

2017

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 questions are of equal value.

Answer five questions, selecting two each from Group – A and Group – B, in which Q. No. 1 is compulsory.

1. Answer any **three** questions of the following :

- (a) Define diffraction of light. Differentiate between Fresnel's and Fraunhofer's class of diffraction.
- (b) Use Fermat's principle to obtain the law of reflection of light.

- (c) Obtain equation of continuity from Maxwell's equation of electromagnetic field. •
- (d) Give a brief explanation of propagation of electromagnetic wave in ionosphere. •
- (e) Discuss the difference between zone plate and convex lens. •
- (f) What is optical fiber ? Give the principle involved in its working.

Group – A

- 2. What are cardinal points of a thick lens ? Obtain the thick lens formula. •
- 3. Describe with neat diagram, the construction and working of a Michelson interferometer. Discuss one of its application. •
- 4. Give the construction and theory of a plane diffraction grating. How it is used to measure wave length of sodium light ?
- 5. Discuss the theory of diffraction at a straight edge and show that the bands produced are not equally spaced.

Group – B

6. Obtain Maxwell's equations for electromagnetic field from the basic laws of physics representing these equations.
7. Define Poynting vector for electromagnetic waves. Obtain Poynting theorem for the flow of electromagnetic energy in a medium. ◀
8. Explain production and deflection of linearly, elliptically and circularly polarised light.
9. Write notes on any **two** of the following :
 - (a) Brewster's law ◀
 - (b) Babinet's compensator
 - (c) Nicol prism
 - (d) Transverse nature of electromagnetic wave. ◀

