**K16U 2122**

### III Semester B.Sc. Degree (CBCSS – Reg./Supple./Imp.) Examination, November 2016
### (2014 Admn. Onwards)
### COMPLEMENTARY COURSE IN PHYSICS
### 3C03PHY : Optics and Photonics

Time : 3 Hours

Max. Marks : 32

## SECTION – A

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

1. Sine of the angle of acceptance of an optical fibre is known as _____

2. What is the condition for destructive interference ?

3. In Fresnel diffraction the radii of the various zones are proportional to _____

4. The tangent of the angle of polarization is numerically equal to _____ of the reflecting medium.

5. Expand LASER.

(5×1=5)

## SECTION – B

Answer **any 4** questions. Short answer type. **Each** question carries **2** marks.

6. Explain double refraction.

7. Explain Raman effect. How stokes and anti stokes lines are formed ?

8. What are the conditions for obtaining sustained interference pattern ?

9. Distinguish between spontaneous and stimulated emission.

10. Discuss about pile of plates.

11. Distinguish between Raman spectra and Fluorescence spectra.

(4×2=8)

P.T.O.

## SECTION – C

Answer **any 3** questions. Short essay/problem type. **Each** question carries **3** marks.

12. Discuss the formation of colours in thin films.

13. A narrow slit is illuminated by monochromatic light of wavelength $6 \times 10^{-7}$ m. It is placed at a distance of 0.1 m from a straight edge. If measurements are carried out at a distance equal to 1 m from the edge, what is the distance between the first and second dark bands ?

14. Calculate the thickness of a half wave plate for light of wavelength 580 nm. Principal refractive indices are $n_o = 1.544$ and $n_e = 1.553$.

15. Explain the construction and working of a Ruby Laser.

16. Calculate the numerical aperture and hence the acceptance angle for an optical fibre given that refractive indices of the core and the cladding are 1.45 and 1.40 respectively.

$$(3 \times 3 = 9)$$

## SECTION – D

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

17. Discuss the theory of diffraction grating. Describe in detail how you would use a transmission grating to determine the wavelength of light.

18. Explain production and detection of plane, circularly and elliptically polarized light.

19. Explain the formation of Newton's rings. Describe the method of determination of wavelength of monochromatic light by Newton's ring apparatus.

20. Explain the propagation of light in optical fiber. How the fiber optic communication system works ? Write some advantages of the system.

$$(2 \times 5 = 10)$$