

(6 pages)

Reg. No. :

Code No. : 30620 E Sub. Code : CMPH 21

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2022.

Second Semester

Physics — Core

OPTICS AND ACOUSTICS

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer :

1. The dispersive power of prism depends upon

- (a) the shape of the prism
- (b) the material of the prism
- (c) the angle of the prism
- (d) height of the prism

2. The reciprocal of dispersive power is called

- (a) constringence
- (b) dispersive power
- (c) dispersion
- (d) angular dispersion

3. The effective path difference in colour of thin film is

- (a) $\frac{\lambda}{2}$
- (b) $2 \mu t \cos r$
- (c) $2 \mu t \cos r + \frac{\lambda}{2}$
- (d) $\mu t \cos r + \frac{\lambda}{2}$

4. The radius of the dark ring is proportional to

- (a) $\sqrt{r}$
- (b) $\sqrt{Rn}$
- (c) $\sqrt{n}$
- (d) $\sqrt{nR\lambda}$

5. The easiest pattern observed by the spectrometer is

- (a) Fresnel
- (b) Fraunhofer
- (c) Newton
- (d) Thomas Young



6. The most common optically active substance is
 (a) Salt (b) Sugar
 (c) Quartz (d) Sodium Chloride
7. The Intensity of sound will be depends on
 (a) frequency (b) amplitude
 (c) angular frequency (d) velocity
8. The frequencies of the harmonies of a string are
 (a) of the same pitch (b) unrelated
 (c) in the ratio 1:3:5 (d) in the ratio 1:2:3
9. Ultrasonic wave carry more
 (a) energy only (b) frequency only
 (c) heat (d) energy & frequency
10. The relationship between speed (v) frequency (f) wavelength (λ) is
 (a) $Vf = \lambda$ (b) $f\lambda = V$
 (c) $V\lambda = f$ (d) $V = \lambda/f$

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PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain how will you minimize spherical aberration in a lens
 Or
 (b) Distinguish between Ramsden eyepiece and Huygen's eyepiece.
12. (a) Determine the diameter of a thin wire using a air wedge.
 Or
 (b) Discuss the theory of Newton's rings method.
13. (a) Explain the method of Nicol Prism used as an analyser.
 Or
 (b) Explain the working and uses of quarter wave plate.
14. (a) What are forced vibrations. Discuss the phenomenon of resonance.
 Or
 (b) Explain how the diameters of two wires can be compared using sonometer.

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[P.T.O.]



15. (a) Explain the requisites of good acoustics of building.

Or

- (b) Write down any five applications of ultrasonic wave.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the refraction through a thin prism.

Or

- (b) Explain the construction and working of Gauss eye piece.

17. (a) Explain the theory of interference fringes.

Or

- (b) Explain Michelson interferometer with a neat diagram.

18. (a) Obtain the expression for fresnel diffraction at a narrow wire.

Or

- (b) Explain the production and detection of plane elliptical and circularly polarised light.

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19. (a) Give the theory of Helmholtz resonator and find an expression for its fundamental frequency.

Or

- (b) Explain Melde's experiment for transverse and Longitudinal vibrations.

20. (a) What are ultrasonics. Describe in detail one method of their production and defection.

Or

- (b) Explain what causes reverberation in a hall and how it can be minimized.
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