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. END SEMESTER EXAMINATIONS NOVEMBER-2022
SEMESTER - III
20UPHCT3006 - Optics and Spectroscopy

Total Duration : 2 Hrs 30 Mins.   **Total Marks : 60**

Section A

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

1. Relate Fresnel and Fraunhofer Diffraction.

2. Sketch a neat and clean diagram of quarter-wave plate and describe about its working.

3. Compute the width and intensity of spectral lines.

4. Explain the formation of interference fringes in wedge shaped films.

5. Compute the difference between Huygens's and Ramsden's eyepiece.

6. Determine the thickness of a half wave plate of quartz for a wavelength 500nm. Given, the refractive indices of the extra ordinary and ordinary rays are $\mu_e =$1.553 and $\mu_o =$1.544, respectively.

7. Illustrate the working principle behind the combination of prisms to produce
   i) Dispersion without deviation and
   ii) Deviation without dispersion.

8. In a Newton's ring experiment, the diameter of the 10th ring changes from 1.40cm to 1.27cm when a liquid is introduced between the lens and the plate. Calculate the refractive index of the liquid.

Section B

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

9. Compute the difference between the absorption and emission type spectrometers with necessary diagrams.

10. Explain how circular fringes are produced in Michelson's Interferometer. Show that the radii of circular fringes obtained by the Michelson's Interferometer are proportional to the square root of natural number.

11. Examine the Production and detection of plane, circular and elliptically polarized light with neat diagrams.

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12. Explain Spherical Aberration and predict various ways for its removal.

13. Explain in detail the plane transmission grating element in Oblique incident and discuss about Absent spectra and Overlapping spectra.

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