Exam. Code : 103203

Subject Code : 8024

B.A./B.Sc. 3rd Semester (Old Sylb. 2018)

PHYSICS

Paper—B (Optics)

Time Allowed—3 Hours] [Maximum Marks—35

Note :— Attempt **ALL** questions from Section A and **One** question each from Sections B, C, D and E. All questions carry equal marks.

SECTION—A

1. (a) Write a short note on coherence of light.

   (b) What is the effect of increasing the slit width in a Fresnel's Biprism set-up ?

   (c) Explain why an excessively thin film appears black in reflected light.

   (d) What are Newton's rings ? Discuss about their formation.

   (e) Discuss about the resolving power of an optical instrument and hence explain Rayleigh's criterion for just resolution.

   (f) Write a short note on Polarisation by scattering.

(g) Unpolarized light of intensity 'I' falls on two crossed polarising sheets so that no light is transmitted. If a third polarising sheet is placed between them, can light be transmitted ? Explain. 7×1

SECTION—B

2. Monochromatic light from a narrow slit falls on two parallel slits and interference fringes are obtained on a screen (Young's experiment). Calculate the spacing between two consecutive Maxima or Minima. Discuss the shape of the fringes. 6,1

3. Define fringe width. Derive the formula used to determine the wavelength of sodium light with the help of a Fresnel's biprism. 1,6

SECTION—C

4. Discuss the phenomenon of interference of light due to thin films and find the condition of Maxima and Minima. Show that the interference patterns of reflected and transmitted Monochromatic light are complementary. 5,2

5. Explain the formation of fringes by Fabry Perot Interferometer and discuss the effect of increasing the reflectivity R on the intensity and sharpness of fringes. Compare the fringes with those of Michelson's Interferometer. 7

SECTION—D

6. Define resolving power and limit of resolution of a telescope. Deduce expressions for them and discuss it. Why do good telescopes have objectives of large apertures ? 1,5,1

7. What do you mean by Fresnel's half period zones ? Explain the construction and theory of a zone plate. Explain how zone plate forms the image of an object and show that it can act as a converging lens. 1,4,2

SECTION—E

8. (a) Define Plane of polarization and Plane of vibration. 2

   (b) State Brewster's law and prove that the angles of incidence and refraction are complementary when complete polarization is obtained by reflection at a plane glass plate. 5

9. (a) What do you understand by double refraction ? What are ordinary and extraordinary rays in a uniaxial crystal ? 2,2

   (b) Write short note on Wire grid Polariser. 3