K18U 1912

Reg. No. : .....

Name : .....

III Semester B.Sc. Degree (CBCSS – Reg./Sup./Imp.) Examination, November 2018
(2014 Admn. Onwards)
COMPLEMENTARY COURSE IN PHYSICS
3C03PHY : Optics and Photonics

Time : 3 Hours

Max. Marks : 32

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

SECTION – A

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

1. In He-Ne laser population inversion is achieved by
2. A Nichol prism is based on the principle of
3. The ratio of intensities of 2 waves is given by 4 : 1. Then the ratio of the amplitudes of the 2 wave is
4. Raman effect is an optical analogue of
5. Wide separation of spectral line indicates

(5×1=5)

SECTION – B

(Answer **any four**. Short answer type. **Each** question carries **two** marks) :

6. State law of malus. Give an expression for it.
7. What is a wave plate and give its classifications.
8. What are the uses of optical fibers ?
9. Write any two applications of Raman Effect.

P.T.O.

10. Define uniaxial crystals. Write down the classifications.

11. What are the necessary conditions for interference of light waves ? **(4×2=8)**

SECTION – C

(Answer **any three**. Short essay/Problem type. **Each** question carries **three** marks) :

12. Explain the phenomenon of polarization by double refraction.

13. What is the radius of the sixth zone in a zone plate of focal length 10 cm for a light of wavelength $\lambda = 6000A^{\circ}$?

14. 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.

15. The core and cladding of the silica fiber have refractive indices of $n_1 = 1.5$ and $n_2 = 1.4$ Respectively. Calculate the critical angle of reflection for the core cladding boundary and acceptance angle of the fiber.

16. 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 and 0.2235 respectively. Calculate the wavelength. **(3×3=9)**

SECTION – D

(Answer **any two**. Long essay type. **Each** question carries **five** marks) :

17. Explain the construction and principle of a quarter wave plate and half wave plate.

18. Explain the theory of zone plate. Derive an expression for its focal length.

19. Explain the formation of interference fringes by an air wedge. Derive an expression for fringe width.

20. Explain principle, construction and working of He-Ne laser with suitable diagram. **(2×5=10)**

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