



**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**

**PHS 3454/3554**

**Modern Physics**

**Time: 3 Hrs**

**Max. Marks: 75**

**PART – A**

**Answer any five of the following questions.**

**5 x 15 = 75**

1. Explain the Vector atom model in detail.
2. Discuss the theory of Zeeman Effect and deduce an equation for the frequency shift due to the application of an external magnetic field.
3. Explain the coupling schemes with a neat diagram.
4. Explain the liquid drop model of nuclear structure.
5. Give an account of theory, construction and working of cyclotron. Discuss its limitations.
6. Obtain an expression for the rotational energy of a diatomic molecule considering rigid rotator model. What are the effects of an isotope in the sample?
7. Explain the Classical and Quantum theories of Raman Scattering.

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