QP CODE: 25019365

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Reg No : .....

Name : .....

B.Sc DEGREE (CBCS)) REGULAR/ IMPROVEMENT/ REAPPEARANCE / MERCY CHANCE EXAMINATIONS, FEBRUARY 2025

Fourth Semester

Complementary Course - PH4CMT02 - PHYSICS - OPTICS AND SOLID STATE PHYSICS

(Common for B.Sc Chemistry Model I, B.Sc Geology Model I)

2017 Admission Onwards

70982490

Time: 3 Hours Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Why two independent sources of light cannot be coherent?
2. Explain the theory of plane transmission grating.
3. Angular separation of any two spectral lines in grating spectrum is double in the second order spectrum in comparison to the first order spectrum. Why?
4. Explain principal section of a crystal.
5. What is dextro rotatory substance?
6. Write any two pump sources in laser.
7. What is meant by acceptance angle?
8. Differentiate between polar and non-polar molecules.
9. What you mean by electric displacement vector D?
10. Explain the phenomenon ferroelectric effect.
11. Write down the axial lengths of unit cell and interaxial angles in Cubic crystal system.
12. Give the crystal parameters of monoclinic crystal system.

(10×1=10)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Two coherent sources whose Intensities are in the ratio 25:16 produce interference fringes. Calculate the ratio of maxima to minimum intensity in the fringe system.

14. Light of wavelength 5500 Å from a narrow slit is incident on a double slit. The overall separation of 5 fringes on a screen 200 cm away is 1 cm. Calculate the slit separation and fringe width.

15. Two straight and narrow parallel slits 1 millimeter apart are illuminated by a monochromatic light. Fringes formed on the screen held at distance of 100 cm are 0.5 mm apart. What is the wavelength of the light used?

16. In Newton's rings experiment find the radius of curvature of the lens surface in contact with the glass plate when a light of wavelength 5890 Armstrong is illuminated. The diameter of the third ring is 3.2 mm. The light is falling at such angle that it passes through the air film at an angle of zero degree to the normal.

17. Explain a) polarisation by double refraction b) polarisation by scattering.

18. What is laser? What are the main components in a laser source? Distinguish between meta-stable state and excited state.

19. Discuss the different polarisation mechanisms of dielectrics.

20. Write a short note on (a) crystal structure (b) crystal lattice (c) Basis (d) translational vectors.

21. In a crystal, a lattice plane cuts intercepts of 2a, 3b and 6c along the axes, where a, b and c are primitive vectors of the unit cell. Determine the Miller indices of the given plane.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Explain the interference phenomenon in thin films. What are the differences between interference and diffraction?

23. State and explain malu's law.

24. With the help of energy level diagrams explain three level laser systems and four level laser systems. Explain any five applications of laser.

25. Discuss the close –packed and loose-packed structures in crystals with mention on hcp, fcc, bcc and simple cubic structures.

(2×10=20)