LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

FIFTH SEMESTER – NOVEMBER 2016

PH 5509 / PH 5506 / PH 3500 - OPTICS

Date: 05-11-2016
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL questions: **(10x2=20 marks)**

1. Define unit planes.

2. Why crosswires cannot be used in Huygen's eyepiece?

3. What is meant by interference of light?

4. Mention any two uses of antireflective coating.

5. What is meant by resolving power of an instrument?

6. Write down Rayleigh's criteria for just resolution of two nearby images.

7. State Malus law.

8. What is a half wave plate?

9. Explain population inversion?

10. What is Raman effect?

PART – B

Answer any FOUR questions: **(4x7.5=30 marks)**

11. Discuss the matrix method in ray optics and obtain the translation matrix.

12. Explain the interference pattern occurring in wedge-shaped films.

13. Find the fringe width for diffraction at a single slit.

14. a) Describe the construction and working of a quarter wave plate.

    b) Find the thickness of a half wave plate of quartz for a wavelength of 5000Å, if μ_e= 1.553,

    μ_0= 1.544. **(5+2.5)**

15. Discuss Einstein's coefficients and obtain an expression connecting them.

PART – C

Answer any FOUR questions: **(4x12.5=50 marks)**

16. a) What is spherical aberration in lenses? **(2.5+10)**

    b) Discuss the methods of reducing it with suitable theory.

17. Outline the theory of interference in thin filims.

    a) From reflected light   b) From transmitted light   **(6.5+6)**

18. What is Fraunhofer diffraction phenomena? Explain Fraunhofer diffraction at a single slit. **(6.5+6)**

19. Discuss the production and detection of circularly polarized light. **(6.5+6)**

20. Describe CO_2 laser and explain its working.

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