

No of printed pages: 02

Seat No.:



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS) (Grant-in-Aid)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Bachelor of Science (Semester III) Internal Examination - 2025
US03MAPHY01: OPTICS

Date: 23-09-2025, TUESDAY

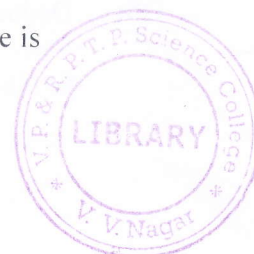
Total marks: 30

Time: 2:45 p.m. to 4.15 p.m.

Note: Figures to the right indicate marks of the question.

Q1: Write the most appropriate answer from the following multiple-choice questions. [06]

- (i) -----points are also called the unit points.
- (a) Principal (c) Focal
(b) Nodal (d) None of these
- (ii) The ratio of the focal lengths of field lens to eye lens in Huygen eyepiece is
- (a)3:1 (c)1:4
(b)1:2 (d)1:1
- (iii) Interference occurs due to _____ of the light.
- (a) wave nature (c)Both a and b
(b) particle nature (d) None of these
- (iv) _____ is a device which is used to find whether the light is polarized or not polarized.
- (a) Polarizer (c) Lens
(b) Analyzer (d) Mirror
- (v) The ray which does obeys Snell's law of refraction is known as _____ ray.
- (a) simple (c) extra-ordinary
(b) ordinary (d) magnetic
- (vi) The propagation of light in an optical fiber is based on the principle of
- (a) Total internal reflection (c) Dispersion of light
(b) Refraction (d) None of these



F.T.O

Answer the following questions in detailed.

[6 marks each]

- Q2:** Explain in details about the construction of Huygens eye piece along with its cardinal points and derive necessary equations.

Or

Explain in details about the construction of Ramsden eye piece along with its cardinal points and derive necessary equations.

- Q3:** Describe the construction and working of Newton's rings. Derive the conditions for the formation of dark and bright rings.

Or

Write a short note on Fraunhofer diffraction at double slits and explain the conditions for interference and diffraction maxima and minima.

- Q4:** Clearly distinguish between (i) interference and diffraction of light, and (ii) positive and negative crystals.

Or

Describe the superposition of two linearly polarized light waves at right angles and derive the general equation of the resulting ellipse.

- Q5:** Deduce an expression for acceptance angle and critical angle of an optical fiber.

Or

Explain classifications of optical fiber.





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Bachelor of Science (Semester III) Quiz - 2025
US03MAPHY01: OPTICS

Date: 23-09-2025, Tuesday

Time: Maximum 20 minutes

Total marks :15

Q-1 Fill in the blanks with appropriate answer given in the bracket. [08]

- (i) The power of a lens is the _____ of its focal length in meter. (reciprocal/ proportional)
- (ii) Aberrations occur due to the dispersion of light are called _____ aberrations. (monochromatic/distortion)
- (iii) The central fringe is _____ in the fringes produced by Lloyd's mirror. (bright / dark)
- (iv) Interference pattern in a biprism experiment is due to the splitting of _____. (amplitude / wavefront)
- (v) In _____ crystals both the refracted rays are extraordinary rays. (biaxial / uniaxial)
- (vi) In _____ experiment the complete set of fringes is obtained. (Fresnel Biprism / Lloyd's mirror)
- (vii) The innermost cylindrical region is the light guiding region known as the _____. (core/cladding)
- (viii) If n_1 is refractive index of the core and n_2 is the refractive index of the cladding in an optical fiber than it is required that, _____ for total internal reflection. ($n_1 > n_2 / n_1 < n_2$)

Q-2 Whether the following statement is true or false. Write your answer in the box [07]

- (i) Coma is a type of monochromatic aberration. []
- (ii) Fabry Perot interferometer make use of the fringes of equal inclination. []
- (iii) In the biprism experiment, the fringe width is $\beta = \frac{\lambda d}{D}$. []
- (iv) The tangent of the angle of polarization is numerically equal to the refractive index of the medium. This is Malu's law. []
- (v) $\Delta (=f_1 + f_2 - d)$ is known as optical separation of the lens system. []
- (vi) The numerical aperture is defined as the sine of the acceptance angle. []
- (vii) GRIN fiber stands for "Graded Index Fiber". []

