

Roll.No.

25UPHCT3006

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN  
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)  
Chromepet, Chennai - 600 044.

B.Sc.Physics - END SEMESTER EXAMINATIONS - NOVEMBER 2025  
SEMESTER - III

**25UPHCT3006 - Optics and Spectroscopy**

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

### Section B

Answer any **SIX** questions ( $6 \times 5 = 30$  Marks)

1. Explain spherical and chromatic aberrations in a lens. How are they minimized?
2. Describe how wavelength of the sodium light can be measured using Newton's rings experiment.
3. Distinguish between Fresnel and Fraunhofer diffractions with suitable examples.
4. Derive Cauchy's formula for dispersion of light and explain its significance.
5. Classify the different types of polarized light with suitable sketches.
6. Explain and express the dispersive power of a grating.
7. Describe Laurent's half-shade polarimeter and its use in measuring specific rotation.
8. Discuss about the process of quantization of energy.

### Section C

Answer any **THREE** questions ( $3 \times 10 = 30$  Marks)

9. Derive and explain the condition for a chromatism in a combination of two lenses with a neat diagram.
10. Explain the principle and working of Michelson's interferometer and explain how it is used to determine the difference in wavelength between two neighbouring spectral lines.
11. Derive the condition for principal maxima and minima in Fraunhofer diffraction at a single slit.
12. Derive the expression for the intensity of plane-polarized light emerging from a half-wave plate and quarter-wave plate and discuss their applications.
13. Explain the quantum theory of Raman effect. Derive the expression for Raman shift and discuss its significance.

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