



Date: 14-11-2024

Dept. No.

Max. : 100 Marks

Time: 09:00 am-12:00 pm

SECTION A

Answer ANY FOUR of the following:

4 x 10 = 40

Marks

1. Derive the conditions for the combination of two narrow angled prisms to produce deviation without dispersion.
2. What is an air wedge? Explain the formation of interference fringes by an air-wedge. Derive an expression for the fringe width.
3. What do you mean by spherical and chromatic aberration of a lens? Explain their causes
4. What is meant by double refraction? Explain Huygen's theory on double refraction in uniaxial crystals.
5. What are the components of laser? Describe ruby laser and explain its working. What is a direct vision prism? How do you construct such a prism?
6. In Lloyd's single mirror interference experiment, the slit source is at a distance of 2 mm from the plane of the mirror. The screen is kept at a distance of 1.5 m from the source. Calculate the fringe width. (Given: Wave length of light is 5890 \AA).
7. Explain the production and detection of circularly polarised light
8. Discuss Fraunhofer diffraction due to a single slit.

SECTION B

Answer ANY THREE of the following:

3 x 20 = 60

Marks

9. (a) What is system matrix? Analyse the system of two thin lenses using the matrix formulation. (b) Derive the conditions for the combination of two narrow angled prisms to produce dispersion without deviation.
10. (a) Describe the Fresnel's Biprism. Explain how the wavelength of light can be determined with its help. (b) Derive an expression for resolving power of a microscope.
11. (a) Explain with necessary theory, Fraunhofer diffraction due to double slit. (b) Discuss missing orders in a double slit
12. (a) Explain the principle, construction, working and uses of Nicol prism with a neat diagram. (b) What are Einstein coefficients? Obtain the relation between them.
13. (a) What is carbon dioxide laser? With necessary diagrams explain the construction and working of it. (b) Outline the theory of second harmonic generation.

14. What is meant by optical activity? Discuss the working of a Laurent's half shade polarimeter to determine specific rotation of sugar.

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