Date: 11-05-2023   Dept. No.   Max. : 100 Marks
Time: 01:00 PM - 04:00 PM

PART – A   (10 x 2 = 20 Marks)

Q. No. Answer ALL questions

1   What are cardinal points and unit points in an optical system?

2   Explain the necessary conditions for observing interference fringes.

3   Differentiate between Fresnel and Fraunhofer diffractions.

4   State any two differences between Ramsden's and Huygen's eyepieces.

5   Calculate the thickness of a doubly refracting plate capable of producing a path difference of $\lambda/4$ between ordinary and extra ordinary waves. Given λ = 5890 Å, μ_0 = 1.53, μ_e = 1.54.

6   Explain astigmatism.

7   State Malu's law.

8   What is a zone plate?

9   Define resolving power of a prism.

10 Write a short note on stimulated emission.

PART – B   (4 x 7.5 = 30 Marks)

Answer any FOUR questions

11 Describe the principle and structure of optical fibers and explain how the light wave is propagated in single and multimode fibers.

12 Discuss the phenomenon of interference in thin films due to reflected light.

13 Explain Fraunhoffer diffraction at a circular aperture.

14 Write a detailed note on polarization by reflection and double refraction.

15 Outline the theory of plane transmission grating.

16 Derive the condition for minimum spherical aberration for a combination of two thin lenses.

Answer any FOUR questions

18   Using a neat diagram describe in detail the construction and working of a carbon dioxide laser.

20   Describe Fresnel's biprism. Explain how the wavelength of light can be determined using it.

21   Explain in detail the construction and working of a Laurent's half shade polarimeter. Explain how it is used to determine the specific rotation of sugar solution.

22   What is a system matrix? Analyze a system of thin lenses using the matrix formulation and hence derive the formula for its focal length.

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