

HG(2) — Phy (3)

2020

Time : 3 hours

Full Marks : 75

Pass Marks : 34

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer five questions selecting two from each Group in which Q. No. 1 is compulsory.

1. Answer any **three** questions of the following : 5×3 = 15
- (a) Explain the Nodal and Cordinal point of a system of Co-axial lens.
 - (b) State and explain condition for interference of Light.
 - (c) Explain Helmholtz and Lagrange equations.

TT - 1/1

(Turn over)

- (d) Explain the Rayleigh's criterion for limit of resolution.
- (e) What is Brewster's law ? Give an application of it.
- (f) What is optical fiber ? Give the principle involved in its working.

Group - A

- 2. State and explain Fermat's principle. Use this principle to derive the lens formula. 15
- 3. Discuss the theory of diffraction at a straight edge and show that the bands produced are not equally spaced. 15
- 4. Give the theory of Newton's ring. How the wavelength of monochromatic source is determined ? 15
- 5. What do you understand the resolving power of an optical instrument ? Find an expression of resolving power of a plane transmission grating. 15

TT - 1/1

(2)

Contd

Group – B

6. State Maxwell's field equations and obtain an expression for the velocity of Propagation of plane electromagnetic wave in a medium of permeability μ and permittivity ϵ . 15
7. Derive Fresnel's formula for reflection and refraction of electromagnetic theory of light. What is Brewster angle? 15
8. Explain production and defection of linearly, elliptically and circularly polarised light. 15
9. Write short notes on any **two** of the following : $7\frac{1}{2} \times 2 = 15$
- (a) Poynting vector
 - (b) Zone plate
 - (c) Basinet's compensator
 - (d) Transverse nature of electromagnetic wave

