TB214110W

Reg. No :.....

Name :.....

B.Sc. DEGREE (C.B.C.S.) EXAMINATION, MARCH 2023

(2021 Admissions Regular, 2020 Admissions Supplementary / Improvement, 2019 &2018 Admissions Supplementary)

SEMESTER IV - COMPLEMENTARY COURSE 2 (PHYSICS)

(For Chemistry)

PH4C02B18 - PHYSICAL OPTICS , LASER PHYSICS AND SUPERCONDUCTIVITY

Time : 3 Hours **Maximum Marks : 60**

Part A

I. Answer any Ten questions. Each question carries 1 mark (10x1=10)

1. Explain the factors which affect the width of interference fringes.
2. When white light is used to produce an interference pattern, compare the fringes produced by red and blue.
3. Distinguish between Fresnels and Fraunhofer diffractions.
4. Define dispersive power of grating.
5. The quarter and half wave plates are generally called retardation plates. Why?
6. Explain the significance of blunt corners of the calcite crystal.
7. Explain the term principal plane.
8. What is metastable state?
9. Explain the term population inversion.
10. Differentiate between meridional ray and axial ray.
11. Explain the purpose of cladding on the fiber cables.
12. Describe the features of type I super conductor.

Part B

II. Answer any Six questions. Each question carries 5 marks (6x5=30)

13. Prove that two interfering waves of equal amplitude produce a region of maximum amplitude and complete darkness.
14. Plane waves of $\lambda = 500$nm are incident on a slit. On a screen 3m away from the slit, the first minimum is found to lie at 3mm on either side of the central maximum. Calculate the width of the slit.
15. Find the radius and area of the third transparent zones of a zone plate whose first focal length is 1m for a wavelength of 400 nm.
16. Discuss the significance of Brewster's angle. Find the polarizing angle of water if μ for water is 1.33.
17. A beam of light passing through water strikes a glass plate which is also in water. When the angle of incidence is 51^0, the reflected beam is found to be plane polarized. Calculate the refractive index of glass with respect to water.
18. Explain the working of YAG laser.
19. Find the relative population of two states in a ruby laser that produces a light beam of wavelength 694.3nm at 400K and 500K.
20. Briefly explain step index and graded index fibers.
21. Explain Meissner effect.

Part C

III. Answer any Two questions. Each question carries 10 marks **(2x10=20)**

22. With a neat diagram, describe Young's double-slit experiment.
23. Explain diffraction pattern due to straight edge.
24. Explain the phenomenon of double refraction in uniaxial crystals. How is this phenomenon explained using Huygen's theory ?
25. With necessary theory, describe the lasing action in Helium Neon laser