Turn Over



What is the function of optical resonator?

12. For circuits used for transporting electric power, large power loss in transmission is indicated by low power factor. Explain.

 $(10 \times 1 = 10)$

Part B

11. Define rms value of current in a resistor circuit. Give its relation with the maximum value of

Answer any six questions. Each question carries 5 marks.

Page 1/2

What are the condition for two sources to be coherent?

Why do we get circular fringes in Newton's ring experiment?

How will you distinguish plane polarised light from ordinary light?

What is meant by dispersive power of a grating?

What are the important characteristics of laser beam?

Explain phase change on reflection.

What is half period Element?

10. What is ferroelectric effect?

current

Max. Marks: 60

Complementary Course - PH4CMT01 - PHYSICS-OPTICS & ELECTRICITY

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

2017 Admission Onwards

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Part A Answer any ten questions. Each question carries 1 mark.

Thick films illuminated by white light do not exhibit any color in white light. Explain why?

Time: 3 Hours

1.

2.

3.

4.

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6.

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9.

QP CODE: 25019740

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

Fourth Semester





- 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. A parallel beam of sodium light is incident normally on a plane transmission grating having 6000 lines /cm. The first order principal maximum is observed to be deviated through an angle of 20.70 degree. Calculate the wavelength of the light.
- 15. Determine the angle of incidence for which light reflected from glass surface is completely polarized. Refractive Index of a glass interface is 1.5.
- 16. Plane polarized light with wavelength 500 nm falls on a quartz plate of thickness 3.2×10^{-3} cm. nE = 1.5508 and nO= 1.5418. Calculate the phase retardation of the rays.
- 17. 25 gram of cane sugar is dissolved in water to make up 60 cc of solution. 20 cm length of this solution produces 53° optical rotation. Calculate the specific rotation.
- 18. What is laser?Explain the main components in a laser source? Distinguish between spontaneous emission and stimulated emission.
- 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 1.5 micro Farad capacitor is charged to 60 V by a battery, which is then removed. At time t=0, a12 mH coil is connected in series with the capacitor to form an LC oscillator. What is the potential difference across the inductor as a function of time?
- 21. A series LCR circuit driven with rms voltage 120 V at frequency 60 Hz, contains a resistance 200ohms, an inductance with reactance 80 ohms and a capacitor with capacitive reactance 150 ohms (a) What are the power factor of the circuit. (b)What is the average power dissipated?

(6×5=30)

Part C

Answer any **two** questions. Each question carries **10** marks.

- 22. Obtain an expression for fringe width in young's double slit experiment.
- 23. 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.
- 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. With necessary mathematical equations and phasor diagrams discuss the variation os current and voltage through (a) resistor circuit, (b) pure inductor circuit and (b)capacitor circuit

