QP CODE: 23507027

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Reg No : .....

Name : .....

INTEGRATED MSC DEGREE EXAMINATION, AUGUST 2023

Second Semester

NTEGRATED MSC BASIC SCIENCE-PHYSICS

CORE - IPH2CR02 - PHYSICAL OPTICS

2021 Admission Onwards

DFD79219

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What is meant by optical path?
2. What are Haidinger fringes?
3. What is an interferometer?
4. Explain the fraunhofer pattern obtained with a narrow slit ?
5. What is an optic axis?
6. What is meant by optical activity?
7. Distinguish between the spontaneous emission and stimulated emission processes.
8. Mention the important properties of laser beam.
9. What is graded index fibre? Give its refractive index profile.
10. What is phase hologram?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. A light source emits light of two wavelengths λ1= 4300 A° and λ2 = 5100 A°. The source is used in a double slit interference experiment. The distance between the sources and the screen is 1.5 m and the distance between the slits is 0.025 mm. Calculate the separation between the third order bright fringes due to these two wavelengths.

12. A parallel beam of light (λ=5893 X10^{-10} m) is incident on a thin glass plate (μ=1.5) such that the angle of refraction into the plate is 50^{o}. Calculate the smallest thickness of the smallest thickness of the glass plate which will appear dark by transmission.

13. Diffraction pattern of a single slit of width 0.5 cm is formed by a lens of focal length 40 cm. calculate the distance between the first dark and the next bright fringe from the axis. Wavelength of light used is 4890 A° .

14. light intensity Io is incident on a polarizer . What is the intensity of the resultant beam if (i) incident light is unpolarized ? (ii) incident light is plane polarised with its electric field making an angle of 30°with the axis of the polarizer?

15. What are the pecularities of metastable state?

16. In helium-neon laser why is it necessary to use narrow tube?

17. Draw the block diagram of a communication system and briefly explain the components.

18. Explain the method for hologram recording.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. What are Newtons rings? Derive an expression for radii of rings.

20. Explain the construction of fresnel's half period zones on a plane wave front.

21. Discuss the propagation of light through an optical fibre? Obtain the expressions for critical angle, acceptance angle and numerical aperture.

22. What are DOEs (diffractive optical elements) ? Describe their sailent features and applications.

(2×5=10 weightage)