QP CODE: 26802034

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Reg No : .....

Name : .....

INTEGRATED M Sc DEGREE EXAMINATION APRIL 2026

Second Semester

INTEGRATED M Sc BASIC SCIENCES - PHYSICS

CORE - IPH2CR02 - PHYSICAL OPTICS

2021 Admission Onwards

DD2F0770

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What is the relation between optical path length and phase change?
2. Two waves are said to be coherent when ?
3. Explain the phenomenon of colour of thin films.
4. How can you get polarised light by reflection ?
5. Explain the huygen's theory of double refraction?
6. Define specific rotation.
7. Which are the two processes by which an atom can emit photons?
8. What is meant by metastable state?
9. What is meant by 'Spiking' in Ruby laser?
10. What is holographic scanner?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Fringes of equal thickness are observed in a thin glass wedge of refractive index 1.52. The fringes spacing is 0.1 mm and wavelengthnof light is 589.3 nm. Calculate the angle of wedge.
12. In a Newton's rings experiment the diameter of the 15th ring was found to be 0.590 cm and that of the 5th ring was 0.336 cm. If the radius of the plano-convex lens is 100 cm, calculate the wavelength of the light used.

13. The diameter of the first ring of a zone plateis 1.1 mm. if plane wave (λ=6000A°)F fall on the plate, where should the screen be placed so that light is focussed to be a bright spot?

14. In a single slit diffraction pattern the distance between the first minima on either side of the central zero maximum is 4.4 mm as observed on a screen at a distance of 0.7 m . The wavelength of light used is 5890 A °. Calculate the slit width

15. Why is it difficult to achieve laser action at high frequencies?

16. A glass fibre is made with core of refractive index 1.55 and cladding is dopped to give a fractional difference of 0.005. Find the refractive index of cladding and numerical aperature.

17. Optical power of 1mW is launched in to an optical fibre of length 100 m. If the power emerging from the other end is 0.3 mW, calculate the fibre attenuation.

18. Explain the different types of hologram.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. How can Michelson interferometer is used for (i) Detemining the difference of wavelengths of two nearby spectral lines (ii) Calibrating standard meter.

20. Give the theory of plane transmission grating. How will you determine the wavelength of monochromatic light using grating.

21. List the main components of optical communication system. Describe the basic optical communication system.

22. Describe the recording and reconstruction process in holography with the help of suitable diagram.

(2×5=10 weightage)