

2021-24

Time : 3 hours

Full Marks : 75

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

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A

1. Answer all questions of the following : $1 \times 10 = 10$
 - (a) What is range of audible sound ?
 - (b) Define Group velocity.
 - (c) What is speed of light in vaccume ?
 - (d) What is velocity of sound in air ?
 - (e) What is Coherent source ?
 - (f) Which type of fringes obtained by a Fabry Perot Interferometer ?

- (g) Define resolving power of an optical instrument.
- (h) What is Zone plate ?
- (i) What is the wavelength of Sodium light ?
- (j) Write the condition for constructive interference in Michelson Interferometer.
2. Write down the conditions to get constructive and destructive fringes. 5

Group – B

Answer any four questions of the following :

$$15 \times 4 = 60$$

3. What are Transverse and Longitudinal waves ?
Derive the wave equation of a progressive Harmonic wave.
4. State Newton's formula for velocity of sound in air. Discuss the necessary correction applied by Laplace.
5. Discuss the formation of bright and dark circular fringes in Newton's ring experiment and show that

the separation between successive interference fringes decreases as the order of fringes increases.

6. Discuss the construction and working of a Fabry Perot Interferometer. Why it is more suitable for the study of Hyperfine structure ?
7. Discuss, in detail, the Fraunhofer diffraction from N-slits. Explain the dependence of intensity on N.
8. Discuss, in detail, the Fresnel-Kirchoffs integral formula.

