

RS 36183

THREE YEAR B.Sc. (CBCS) DEGREE EXAMINATION, APRIL/MAY 2022.

THIRD SEMESTER

PHYSICS (WM)

Paper III — WAVE OPTICS

(2015-16 to 2019-20 Admitted Batch)

Time : Three hours

Maximum : 75 marks

(No additional sheet will be supplied)

PART A — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

Write a short note on Astigmatism.

Write a note on distortion and how to remove it?

Discuss the conditions for interference of light.

Explain the formation of colors in thin films.

Distinguish between Fresnel and Fraunhofer diffraction.

Derive an expression for resolving power of grating.

Write a short note on Malus law.

Write a note on double refraction.

Write a short note on Einstein coefficients.

What are the advantages of fiber optics?

PART B — ($5 \times 10 = 50$ marks)

Answer ALL questions.

What is spherical aberration? Explain minimizing methods of spherical aberration.

Or

What is chromatic aberration? Obtain an expression for the chromatic aberration of a lens. Derive the condition for achromatism, when two lenses are in contact and separated by a distance.

Describe the experiment to determine wavelength of light using a Fresnel's biprism.

Or



15. Explain the Fraunhofer diffraction due to double slit with necessary theory. There are 15,000 lines per inch in a grating. What the maximum number of orders obtained by using light of wavelength $6000\text{\AA}$?

Or

16. Describe the construction and working of a zone plate with necessary theory.
17. Describe the construction and working of a Nicol prism. Calculate the specific rotation of 30% sugar solution if the plane of polarisation is turned through 30° after traversing 25 cm.

Or

18. Define quarter wave plate and half wave plate. Deduce the equation for the thickness of a calcite crystal plate using quarter and half wave plates.
19. Describe the construction and working of a Ruby laser.

Or

20. State and explain an optical fiber. Explain the different types of optical fibers.
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