



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)  
Dundigal, Hyderabad – 500 043

## LABORATORY WORK SHEET

Date: 24/06/2022.

Roll No: 21951A6754.....Name: P. JYOTHI PRASANNA.....

Exp No: 04..... Experiment Name: SINGLE SLIT DIFFRACTION.....

### DAY TO DAY EVALUATION:

	Preparation	Algorithm	Source Code	Program Execution	Viva	Total
		Performance in the Lab	Calculations and Graphs	Results and Error Analysis		
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	4	4	20

Signature of Lab I/C

### START WRITING FROM HERE:

#### SINGLE SLIT DIFFRACTION

AIM: To determine the width of a given single slit using laser diffraction.

APPARATUS:

- i) Laser source with stand
- ii) Single slit with stand and
- iii) A screen with stand.

FORMULA: Width of the slit can be calculated using

$$a = \frac{n\lambda}{\sin\theta}$$

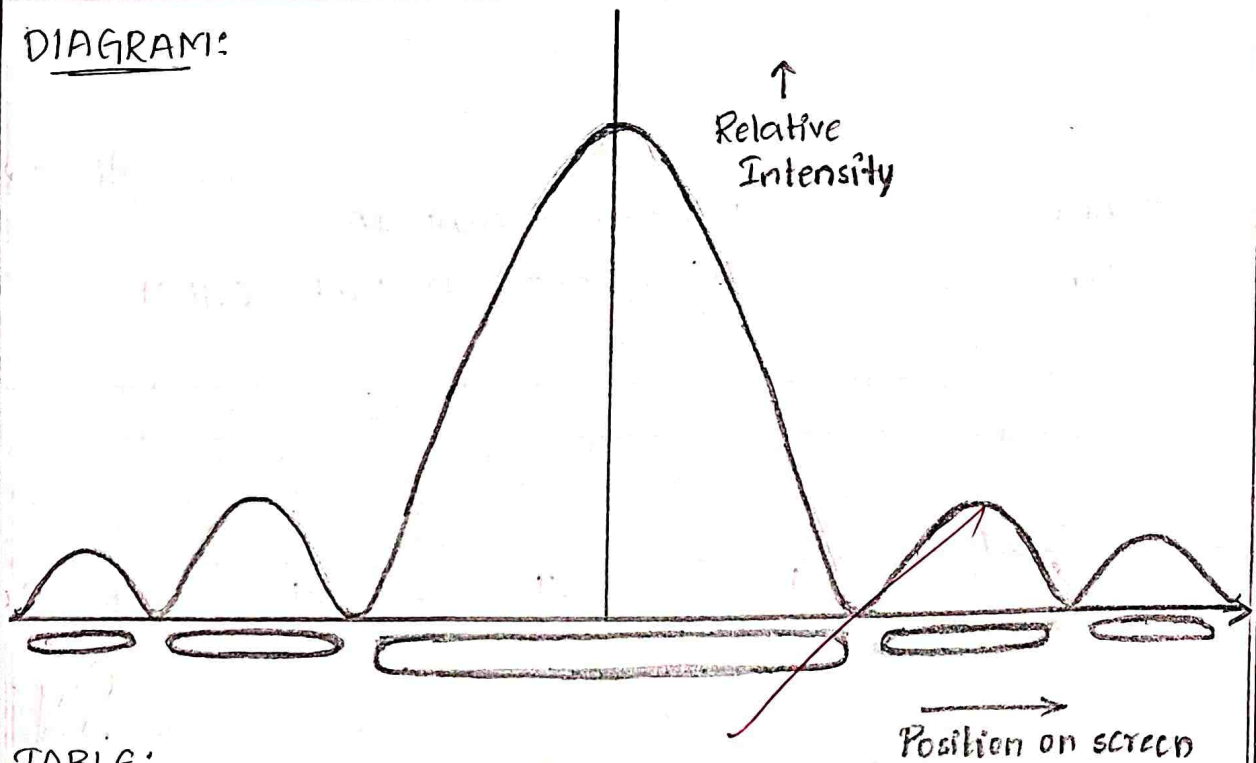
$a$  = width of the slit

$n$  = order of the diffraction pattern.

$\lambda$  = wavelength of the laser light used.

RESULT: Width of a single slit is found to be  $1.03 \times 10^{-2}$  cm

# DIAGRAM:



## TABLE:

S.No	DISTANCE(D) in cm	ORDER (n)	LEFTSIDE (d <sub>1</sub> ) cm	RIGHT SIDE (d <sub>2</sub> ) cm	$d = \frac{d_1 + d_2}{2}$ (cm)	$\sin \theta = \frac{d}{\sqrt{d^2 + D^2}}$	$a = \frac{n\lambda}{\sin \theta}$ (cm)
1	70 cm	n=1	0.4	0.4	0.4	$5.71 \times 10^{-2}$	$1.03 \times 10^{-2}$
		n=2	0.8	0.8	0.8	$1.14 \times 10^{-2}$	$1.03 \times 10^{-2}$
2	75 cm	n=1	0.4	0.5	0.45	$5.99 \times 10^{-3}$	$9.83 \times 10^{-3}$
		n=2	0.9	1	0.95	$1.26 \times 10^{-2}$	$9.34 \times 10^{-3}$
3	80 cm	n=1	0.5	0.7	0.6	$7.49 \times 10^{-3}$	$7.86 \times 10^{-3}$
		n=2	1.1	1.2	1.15	$1.43 \times 10^{-2}$	$8.23 \times 10^{-3}$

$$\lambda = 5890 \text{ \AA} ; \lambda = 5890 \times 10^{-8} \text{ cm}$$



## VIVA VOCE:

1. Define diffraction

The process by which a beam of light or other system of waves is spread out as a result of passing through a narrow aperture ~~or~~ across any edge, typically accompanied by interference between the wave forms produced.

2. What is the difference between single slit and double slit diffraction?

In a single slit diffraction, light spreads out in a line perpendicular to the slit. But in a double slit diffraction, light diffracts when passing through the slits, but the light from those then interfaces to produce an interference pattern on the screen.

3. What is the condition for diffraction to occur?

Diffraction of light occurs when size of the obstacle or the aperture is comparable to the wavelength of light.

4. Discuss differences between interference and diffraction.

Interference may be defined as waves emerging from two different sources, producing different source, producing different wave fronts. Diffraction, on the otherhand, can be terminal as secondary waves that emerge from the different parts of the same wave.

Sax