



Reg. No. :

Name :

IV Semester B.Sc. Degree (CBCSS – Supplementary) Examination, April 2023
(2017 & 2018 Admissions)
CORE COURSE IN PHYSICS
4B04 PHY – Optics

Time : 3 Hours

Max. Marks : 40

Instruction : Write answers in English Only.

SECTION – A

Answer **all** questions – Very short answer type – **Each** carries 1 mark.

1. System matrix for a thin lens is given by _____
2. When the two mirrors in a Michelson interferometer are at right angles to each other, the fringes are _____
3. In a double slit diffraction pattern, when $a = b$, the missing order of interference are _____
4. A Nicol prism is based on the principle of _____ (4×1=4)

SECTION – B

Answer **any seven** questions – Short answer type – **Each** carries 2 marks.

5. Define unit planes.
6. Explain cosine law.
7. Write a note on non-reflecting films.
8. How will you determine wavelength of light using air wedge experiment ?
9. What is a zone plate ? Name two types of zone plates.
10. Give the expression for the position of the n^{th} dark band due to a straight edge Fresnel diffraction. Explain the symbols.
11. Define resolving power of a grating.
12. Explain polarisation by double refraction.
13. State and explain Malu's law.
14. Explain how circularly polarised light can be produced. (7×2=14)

P.T.O.



SECTION – C

Answer **any four** questions – Short essay/problem – **Each** carries 3 marks.

15. An object is placed 20 cm from a convex lens of focal length 15 cm. Find the position of the image and magnification, by system matrix formalism.
16. How will you determine the refractive index of a liquid by Newton's rings experiment ?
17. A monochromatic light of wave length 5000\AA from a distant source falls on a slit 0.5mm wide. What is the distance between the two bright bands on each side of the central bright band of the diffraction pattern observed on a screen placed 2 m from slit ?
18. What is the radius of sixth zone in a zone plate of focal length 10 cm for a light of wavelength 6000\AA ?
19. Draw the intensity distribution curve of the Fraunhofer diffraction pattern of a single slit.
20. A quarter wave plate is constructed from a quartz crystal whose refractive indices are $\mu_e = 1.553$ and $\mu_o = 1.544$. Calculate the thickness of the plate for wavelength of 6500\AA . (4×3=12)

SECTION – D

Answer **any two** questions – Long essay type – **Each** carries 5 marks.

21. Explain the formation of Newton's rings. How can these be used to determine the wavelength of monochromatic light ?
22. Give the theory of plane diffraction grating and how it is used to measure the wavelength of given source of light.
23. What is a zone plate ? How it forms the image of an object and derive an expression for its focal length ?
24. Explain the construction, working and uses of
a) Quarter wave plate b) Half wave plate. (2×5=10)