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

Course Code: PHS 2547 **Time : 3 Hrs**

Course Title: Physical Optics **Max. Marks : 75**

PART- A **Answer <u>any five</u> of the following questions** **5 x 15 = 75**

1. Describe Young's double slit experiment in detail and give the conditions for occurrence of bright and dark fringes in the interference pattern.
2. (a) What is Diffraction?

   (b) Derive an expression for the intensity distribution due to Fraunhofer diffraction at a single slit. Also discuss the conditions of maxima and minima.
3. What is zone plate? Explain the construction and working of a zone plate.
4. Define *plane of polarization* with a suitable diagram. Explain the principle of working, its construction and the process by which polarization takes place inside a *Nicol prism*.
5. (a) Distinguish ordinary and extra-ordinary rays.

   (b) Explain how the intensity of the polarized beam be increased using a *Pile of Plates* arrangement
6. For atomic transitions, derive Einstein relations and hence deduce the expression for the ratio of spontaneous emission rate to the stimulated emission rate.
7. Explain with the help of neat diagram the principle and working of a He-Ne laser.
