



19101465

QP CODE: 19101465

Reg No :

Name :

B.Sc DEGREE (CBCS) EXAMINATION, MAY 2019

Fourth Semester

Complementary Course - PH4CMT01 - PHYSICS-OPTICS & ELECTRICITY

(Common for B.Sc Mathematics Model I, B.Sc Statistics Model I)

2017 Admission onwards

2124B57A

Maximum Marks: 60

Time: 3 Hours

Part A

Answer any **ten** questions.

Each question carries **1** mark.

1. What are coherent sources?
2. What are the conditions for producing observable interference pattern?
3. Write the expression for fringe width in Young's double slit experiment and explain the terms
4. Excessively thin films even when illuminated with white light appear black in reflected light explain why ?
5. Explain the formation of newton's ring by reflection of light.
6. What is fresnel diffraction?
7. What is a Polaroid? Mention two uses of polaroids.
8. What is population inversion?
9. What do you mean by active medium in laser?
10. Explain the significance of Curie point for ferroelectric crystals.
11. What is the energy supplied when a current of i units flows through an inductor of self inductance L units?
12. Write the expression for, rms voltage, rms current and average power in an ac circuit.

(10×1=10)

Part B

Answer any **six** questions.

Each question carries **5** marks.

13. What is the longest wavelength that can be observed in third order spectrum with a grating having 6000 lines per centimetre at normal incidence?
14. Obtain an expression for the resolving power of a grating
15. Explain the polarization by refraction and selective absorption





16. What is meant by double refraction how will you demonstrate it experimentally?
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 $0.0523 \text{ rad m}^2\text{kg}^{-1}$.
18. Explain any five applications of laser.
19. A dielectric material having dielectric constant 3 is placed in an electric field of intensity 105 v/m . Find the polarisation in the dielectric material.
20. A 15 micro Farad capacitor is connected to a 220 V , 50 Hz source. Find the capacitive reactance and the current (rms and peak) in the circuit. If the frequency is doubled, what happens to the capacitive reactance and the current
21. With necessary mathematical equations, explain the dissipation of power when an ac is applied to an LCR circuit
(6×5=30)

Part C

Answer any **two** questions.

Each question carries **10** marks.

22. Discuss the formation of interference fringes on a screen due to the monochromatic light passing through two parallel slits on an opaque screen. Also arrive at the expression for Fringe width.
23. Derive an expression for conditions of brightness and darkness on a plane thin film.
24. With the help of geometry of optical fibre explain how light is propagated through and optical fibre. Derive the equation of numerical aperture of an optical fibre.
25. Discuss the growth and decay of current through (a)RC, (b) LC and (c) RL circuit . Also compare their phasor diagrams.

(2×10=20)

