LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS

FIFTH SEMESTER – APRIL 2010

PH 5506/PH 3500 - OPTICS

Date & Time: 29/04/2010 / 1:00 - 4:00   Dept. No.   Max. : 100 Marks

PART - A

Answer ALL Questions   **(10x2=20 marks)**

1. Write the translation and refraction operation of a ray in matrix form.

2. What is meant by chromatic aberration?

3. What is antireflective coating?

4. Write down any four applications of Michelson interferometer.

5. State any two differences between Fresnel and Fraunhoffer diffraction?

6. What is a plane transmission grating?

7. State Brewster's law.

8. Calculate the thickness of a quarter wave plate.

   Given $\lambda = 5890 A°$, $n_o = 1.53$, $n_e = 1.54$.

9. What is a meta stable state?

10. Explain second harmonic generation.

PART - B

Answer Any FOUR Questions   **(4X7.5=30 marks)**

11**.** Explain about Ramsden's eye piece in detail.

12. Give the theory of interference in thin films due to reflected light.

13. What is meant by resolving power of microscope? Derive an expression for it.

14. Explain the construction of Nichol prism and how is it used as a polarizer.

15. Obtain the relation between Einstein Coefficients.

PART - C

Answer Any FOUR Questions   **(4x12.5=50marks)**

16. a) Define the term dispersive power.

    b) Explain i) Deviation without dispersion ii) Dispersion without deviation with a neat
      ray diagram.

17. Describe Fresnel's Biprism. Explain the experimental arrangement and show how the
    wavelength of light can be determined with it.

(P.T.O.)

18. i) Explain the phenomenon of Fresnel's diffraction at a straight edge, and discuss the intensity at a point

    ii) above the geometrical shadow

    iii) within the geometrical shadow.

19. Define specific rotation. Explain the construction and working of Laurent's Half shade polarimeter.

20. Explain in detail the construction and working of Helium –Neon laser with a neat energy level diagram.

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