

2018-21

Time 3 hours

Full Marks 60

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

(Short-answer Type Questions)

- 1 Answer any three of the following $4 \times 3 = 12$
- (a) What are damped Oscillations ?
 - (b) Deduce the differential equation of wave motion
 - (c) Derive a relation between phase velocity and group velocity
 - (d) Explain fringes of equal thickness and fringes of equal inclination

- (e) What are the differences between Fresnel's and Fraunhofer's diffraction ?
- (f) Compare the zone plate with a convex lens

Group – B

(Long-answer Type Questions)

Answer any four of the following questions

$12 \times 4 = 48$

- 2 What are forced vibration of a body ? Give the full theory of forced vibration of a body and deduce the condition for amplitude resonance
- ~~3~~ Give an account of Sabine's work and deduce Sabine's formula <https://www.vbuonline.com>
- 4 Describe the construction and working of a Fabry-Perot interferometer and deduce an expression for the intensity distribution in the fringes
- 5 What is a zone plate ? Show that it has multiple foci
- ~~6~~ Explain the colours exhibited by a thin soap-film in reflected white light

7. Discuss Fraunhofer's diffraction at a single slit
Derive expression for intensity distribution
8. What is Rayleigh's criterion for the limit of resolution? Obtain expression for resolving power of a grating
9. Write notes on any two of the following .
- (a) Half-period Zones
 - (b) Newton's rings
 - ~~(c) Intensity of wave~~
 - ~~(d) Newton's formula for velocity of sound~~

