19101372

QP CODE: 19101372

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) EXAMINATION, MAY 2019

Fourth Semester

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

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

2017 Admission onwards

E377806B

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

Part A

Answer any **ten** questions.

Each question carries **1** mark.

1. Explain the formation of newton's ring by reflection of light.
2. Why do we use lens to prepare fraunhofer diffraction?
3. Define resolving power of grating.
4. Explain optic axis and principal section of a crystal.
5. What is a polaroid ?
6. Distinguish between meta-stable state and excited state.
7. What is the function of optical resonator?
8. Write two examples of polar molecules.
9. Explain the term permittivity of the medium.
10. Explain the significance of Curie point for ferroelectric crystals.
11. Define crystal structure.
12. What is coordination number?

(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. Discuss about young's double slit experiment.
15. Given that angular width of a fringe formed is 0.1°. If the wavelength of light used is 4500 Å, then calculate the spacing between the slits.

16. Explain the phenomenon of colours in thin films.

17. Calculate the length of the solution of concentration 50 kgm-3 which produces an optical rotation of 450 . The specific rotation of the solution is 0. 0523 rad m2kg-1.

18. Distinguish between step index and graded index fibres.

19. Determine the value of electric field in a material for which the electric susceptibility is 4 and polarisation is 3 x 10-7 C/m2.

20. Find the Miller indices of a plane that makes an intercepts on a, b and c axes equal to 4Å, 6Å and 4Å in a tetragonal crystal with the c/a ratio as 2.

21. The distance between adjacent atomic planes of a calcite crystal is 0.3 nm. Find the smallest angle of Bragg scattering for 0.03 nm X-rays.

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **10** marks.

22. Give the theory of a plane transmission grating and describe how it is used to determine the wavelength of light using grating at normal incidence.

23. What is polarization of light? How can you produce and detect plane polarised light?

24. Explain why population inversion is not possible in two level systems. With the help of energy level diagrams explain three level laser systems and four level laser systems. Why the laser beam in a three level system is spiking?

25. Describe the terms Lattice, Primitive cell and Unit cell. Describe the seven crystal systems in three dimensions.

(2×10=20)