

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. <http://www.gnduonline.com>
- 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 5th 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 Perot 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.

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