THE AMERICAN COLLEGE, MADURAI

(An Autonomous Institution Affiliated to Madurai Kamaraj University)
Re-accredited (2nd Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale

Backlog Arrear Examination, March 2021

PSP 5405 **Condensed Matter Physics-I**

Time: 3hr **Max.Mark:75**

Part - A

Answer any FIVE from the following questions. **(5 x 15=75)**

1. What are Bravais lattices? Explain the Bravais lattices for seven crystal systems with a neat sketch.
2. Obtain Laue's equations for x-ray diffraction by crystals. Show that these are consistent with Bragg's law.
3. Derive an expression for binding energy of an ionic crystal and obtain the expression for Medulung constant.
4. What are the assumptions of Debye model? Describe the Debye's theory of lattice heat capacity.
5. Describe the thermal conductivity of phonon in detail.
6. Discuss the formation of allowed and forbidden energy bands on the basis of Kronig-Penny model.
7. Explain how to determine the intrinsic carrier concentration in a semiconductor.

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