Attempt any *one* : 8

(*a*) Explain the farmation of metallic bond. Give its physical properties.

(*b*) Assume the relation for specific heat of solids by Debye's theory and explain its behaviour at low temperature.

5. Write short notes on any *two* : 8

(*a*) Simple cubic structure

(*b*) Amorphous solids

(*c*) Bragg's law

(*d*) Wiedemann-Franz's relation.