



# 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: PHY 2477**

**Course Title: Modern Optics**

**Time: 3 Hr**

**Max. Mark: 75**

**Answer any FIVE Questions**

**5 x 15 = 75**

1. Discuss how the intensity of the transmitted polarized light varies, and explain the total internal reflection phenomena.
2. Explain the absorption and emission processes using Einstein coefficients. And obtain the ratio of spontaneous to stimulated emission coefficient.
3. Explain the variation of laser power around threshold and derive the threshold population inversion density required for laser oscillation.
4. Explain elliptical and circularly polarized light and derive the path difference and the phase difference of the O- and E- rays.
5. Describe the Fourier transform properties of a lens when the object is placed (i) against the lens and (ii) in front of the lens.
6. Explain the quarter wave plate and half wave plate for producing and detecting circularly polarized light, and also explain Babinet compensator.
7. Explain Optical fiber system and multimode Graded index fibers. Obtain the relation for Numerical aperture