



# THE AMERICAN COLLEGE, MADURAI

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

Re-accredited (2<sup>nd</sup> Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale

## Backlog Arrear Examination, March 2021

COURSE CODE: PSP 5406

COURSE TITLE: Condensed Matter Physics-II

Time: 3hr

Max.Mark:75

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### Part-A

Answer any **FIVE** from the following questions.

(5 x 15=75)

1. Obtain the Kramers-Kronig Relations.
2. Derive London's equations and obtain the expression for penetration depth.
3. State the AC Josephson effect and explain it in detail.
4. Discuss on the quantum theory of paramagnetism
5. Derive the local electric field of an atom and hence deduce Clausius-Mossatti relation.
6. Obtain the Magnon dispersive relation for spin wave in one dimension with nearest neighbor interaction.
7. (i) Distinguish between schottky defect and frenkel defect.  
(ii) Show that the critical shear strength of a single crystal is of the order of  $1/6$ .

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