Reet Sharma 106030 Performed on 21/12/2021

Experiment 1: Newton's Ring

AIM: To measure the radius of curvature of a plano convex lens using Newton's rings apparatus

APPARATUS: (1) Newton's rings apparatus consisting of

a. Plano Convex lens

b. Optically flat glass plate

c. Beam splitter

d. T-type traveling microscope with scale with L.C. = 0.001 cm

(2) Monochromatic source of light of known wavelength (ex. Sodium)

(3) Reading lamp and reading lens

OBSERVATIONS:

Table 1.1: Calculation of the least count of the scale on microscope

Smallest Division on the main scale	0.05 cm
Number of Divisions on vernier scale	10
L.C. of traveling microscope	0.001 cm

Table (1.2) Diameters of Newton's rings

Seq. no. of Dark ring(n)	Upper position (P), cm	Lower position (Q), cm	Diameter D_n=P-Q cm	Square of diameter D_n^2,cm^2
1	2.512	2.401	0.111	0.012321
2	2.534	2.381	0.153	0.023409
3	2.54	2.349	0.191	0.036481
4	2.553	2.553	0.218	0.047524
5	2.567	2.321	0.246	0.060516

CALCULATIONS:

Slope of the graph of D_n^2Vs n= 0.01236

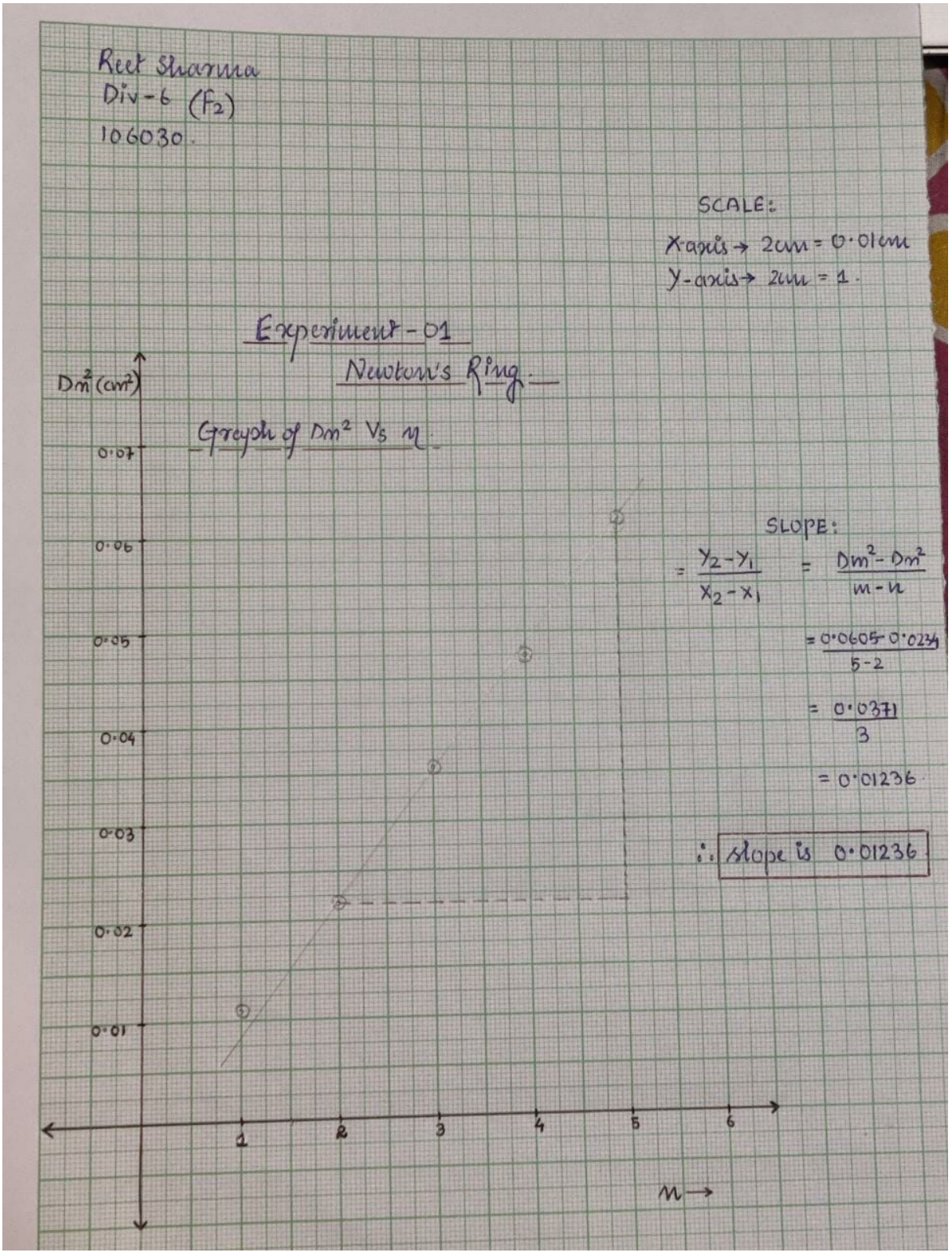
Wavelength of sodium source used in the experiment= 5890 A^{o}

Radius of curvature of plano convex lens

$= \frac{\mu(Dm^2 - Dn^2)}{4(m-n)\lambda} = \frac{1*slope}{4*\lambda} = \frac{1*0.01236}{4*5890*10^{-8}}$ = 52.46 cm

Standard radius of curvature R_s cm	Radius of curvature using Newton's rings R_e, cm	%deviation$= \left\| \frac{R_s - R_e}{R_s} \right\| * 100\%$
50	52.46	4.92 %

GRAPH:


Reet Sharma
Div-6 (F2)
106030.
SCALE:
X-axis → 2cm = 0.01cm
Y-axis → 2cm = 1.
Experiment-01
Newton's Ring.
Graph of Dm² Vs n.
Dm² (cm²)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
1
2
3
4
5
6
n →
SLOPE:
= Y2-Y1 / X2-X1 = Dm²-Dm² / m-n
= 0.0605-0.0234 / 5-2
= 0.0371 / 3
= 0.01236
∴ slope is 0.01236

MY UNDERSTANDING OF THE EXPERIMENT:

Newton's rings appear as a series of concentric, alternating bright and dark rings centred at the point of contact between two surfaces. We also observed that fringe width of the concentric circles decreases as we move in the outward direction.

In short, we learned the conditions to get Newton's Ring and measured the radius of curvature of a plano convex lens using Newton's rings apparatus