K19U 0590

Reg. No. : .....

Name : .....

IV Semester B.Sc. Degree (CBCSS-Reg./Supp./Imp.) Examination, April 2019
(2014 Admission Onwards)
CORE COURSE IN PHYSICS
4B04 PHY : Optics

Time : 3 Hours Max. Marks : 40

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

SECTION – A

(Answer **all**-Very short answer type-**Each** question carries **one** mark)

1. The cosine law in interference is _____
2. A ray passes through refracting surface. If T and R represents the translation and refraction matrices, then the system matrix S is _____
3. A soap bubble appears multicoloured in white light due to _____
4. A Nichol prism is based on the principle of _____

SECTION – B

(Answer **any seven**-Short Answer type-**Each** question carries **two** marks)

5. Draw the intensity distribution curve in fraunhoffer single slit diffraction pattern.
6. State the Brewster's law.
7. What are a quarter wave plates ? Give an expression for it.
8. What are the necessary conditions for interference of light waves ?
9. Define unit planes and nodel planes.
10. Define resolving power. Give an expression for resolving power of grating.
11. What are the dissimilarities between a zone plate and a convex lens ?
12. When white light is incident on a wedge shaped film, discuss about the nature of the fringes so formed ?

P.T.O.

13. Write down any two differences between interference and diffraction.

14. State the Malus's law.

SECTION – C

(Answer **any four** -Short Essay/Problem type-**Each** question carries **three** marks)

15. What is a zone plate ? Derive an expression for the focal length of zone plate.

16. When sunlight is incident on water surface at glancing angle of 37°, the reflected light is found to be completely plane polarised. Determine the refractive index of water and angle of refraction.

17. Calculate the radius of the first dark ring of the diffraction pattern produced by a circular aperture of radius 0.01 cm at the focal plane of a convex lens of focal length 10 cm. wavelength of light used 5×10^{-7} m.

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. What is a refraction matrix ? Deduce an expression for refraction matrix.

20. In the Newton's ring arrangement the radius of curvature of the curved surface is 50 cm. The radii of the 9^{th} and 16^{th} dark rings are 0.18 cm and 0.2235 cm respectively. Calculate the wavelength.

SECTION – D

(Answer **any two** -Long Essay type. **Each** question carries **five** marks)

21. Describe a Michelson interferometer. How can it be used for measuring the wavelength of monochromatic light ?

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

23. Explain the following methods for the production of polarised light.
    i) Polarisation by reflection
    ii) By double refraction
    iii) Scattering

24. Describe and explain the phenomenon of diffraction due to a straight edge.
