Exam. Code : 103203
Subject Code : 1356

B.A./B.Sc. 3rd Semester

PHYSICS

(Optics)

Paper—B

Time Allowed—3 Hours] [Maximum Marks—35

Note :— Attempt ***all*** questions of section A and one question each from sections B, C, D and E. All questions carry equal marks.

SECTION—A

I. (a) What is the working principle of Michelson interferometer ?

(b) Lens coated with non reflecting thin films give a purple tinge when seen in reflected light. Why ?

(c) Differentiate between temporal and spatial coherence.

(d) Can diffraction occur for virtual images ? Why ?

(e) What are the factors on which the amplitude of light waves from half period zone at observation point depends ?

(f) Two nicol prisms are set so that maximum light is transmitted. Through what angle should one of the prisms be rotated to reduce the intensity to one half ?

(g) Why does the electric vector in the electromagnetic waves determine the polarization rather than the magnetic vector ?

SECTION—B

II. What is interference of light ? Write conditions for sustained interference.

III. Explain with analytical treatment the colour of thin films. Why is broad source necessary ?

SECTION—C

IV. Explain and differentiate between division of wavefront and division of amplitude. Discuss Fresnel's Biprism.

V. (a) In a double slit experiment, two slits are illuminated with light of wavelength 450 nm. If the slits are separated by 2.5 mm and the slit to screen distance be 1 m, find the distance of the 5^{th} bright and dark fringe on either side of the central maximum.

(b) Two straight narrow parallel slits are 0.5 mm apart. If the screen is placed at a distance of 100 cm from the slits, calculate the fringe width.

SECTION—D

VI. State and explain Rayleigh's criterion for limiting resolution. Derive an expression for the resolving power of a Fabry Parot interferometer.

VII. Explain the theory of Zone plate. Compare its function with that of a convex lens.

SECTION—E

VIII. Explain the polarisation wire grid polarizer.

IX. Distinguish between unpolarized, plane polarized and polarized light. Explain how polarization of light is possible by scattering.