



# 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

PGC 4426

### PHYSICAL CHEMISTRY-II

Time: 3 Hours

Max Marks: 75

Answer ANY FIVE Questions

(5 X 15 = 75)

1. Derive Maxwell's distribution of molecular velocities and explain the effect of temperature.
2. Arrive at the rotational fine structure of electronic-vibration transition and explain it with spectrum and Fortrat diagram.
3. Using quantum mechanical formulation, deduce the eigen value, eigen function, transition frequencies and relative intensities of an AB coupled system.
4. a) Discuss the factors affecting intensities of spectral lines in rotational spectra. (7) b) Discuss overtone and combination bands. (8)
5. a) Give the pulse sequence and vector diagram of a DEPT experiment and explain the information obtained from this technique. (7) b) Illustrate the use of INDOR experiment to determine the relative signs of the coupling constant with the help of energy level diagram. (8)
6. a) Write a note on CARS and hyper Raman effects. (6) b) Outline the principle and applications of dynamic NMR. (9)
7. Discuss briefly transport properties and arrive at the expression for coefficient of thermal conductivity on the basis of transport property. (5+10)