QP CODE: 24803773

24803773

Reg No : .....

Name : .....

INTEGRATED MSC DEGREE EXAMINATION, JUNE 2024

Second Semester

INTEGRATED MSC BASIC SCIENCE-PHYSICS

CORE - IPH2CR02 - PHYSICAL OPTICS

2021 Admission Onwards

2702EA7A

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. State the relation between optical pathline and geometrical pathline.
2. What do you understand by fringes of equal inclination?
3. Explain why Newtons rings is dark for reflected light.
4. Explain the diffraction pattern formed by narrow slit illuminated by monochromatic light.
5. Define and explain polarization.
6. What is meant by double refraction?
7. Distinguish between the spontaneous emission and stimulated emission processes.
8. What is meant by Population Inversion?
9. What is the advantage of a multimode graded index fibre over step index fibre?
10. What is Reflection hologram?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Two coherent sources of monochromatic light of wavelength 6000 A° produce an interference pattern on a screen kept at a distance of 1 m from them. The distance between two consecutive bright fringes on the screen is 0.5 mm. Find the distance between the two coherent sources.

12. A film of refractive index 1.3 and thickness 1.4×10^{-3} mm is illuminated by white light at angle of 45°. A dark band is observed due to transmitted rays by a wavelngth of 500 nm. Calculate the order of interfernce.

13. Calculate the possible order of spectra with a plane transmission grating having 18000 linesper inch when light of wavelength 4500A° is used.

14. 80 gm of impure sugar when dissolved in a litre of water gives an optical rotation of 99° when placed in a tube of length 20 cm. if the specific rotation of sugar is 66° , find the percentage purity of the sugar sample.

15. State the merits of four level pumping scheme.

16. Find the ratio of population of the two states in a He-Ne laser that produces light of wavelength 6328A° at 27°C.

17. Describe the advantages and disadvantages of optical fibre.

18. Write a short note on Holographic optical elements.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Describe the construction with diagram and outline the theory of Michelson's interferometer. Discuss the nature of interference pattern produced.

20. Explain the theory and schematic describe the fresnel diffraction at a straight edge. Zone plate and compare it with a convex lens.

21. What is meant by critical propogation angle of an optical fibre? Obtain an expression for critical propagation angle.

22. Discuss some of the important applications of holography.

(2×5=10 weightage)