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AO—99—2018

FACULTY OF SCIENCE

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

MARCH/APRIL, 2018

(New Course)

PHYSICS

Paper XIII

(Solid State Physics)

(Tuesday, 3-4-2018) **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.

(*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 crystalline state of solids.

(*ii*) What forces are responsible for holding the atoms together to form solid structure ?

(*iii*) Define specific heat of solids.

(*iv*) Define electrical conductivity.

(*v*) What are amorphous solids ?

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

(*a*) Define the following :

(*i*) Close-packed structures

(*ii*) Loose-packed structures.

(*b*) Write down the essential difference between Debye model and Einstein's model of specific heat.

(*c*) Explain Drude Lorentz theory in brief.

P.T.O.

3. Attempt any *two* of the following : 8

(*a*) Define packing fraction and hence explain sodium chloride (NaCl) structure.

(*b*) Explain Hydrogen bonding.

(*c*) Write down the variation of specific heat in low and high temperature region with the help of Einstein's model of specific heat.

4. Answer any *one* of the following : 8

(*a*) What are the types of bonding ? Explain metallic bonds in detail.

(*b*) Explain Sommerfeld's model of free electron.

5. Write short notes on the following : 8

(*a*) Bravais lattices

(*b*) Dulong and Petit's law/classical theory of specific heat.