INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

LABORATORY WORK SHEET

Date: 05/08/2022

Roll No: 21951A6754 Name: P. JYOTHI PRASANNA

Exp No: 09 Experiment Name: NEWTON RINGS

DAY TO DAY EVALUATION:

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

Signature of Lab I/C

START WRITING FROM HERE:

AIM: To determine radius of curvature of plano convex lens using sodium light by forming Newton's rings.

APPARATUS:
1. Travelling microscope
2. Sodium vapour lamp.
3. Plane convex lens
4. Plano convex lens
5. A thin glass plate
6. Magnifying glass.

FORMULAE:

Slope of the straight line $= \frac{D_2^2 - D_1^2}{n_2 - n_1}$

Radius of the curvature $= R = \frac{\text{Slope}}{4\lambda}$

λ = wavelength of Na light

R = Radius of curvature of plano convex lens

D_m = diameter of m^{th} ring.

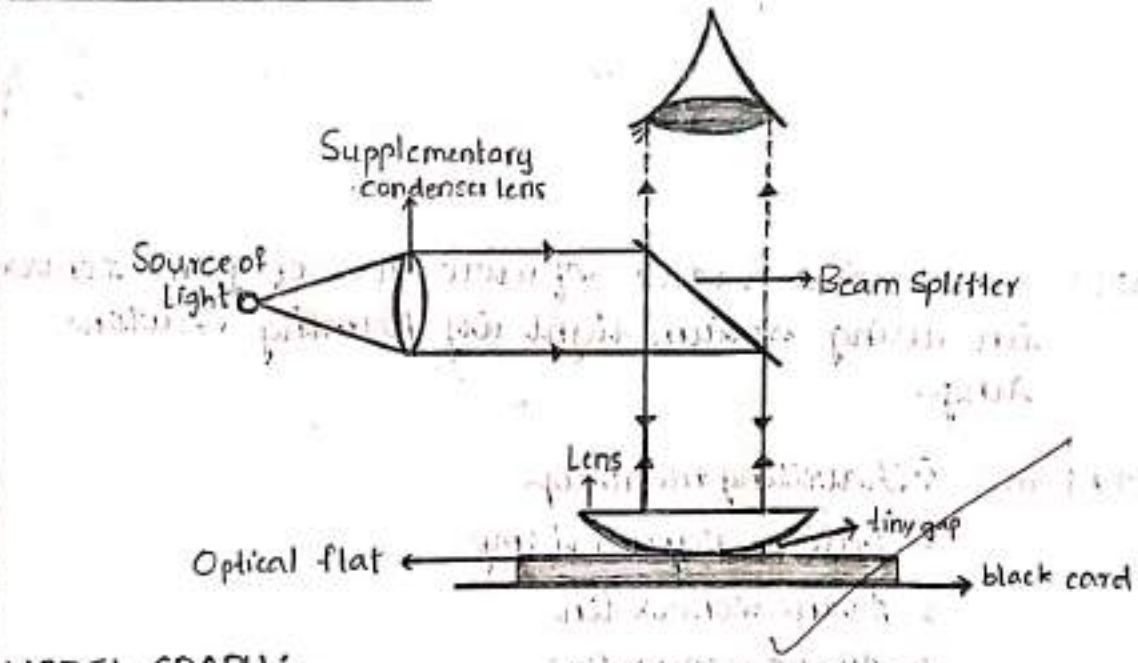
D_n = diameter of n^{th} ring.

DIAGRAM:

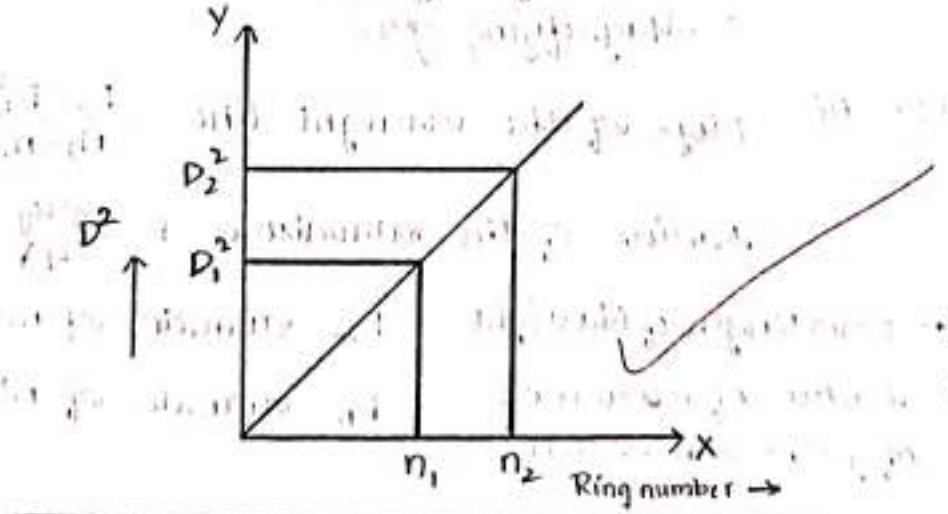
NEWTON RINGS FORMATION

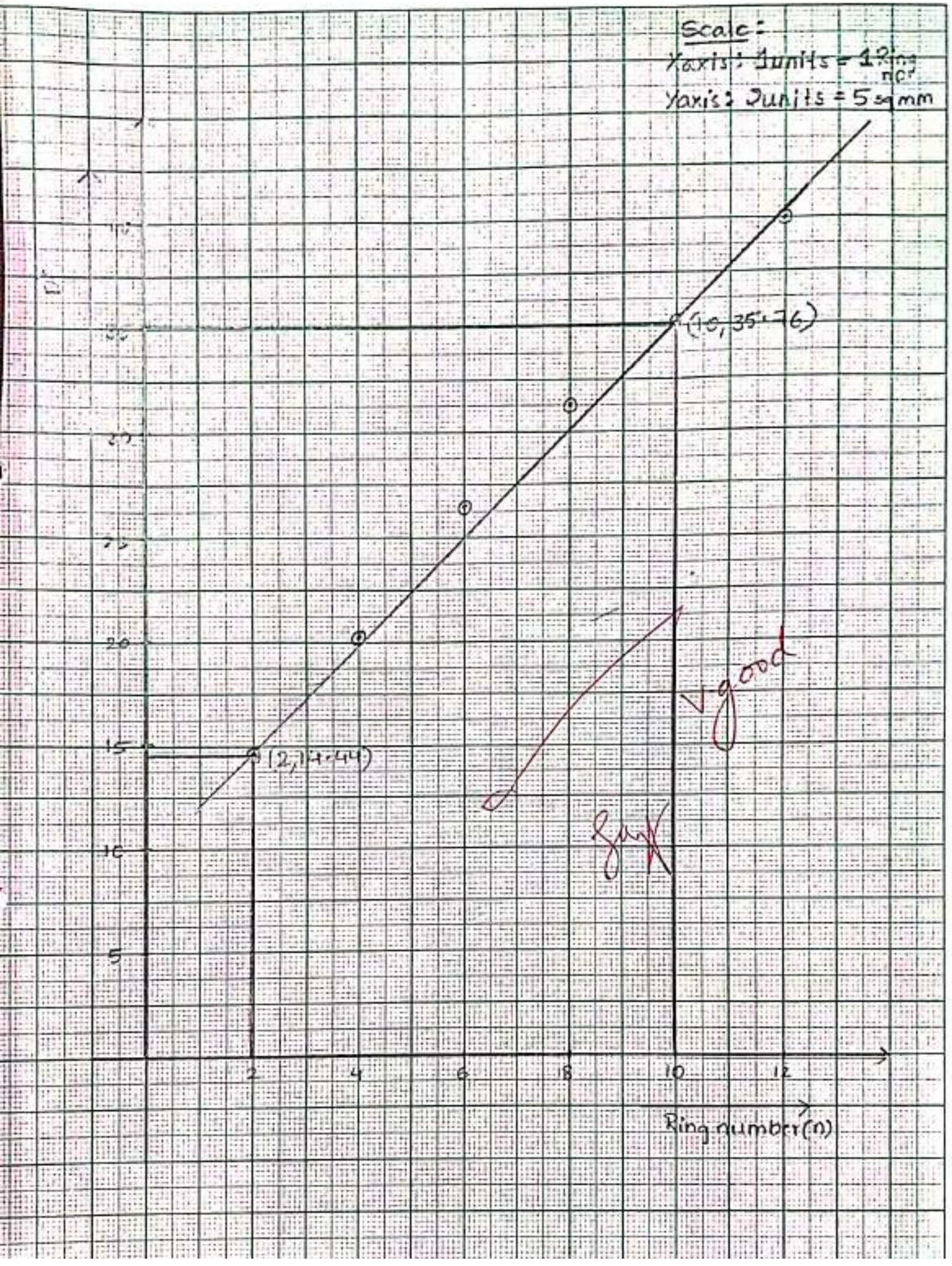
V.V. good

EXPERIMENTAL SET-UP:



MODEL GRAPH:




Scale:
Y axis: 1 units = 1 sq mm
Y axis: 2 units = 5 sq mm
(10, 35.76)
(2, 14.44)
Vgood
good
5
10
15
20
2
4
6
8
10
12
Ring number (n)

OBSERVATION TABLE: (LC = 0.01)mm)

S.No	RING NUMBER (n)	MICROSCOPE READING			D^2
		ON THE LEFT SIDE(a) (mm)	ON THE RIGHT SIDE (b) (mm)	DIAMETER OF THE RING D=(a-b)	
1	2	49.34	45.51	3.8	14.44
2	4	49.72	45.14	4.58	20.98
3	6	50.09	44.97	5.12	26.21
4	8	50.27	44.70	5.57	31.02
5	10	50.41	44.43	5.98	35.76
6	12	50.60	44.23	6.37	40.58

Slope of the straight line = $\frac{D_2^2 - D_1^2}{n_2 - n_1} = \frac{(35.76)^2 - (14.44)^2}{10 - 2} = 2.665$

Radius of curvature of plano convex lens, $R = \frac{\text{Slope}}{4\lambda}$

λ = Wavelength of sodium light = $5890\,A^\circ = 5890 \times 10^{-7}$ mm

$TC = MSR + (VC \times LC)$

$LC = \frac{MS}{\text{no. of VSD}}$

$LC = \frac{0.1\,cm}{100}$

$LC = 0.01\,mm$

RESULT: The radius of curvature of plano convex lens is 113.115 cm.

VIVA VOCE:

1. What is Interference?

The net effect of the combination of two or more trains moving on intersting or coincident paths.

2. Explain the principle behind the formation of newton rings.

The rings of newton's are formed as a result of interference which is between the light waves that are reflected from the top and bottom surface of the air film which is formed between the lens & glass sheet.

3. What is the least count of travelling microscope.

The least count of travelling microscope is 0.001 cm.

4. Why is the central spot dark?

The central fringe in Newton's rings is dark in the case of the reflected system because the air film thickness formed at the centre between the glass plate and the lens is zero.

5. Define radius of curvature of lens.

The distance between the principle focus & centre of curvature of a lens is called its radius of curvature.

Sign