LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **APRIL 2023**

PH 5506 – OPTICS

Date: 05-05-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

	PART – A	**(10 x 2 = 20 Marks)**
Q. No.	**Answer ALL questions**	
1	What is angular dispersion?	
2	What is an eyepiece?	
3	Define interference of light.	
4	How can a coherent source be obtained in practice?	
5	State Rayleigh's criterion for resolution.	
6	State De Morgan's law.	
7	What is double refraction?	
8	State Malu's law.	
9	Write any two properties of laser.	
10	Define second harmonic generation.	
	PART – B	**(4 x 7.5 = 30 Marks)**
	Answer any FOUR questions	
11	Derive the expression for deviation without dispersion.	
12	Explain how white and dark interference fringes are formed using white light in Lloyd's single mirror experiment.	
13	a) What is a zone plate? (2) b) Explain its theory and an expression for its focal length. (5.5)	
14	Write a detailed note on Nicol prism.	
15	Derive Einstein's coefficients.	
16	Explain the construction and working of Huygen's eye piece.	
	PART – C	**(4 x 12.5 = 50 Marks)**
	Answer any FOUR questions	
17	Explain chromatic aberration. Derive an expression for longitudinal chromatic aberration for an object at infinity.	
18	Describe a Michelson's interferometer. How can it be used for the measurement of wavelength of monochromatic light?	

19	a) Show that the resolving power of a plane transmission grating is proportional to the number of opaque rulings per meter. (8.5) b) A grating containing 4000 slits/cm is illuminated with monochromatic light and produces a second order bright line at 30º angle. What is the wavelength of light used? (4)
20	Describe the working of Laurent's half shade polarimeter to determine the specific rotation of a solution.
21	Explain the construction and working principle of a CO_2 laser with energy level diagrams.
22	Derive the expression for interference due to reflected and transmitted system.

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