K18U 0939

Reg. No. : .....

Name : .....

IV Semester B.Sc. Degree (CBCSS – Reg./Supple./Imp.) Examination, May 2018
(2014 Admn. Onwards)
CORE COURSE IN PHYSICS
4B04 PHY – Optics

Time : 3 Hours Max. Marks : 40

Instruction : *Write answers in* ***English*** *only.*

SECTION – A

Answer **all** – Very short answer type – **Each** question carries **one** mark.

1. The cosine law in interference is
2. The property of rotating the plane of polarised light about its direction of propagation is known as
3. Compact disc shows colours in white light due to
4. When the order of half period strips increases, the area of the successive strips **(4×1=4)**

SECTION – B

Answer **any seven** – Short answer type – **Each** question carries **two** marks.

5. State the Brewster's law.
6. Draw the intensity distribution curve of a diffraction pattern at a straight edge.
7. Distinguish between Fresnel diffraction and Fraunhoffer diffraction.
8. What is the function of the compensating plate in Michelson interferometer ?
9. Define unit planes and nodal planes.
10. Write any two similarities of zone plate and convex lens.
11. Why a thick film cannot produce interference when illuminated with white light ?

P.T.O.

12. What are the factors on which the resolving power of a grating depends ?

13. Distinguish between e-ray and o-ray.

14. State the Malus's law. **(7×2=14)**

SECTION – C

Answer **any four** – Short essay/problem type – **Each** question carries **three** marks.

15. Explain the phenomenon of polarisation by double refraction.

16. Two thin lenses of focal lengths 10 cm and 30 cm separated by a distance of 20 cm in air. Find the system matrix and hence find the effective focal length.

17. What is the radius of the sixth zone in a zone plate of focal length 10 cm for a light of wavelength $\lambda = 6000$ Å ?

18. Light of wavelength 500 nm is incident normally on a plane transmission grating second order spectral line is observed at an angle of 30°. Calculate the number of lines per meter on the grating surface.

19. Derive an expression for fringe width in wedge shaped film.

20. In a Michelson interferometer 200 fringes cross the field of view when the movable mirror is moved through 0.0589 mm. Calculate the wavelength of light used. **(4×3=12)**

SECTION – D

Answer **any two** – Long essay type – **Each** question carries **five** marks.

21. Explain the formation of Newton's rings. Explain how it can be used to determine the wavelength of monochromatic light.

22. With proper theory explain two slit Fraunhoffer diffraction and obtain the conditions for maxima and minima.

23. What is system matrix ? Obtain it in the case of a system of two thin lenses separated by a distance and hence derive the formula for focal length.

24. Describe and explain the phenomenon of diffraction due to a straight edge. **(2×5=10)**

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