PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Define dispersive power. Derive the condition to produce deviation without dispersion.

Or

(b) Explain the construction and working of Ramsden eyepiece.

17. (a) Describe Michaelson Interferometer with a neat diagram.

Or

(b) Discuss in detail the determination of thickness of thin wire using air-wedge.

18. (a) Define Fresnel diffraction. How will you determine the wavelength of light using it?

Or

(b) Define Fraunhofer diffraction. How will you determine the wavelength of light using it?

19. (a) Discuss in detail the production and detection of circularly polarized light.

Or

(b) Define acceptance angle and numerical aperture. Derive the expressions for them.

20. (a) Describe the construction and working of CO_2 laser.

Or

(b) Describe the construction and working of a dye laser.

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Reg. No. : .....

Code No. : 41376 E **Sub. Code : SMPH 22**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Second Semester

Physics – Main

OPTICS

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Chromatic aberration occurs due to ———— of light
   (a) distortion (b) dispersion
   (c) scattering (d) bending

2. Huygen's eyepiece is a fully free from ———— aberration
   (a) coma
   (b) astigmatism
   (c) chromatic aberration
   (d) none

3. In interference, the expression for band width (β) is, (D-distance between slit and screen, d-distance between the slits)
   (a) $\frac{\lambda D}{d}$ (b) $\frac{\lambda}{dD}$
   (c) $\frac{\lambda d}{D}$ (d) None

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4. A monochromatic wave contains waves with _____

(a) Same phase
(b) Same frequency
(c) Different frequency
(d) None

5. In half period zones, each zone differ from its neighbor by a phase difference of

(a) $\pi/4$ (b) $\pi/2$
(c) π (d) None

6. In a Fresnel diffraction, the incident waves are _____ waves

(a) Plane (b) Spherical
(c) Elliptical (d) None

7. A half wave plate produces a phase difference of _____

(a) π (b) $\pi/2$
(c) $\lambda/4$ (d) None

8. The acceptance angle (Φ max) is equal to _____ (NA is the numerical aperture)

(a) sin (NA) (b) $\sin^{-1}(NA)$
(c) $\cos^{-1}(NA)$ (d) None

9. The laser output is due to _____ emission

(a) spontaneous (b) stimulated
(c) direct (d) none

10. The efficiency of CO_2 laser is around _____

(a) 100% (b) 40%
(c) 10% (d) Zero

PART B — (5 × 5 =.25 marks)

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

Each answer should not exceed 250 words.

11. (a) What is Astigmatism? How it is eliminated?

Or

(b) Explain the working of prism binocular.

12. (a) When two waves are superposing, find the amplitude of the resultant wave analytically?

Or

(b) Explain the testing of plainness of surfaces.

13. (a) Define diffraction. What are the types of diffractions?

Or

(b) What is a zone plate? How does it differ from a convex lens?

14. (a) Define : Quarter wave plate and Half wave plate.

Or

(b) Distinguish between single mode and multimode fibers.

15. (a) Give any five application of laser.

Or

(b) Give any five applications of Holography.

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