25802164

QP CODE: 25802164

Reg No : .....

Name : .....

INTEGRATED MSC DEGREE EXAMINATION, APRIL 2025

Second Semester

INTEGRATED MSC BASIC SCIENCE-PHYSICS

CORE - IPH2CR02 - PHYSICAL OPTICS

2021 Admission Onwards

43E3937F

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Define temporal coherence.
2. Why do oil films on the roads appear to be coloured during sunlight?
3. What do you understand by fringes of equal thickness?
4. A zone plate has different foci for different wavelength, why?
5. Explain the special feature of the pattern observed in double slit diffraction phenomenon.
6. What is elliptically polarised light?
7. What is meant by coherence of laser beam?
8. What are the functions of optical resonator?
9. What is numerical aperture?
10. What is holography?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. What are the conditions of obtaining constructive and destructive interference?
12. In a Michelson interferometer 200 fringes cross the field of view when the movable mirror is displaced through 0.0589 mm. Calculate the wavelength of monochromatic light used.

13. A 200 mm long tube containing 48 cm^3 of sugar solution produces an optical rotation of 11° when placed in a saccharimeter . If the specific rotation of sugar solution is 66° . Calculate the quantity of sugar contained in the tube in the form of a solution.

14. Calculate the least thickness of a calcite plate which would convert plane polarized light into circularly polarized light. Given μ_o=1.658, μ_e = 1.486 and wavelength of light is 5890A°.

15. The wavelength of emission is 6000A° and the coefficient of spontaneous emission is 106 /s. Determine the coefficient for the stimulated emission .

16. Explain the difference between the step index fibre and graded index fibre.

17. Explain the applications of optical fibre.

18. Distinguish between Reflection and Phase hologram.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Explain formation of Newtons rings. How can these be used to determine the wavelength of monochromatic light.

20. Describe the phenomenon of diffraction due to a straight edge. Why the bands are neither equidistant nor equally illuminated?

21. Discuss the various applications of laser.

22. Explain the holographic detectors and recording materials.

(2×5=10 weightage)