Reg. No. : ...............................

Name : ......................................

### IV Semester B.Sc. Degree (CBCSS – Reg./Supple./Imp.)
### Examination, May 2017
### (2014 Admn. Onwards)
### CORE COURSE IN PHYSICS
### 4B04 PHY : Optics

Time : 3 Hours                                                                 Max. Marks: 40

## SECTION – A

Answer **all** questions. **Each** carries **1** mark.

1. In the case of grating $\lambda/d\lambda$ is called _____

2. The shape of the wave front produced by a point source of light is _____

3. A Nicol prism is based on the _____ phenomenon.

4. Write down the expression of band width of interference pattern.                **(4×1=4)**

## SECTION – B

Answer **any seven** questions. **Each** carries **2** marks.

5. Explain the phenomenon of colours of thin film.

6. What are the uses of Michelson interferometer ?

7. Compare a zone plate and a convex lens.

8. What are Fresnel's half period zones ? Why are they called so ?

9. Why does a grating have closely spaced rulings ?

10. State and explain Malus Law.

11. Write a note on Nicol prism.

12. Explain about quarter wave plate and half wave plate.

13. Derive Cosine law.

14. Define resolving power of grating. Obtain an expression for it. (7×2=14)

## SECTION – C

Answer **any four** questions. **Each** carries **3** marks.

15. Obtain the expression for focal length of a system of two thin lenses.

16. In the Michelson's interferometer arrangement, if one of the mirrors is moved by a distance of 0.08 mm, 250 fringes cross the field of view. Calculate the wavelength.

17. A narrow slit is illuminated by a light of wavelength $6.4 \times 10^{-7}$ m is placed at a distance of 3 m from a straight edge. If the distance between the straight edge and the screen is 6m, calculate the distance between the first and fourth dark bands.

18. Find the radii of the first three transparent zone of zone plate whose first focal length is 1m. $\lambda = 5893A°$.

19. What is the longest wavelength that can be observed in the third order spectrum of a grating with 6000 lines per cm ? Assume normal incidence.

20. When sunlight incident on water surface at glancing angle of 37°, the reflected light is found to be completely plane polarized. Determine the refractive index of water and angle of refraction. (4×3=12)

## SECTION – D

Answer **any two** questions. **Each** carries **5** marks.

21. Explain the effect of translation and refraction and explain imaging by a spherical refracting surface.

22. Explain the formation of Newton's rings. How can these be used to determine the wavelength of monochromatic light ?

23. Discuss diffraction by a circular aperture.

24. Discuss in detail Fraunhofer diffraction due to a single slit. (2×5=10)