

D 143241

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Name.....

Reg. No.....

**FOURTH SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY)
EXAMINATION, APRIL 2026**

(CBCSS)

Physics

PHY 4E 21—MODERN OPTICS

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

Section A*All questions can be attended.**Each question carries weightage 1.*

1. Differentiate between Phase velocity and group velocity.
2. Define the term line width.
3. Define the terms reflecting finesse and co-efficient of finesse.
4. What is a zone plate ? Explain + ve and – ve zone plate.
5. Discuss double refraction.
6. Discuss Maxwell's equations.
7. Discuss the principle of Fabry-Perot etalon.
8. Discuss the theory of Polarizing prisms.

(8 × 1 = 8 weightage)

Section B*Answer any **two** questions.**Each question carries weightage 5.*

9. Write an essay on different polarizations of light.
10. What is meant by degree of partial coherence ? Discuss its significance. Also define the terms fringe visibility, coherence time and coherence length.

Turn over

11. Discuss the basic principles of Fraunhofer diffraction. Explain briefly Fraunhofer diffraction pattern of a single slit.
12. What is electro optic effect ? Discuss Kerr effect and Pockel's effect.

(2 × 5 = 10 weightage)

Section C

*Answer any **four** questions.*

Each question carries weightage 3.

13. If a 500 W laser beam is concentrated by a lens into a cross-sectional area of 10^{-10} m^2 , find the value of the Poynting vector and also the amplitude of the electric field.
14. In a two slit Interference experiment of the Young's type, the aperture to screen distance is 2 meter and the wavelength is 600 nm. If it is desired to have a fringe spacing of 1mm, what is the required slit separation ?
15. Discuss the theory of multilayer films.
16. Write a note on Apodization.
17. What is the minimum resolvable wavelength separation for a grating of 1,200 lines/mm. having a width of 5 cm. ? The wavelength is 500 nm. and the grating is to be used in the first order.
18. A Kerr cell method for finding the velocity of light, the response of the photocell was a minimum when the path difference was 171.8 m. and the frequency of modulation 9.6 MHz. If the value of the integral was 11, calculate the velocity of light.
19. List out the applications of second Harmonic generation.

(4 × 3 = 12 weightage)