

**B A, BSC, BCOM DEGREE END SEMESTER EXAMINATION – MARCH 2026****UGP (HONS.) SEMESTER – 4: – DISCIPLINE SPECIFIC COURSE****COURSE: 24UPHYDSC203: WAVE OPTICS***(For Regular 2024 Admission)*

Time: 1.5 Hours

Max. Marks: 50

**PART A (Short Answers)*****2 marks each - Answer any 10 questions***

1. Show that the phase velocity of a plane wave is same as the propagation velocity of the wave.
2. Briefly explain the principle of Nicol prism.
3. Briefly explain the state of polarisation of a natural light.
4. Define the term dichroism and birefringence.
5. Define coherence. Explain briefly how you can generate coherent sources in practice.
6. Briefly explain the kind of fringes in Newton's rings experiment.
7. Relate optical path and phase. Briefly mention the effect of reflection on the phase of the wave.
8. Explain the principle behind the colours seen in oil spills on the road and express the conditions.
9. Define dispersive power of grating and give the mathematical expression.
10. Distinguish between Fresnel's and Fraunhofer diffractions
11. Discuss any two diffraction phenomena in nature.
12. Differentiate between prism and grating spectra.

**(2 x 10 = 20)****PART B Short Essays or Problems*****(5 marks each) Answer any 6 questions***

13. Explain the superposition of two orthogonal waves leading to the production of an elliptically polarized light.
14. Explain optical activity and hence discuss the Fresnel's explanation for optical activity.
15. Find the least thickness for a calcite plate that would convert the plane-polarised light into circularly polarised light. Given the refractive indices of o-ray and e-ray as 1.658 and 1.486, respectively, and the wavelength of light used is 5000 Å.

16. In a Young's double slit experiment, the 8<sup>th</sup> bright band is observed at a distance of 2 mm from the central bright fringe. Calculate the wavelength of light used, if the distance between the slits is 0.5 mm and that of the screen from the slits is 1.2 m.
17. Explain how the parameters involved in the determination of wavelength are obtained in a Fresnel's biprism experiment.
18. Obtain the expression for the radius of the Newton's ring.
19. Explain half period zones and obtain the expression for radius and area of half period zones. Find the radius of the first zone in a zone plate of focal length 25 cm for a light of wavelength 600 nm.
20. Explain Fraunhofer diffraction at a single slit.

**(5 x 6 = 30)**