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THIRD SEMESTER B.Sc. DEGREE EXAMINATION, FEBRUARY 2023

PHYSICS

Time : Two Hours Maximum : 60 Marks

All parts of the question paper is compulsory as per choice in each part.
Scientific calculator is allowed.
While solving problems substitution and intermediate steps should be shown.
Neat labelled diagram is necessary wherever required.
Symbols used in the questions have usual meaning.

Part A

Answer any **five** *of the following questions.*
Each question carries 2 *marks.*

1. Define transverse wave motion.
2. What is energy density of plane progressive wave ?
3. What is chromatic aberration ?
4. Define spherical aberration ?
5. What is division of wavefront ?
6. Light of wavelength 6000 Å falls on a biprism, interference fringes are produced at a distance of 1 meter from source find fringe width. Given : distance between two sources is 2×10^{-3} m.

(5 × 2 = 10 marks)

Part B

Answer any **four** *of the following questions.*
Each question carries 5 *marks.*

7. Derive the relation between particle velocity and wave velocity.
8. Derive the Second law of reflection from Fermats principle.
9. Describe the method of determination of wavelength of monochromatic source using Lloyd's single mirror.
10. Give the comparison between Zone plate and Convex lens.
11. A parallel beam of sodium light is allowed to be incident normally on a plane grating having 4000 lines per cm. and a second order spectral line is observed to be deviated through 30°. Calculate the wavelength of spectral line.

(4 × 5 = 20 marks)

Turn over

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Part C

Answer any **three** *of the following questions.*
Each question carries 10 *marks.*

12. Give the theory of Helmholtz resonator.

13. What are cardinal points of an optical system. Derive an expression for equivalent focal length of two lens separated by a finite distance.

14. With neat diagrams, relevant theory, explain the method of determining wavelength of monochromatic light using Newton's ring.

15. Define specific rotation. Describe construction and working of Laurent's half shade polarimeter.

(3 × 10 = 30 marks)

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