



Vidyavardhini's College of Engineering and Technology, Vasai (West)

First Year Engineering

Academic Year: 2024-2025

Problem Set 2: Measurements by light – Wave Interference

Subject: BSC2023/EP

Date: 01/0/2025

Max Marks: 10

Submission Deadline: 21-02-2025

CO2: To explain the basic importance of interference in the field of measurements.

Q. No.	Questions	Marks	CO	CL
1	A monochromatic light sources of wavelength 600 nm produce interference fringes. If the fringe separation is 0.5 mm, calculate the distance between the two slits, given that the screen is placed 2 m away.	2	2	2
2	(a) An optical flat is used to test the flatness of a surface. The wavelength of light used is 500 nm, and the fringe spacing observed is 0.2 mm. Determine the height difference between two adjacent fringes. (b) An optical flat is placed on a metal surface to test its flatness using monochromatic light of wavelength $\lambda = 600$ nm. The interference fringe pattern observed has a fringe spacing of 2.5 mm. It is noted that the contour lines of the fringes represent height variations of $\lambda/2$. 1. Calculate the height difference between two successive fringes. 2. If the fringes curve outward in the middle, determine whether the surface is convex or concave. 3. If the surface has a localized high spot of $0.75 \mu\text{m}$, estimate how many additional fringes would appear around this high spot.	5	2	3
3	A scratched surface is tested using an optical flat. If the distance between two fringes is 1 mm and the depth of the scratch is $0.15 \mu\text{m}$, determine the wavelength of light used. Given distance due to scratch is $0.5 \mu\text{m}$.	3	2	3

NB: I don't know what's the matter with people: they don't learn by understanding, they learn by some other way - by rote or something.

Their knowledge is so fragile!

– Richard Phillips Feynman