B.Sc DEGREE (CBCS) EXAMINATION, MARCH 2020

Fourth Semester

Complemetary Course - PH4CMT01 - PHYSICS-OPTICS & ELECTRICITY

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

2017 Admission onwards

F2210A44

Time: 3 Hours   Marks: 60

Part A

*Answer any **ten** questions.*

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

1. Relate phase difference and path difference of a wave .

2. State the conditions on which two waves can produce interference pattern.

3. Why Newton's rings are circular?

4. Is it possible to get a system of newton's rings with bright Center? Justify.

5. What is half period Element?

6. Write a brief note on polarization through pile of plates.

7. What is meant by specific rotation?

8. Write any two pump sources in laser.

9. Why core is having more refractive index than cladding?

10. Explain electric polarisation in dielectrics

11. Define capacitive reactance. How is it related to frequency?

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

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. In a Yong's double slit experiment the 10th bright band is formed at a distance of 4 mm

from the central bright fringe. Calculate the wavelength of light used if the distance between the slits is 1.2 mm and that of the screen from the slits is 1 m.

14. Given that angular width of a fringe formed is 0.1°. If the wavelength of light used is 450 nm, then calculate the spacing between the slits.

15. A monochromatic light of wavelength 6.56 x 10-5 cm is incident on a plane transmission grating of width 2 cm. If the first order spectrum is formed at 18014', find the total number of lines in the grating.

16. An equilateral Quartz prism is cut with its faces parallel to the optic axis. Calculate the angle of minimum deviation for light of a given wavelength for ordinary and extraordinary rays. Given nO = 1.5422 and nE = 1.5533.

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

18. Distinguish between step index and graded index fibres.

19. Two parallel plates have equal and opposite charges and are separated by a dielectric 5mm thick, of dielectric constant 3. If the electric field intensity in the dielectric is 106 v/m, calculate the polarization P in the dielectric and the electric displacement vector D in the dielectric.

20. Starting from the expression for power in P= Ei, obtain the expression for energy per unit volume.

21. A light bulb is rated at 100W for a 220 V supply. Find (a)the resistance of the bulb, (b) the peak voltage of the source and (c) the rms current through the bulb.

(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. 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.

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. 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

(2×10=20)