QP CODE: 26020153

26020153

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) IMPROVEMENT/ REAPPEARANCE / MERCY CHANCE EXAMINATIONS, APRIL 2026

Fourth Semester

Complementary Course - PH4CMT01 - PHYSICS-OPTICS & ELECTRICITY

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

2017 Admission Onwards

C90E8AA5

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. State the super position principal of waves.
3. Briefly discuss about interference by division of amplitude. Give an example
4. What is a half period zone ? Why is it called so?
5. Distinguish between fresnel and fraunhofer diffraction.
6. What is brewster's angle ? what is its significance ?
7. What are optically active substances? Give examples.
8. Write any two pump sources in laser.
9. Name the three levels in three level laser systems.
10. How can you identify ferro electric materials?
11. What is the enertgy supplied when a currect of i units flows through an inductor of self inductsnce L *units*?

12. Draw the phasor diagram of the variation of current and voltage through an LC circuit

(10×1=10)

Part B

*Answer any **six** questions.*
Each question carries 5 marks.

13. A two slit young's experiment is done with monochromatic light of wavelength 600 nm. Slits are 2 mm apart and fringes are observed on a screen placed 10 cm away from the slits. If a transparent plate of thickness 0.5 mm is placed in front of one of the slit interference pattern shifts by 5mm. Find the refractive index of the transparent plate.

14. Light of wavelength 550nm from a narrow slit is incident on a double slit. The overall separation of 5 fringes on a screen 200 centimeter away is 1 centimeter. Calculate the slit separation and fringe width.

15. The limits of the visible spectrum are approximately 400nm and 700m, Find the angular width of the first order spectrum by grating having 5 x 106 lines per meter.

16. Calculate the resolving power of the diffraction grating which has 2500 lines / cm in fourth order spectrum in the wavelength region of 450 nm.

17. With necessary theiry and diagram state and explain malu's law.

18. Distinguish between step index and graded index fibres.

19. Derive the expression for Gauss law in the presence of dielectric.

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. Explain how circular Newton's rings are formed by reflected light. With the necessary theory give the experiment to determine the wavelength of a monochromatic source of light by the Newton's rings method.

23. What is double refraction? Describe the construction, working and use of a Nicol prism.

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 current and voltage variations through a series LCR circuit when an AC is applied to it. Discuss the conditions for resonance in that circuit. Also discuss the band width and sharpness of the circuit.

(2×10=20)