

UDB(Sem-IV) — Phy
(GE / DSC)

2019

Time : 3 hours

Full Marks : 70

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 **all** the Groups as directed.

Group – A
(Compulsory)

1. Select the correct answer in each of the following :
2×10 = 20

(a) The SI unit of intensity of sound wave is .

- (i) Wm^{-3}
- (ii) Wm^{-2}
- (iii) W^{-3}m
- (iv) None of these

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(Turn over)

- (b) A thin film appears brilliantly coloured in
white light due to :

- (i) Diffraction of light
- (ii) Interference of light
- (iii) Polarisation of light
- (iv) None of these

- (c) The ratio of intensities of two waves of same
frequency is 1 : 16. The ratio of their
amplitude will be :

- (i) 1 : 4
- (ii) 1 : 16
- (iii) 4 : 1
- (iv) 1 : 8

- (d) In Young's double slit experiment, the
distance between two slits is d , the distance
of the screen from the slits is D , wavelength
of light used is λ . The distance of first bright
fringe from central bright fringe is :

- (i) $\frac{2D\lambda}{d}$

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(2)

Contd.

(ii) $\frac{D\lambda}{d}$

(iii) $\frac{D\lambda}{2d}$

(iv) $\frac{D}{\lambda d}$

(e) Newton's rings are fringes of :

- (i) Equal thickness
- (ii) Equal inclination
- (iii) Both (i) and (ii)
- (iv) None of these

(f) For a given tension, the velocity 'v' of transverse vibration along a stretched string depends on mass per unit length 'm' as :

- (i) $v \propto m$
- (ii) $v \propto m^{\frac{1}{2}}$
- (iii) $v \propto m^2$
- (iv) None of these

(g) The electric and magnetic fields of light wave are :

- (i) Parallel to each other and they are in same phase

(ii) Parallel to each other and they are in opposite phase

(iii) Perpendicular to each other and they are in same phase

(iv) Perpendicular to each other and they are in opposite phase

(h) The resolving power of a given telescope is highest for :

- (i) Blue Light
- (ii) Yellow Light
- (iii) Red Light
- (iv) Green Light

(i) If the radius of first zone of a zone plate is 0.3 mm, then for the light of wavelength 6000\AA its principal focal length is :

- (i) 1.5 cm
- (ii) 15 cm
- (iii) 24 cm
- (iv) 50 cm

- (i) The secondary wavelets reaching a point from two consecutive half-period zones, drawn for the point on a wavefront, have an average phase difference of :

(i) $\frac{\pi}{2}$

(ii) $\frac{\pi}{4}$

(iii) 2π

(iv) π

Group – B

Answer, in short, any four of the following questions . 5×4 = 20

2. Distinguish between ripples and gravity waves.
3. Explain Huygen's Principle of Secondary wavelets.
4. Find expression for velocity of transverse wave along a stretched string.

5. Explain the difference between Fresnel and Fraunhofer classes of diffraction.
6. Explain Rayleigh's criterion for limit of resolution.
7. Distinguish between temporal and spatial coherence. <https://www.jharkhandstudy.com>
8. What type of fringes are obtained in Fabry-Perot interferometer. Explain in term visibility of fringes.
9. Distinguish between division of amplitude and division of wave front.

Group – C

Answer any two of the following questions :

15×2 = 30

10. Obtain Newton's formula for velocity of sound in gases and discuss Laplace's correction.
11. What is a Zone plate ? Give its theory. Show that a Zone plate has multiple foci.

12. Explain the formula of Newton's rings by reflected monochromatic light and show that the radii of dark rings are proportional to the square root of the natural number.
13. Describe a Michelson's interferometer. How will you use it to measure the wavelength of monochromatic light ?



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