

I BSC SECOND SEMESTER PAPER-II PHYSICS PRACTICALS



LAB MANUAL

(w.e.f 2020-2021 Batch)

Department of Physics Sri Y.N.College (A) Narsapur

* SPECTROMETER-DISPERSIVE POU	VER OF PRISM *Date 26/10/21.
Expt. No	Page No4
Aim: To determine the dispersive po the refracting angle of the prism, its refractive index of the material of the	s minimum deviation and the
Apparatus: Spectnometer, mexcury Spirit level, prism and hand lamp.	vapous lamp, steading lens
Tommula: The dispensive power of m colours is given by	aterial of the prism for two
w = w - y	Discourse the Alassa
<u>u-1</u>	Million in the light of the
where u, u are refractive ind	ices for two colours and
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A STATE OF THE STA	and the state of t
u = Sin Ato	research and a second date of the
sin A/L	was and a construct by the
where A - refractive angle of the	ne paism and
D= angle of minimum devi	ation for light of the given colour
Description: - A spectnometer is ar produce and study various types	optical instrument used to
prioduce and study various types	i) collinator ii prism table
components of a spect-nometer are	
and iii) telescope. The instrument	
metal base which is provided wi	The Leveling Scheros Landing
In the spectorometers the circular	scale is tixed on the cylinarical
block to which telescope is origid	y tixed and it can be stotated
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about the same vertical axis about	ut which verinier table and the

about the same ventical axis about which vennientable and the paism table notate.

Adjustments of the spectnometer: Before using the spectnometer for any experimental observation, the following optical and mechanical adjustments are to made.

a) optical adjustments >

towards a white surface on a white wall and adjust the distance between the cross-wires and the eye-piece by slowly moving the eye-piece inside on outside till the cross-wires are mostly seen.

ii) Adjustment of the telescope for parallel rays: Take the spectrometer to an open place and place it on a stool. Turn the telescope towards a distant object (The top of distant telegraph pole or a tree) and adjust the distance between the objective and eye-piece by a rock and pinion screw until there is no paraller between the image of the object and the cross-wires whatever may be the point of view of the observer Now, the telescope is Said to be adjusted to receive the prallel rays:

illuminate it with the sounce of light, then twin the telescope in line with the collinator and adjust the distance between the slit and the collinator and adjust the distance between the slit and the collinating lens by a rock and pinion screw until and well defined image of slit is observed through the telescope without the

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panallax between the image of slit and the cross-wines. As the telescope is already adjusted to recieve parallel rays, then bean emenging out of the collimator is now said to have been adjusted to see a panallel beam. The slit should be ventical IV, Slit adjustment:

Namow down the slit to avoid abbenations and to make the b) Mechanical adjustments:

Levelling of prism table:

By means of spinit level and levelling scnews, the poism table can be adjusted perfectelly horizontal place the spirit level on the prism table with its length parallel to the line joining any two of the

leveling screws. Adjust the two screws so that the air bubble in the spirit level is at its centre. then, place the spirit level along the pempendicular to the line joining these two screws and adjust the

third screw until the air bubble in the spirit level is at its centre

again, Now, the prism table will be pertectly horizontal ii) Determination of the angle of minimum deviation D:

Now turn the prism on the prism table such that the light from the collimator incident on one of the refracting surfaces, say AB. It emerges out of the second face Ac after retraction through the prism. A line spectrum with consists of number of lines can be seen through the telescope by turning it Spectrometer can be covered with black cloth and extereneous light such that the spectarum is more clean while looking through the telescope notate the prism table slowly in one dissection following the spectful lines, we observe spectral lines

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about the same ventical axis about which rexpientable and the prism table sistate.

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Adjustinguis of the spectmencien: Before using the spectmenter for any experimental observation, the following opinal and mecha-

to all well resulted on the cans manes for the for mainstrue of the form antidentill the cross-wines are mostly seemed

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in) naturations of allowaton without the slik of the collimation and illuminate it with the reverse of lifet. They have the bleem characters of assails supplied the said feeling of the said the collecting less by a such and projon smousearth and well and thought a toward there against the state of again to the

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the angle of minimum deviations	Average of minimum deviation	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Specialing brine
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moving towards the direct reading position of the telescope. As we continue to rotate the prism table in the same direction, in One particular position, the spectral lines suddenly start refracting their path (on turn back). The particular position of the spectral line (1). The consesponding angle of deviation is called angle of minimum deviation, when the spectorum is about referace its path then clamp the prism table and adjust the position of the telescope with the slow motion screw until the vertical cross-wine coincides with say, the violet line of the spectrum. then, note the main scale reading and vernier coincidence on both the verniers & and V. Find the total reading d, on each verinier. Now remove the paism from the paismtable release the telescope and turn it opposite to rollimator, See the direct image of the slit through the telescope and adjust its position with slow motion screw until the veritical = coross wine coincidences with the image of slit. Note the M.S.R and V.c on both the veriniens Find the total meading of The difference between the reading in the minimum deviation position d, and the oreading in the direct image position d, on the vernier gives the angle of minimum deviation D, for that violet line. Similarly, the difference between the reading in the minimum deviation position and the reading in the direct image position on the verinier 2 gives the angle of minimum deviation D, for the same line of the Spectrum. Then the mean angle of minimum deviation D is obtained forom the relation.

D = D1+D2

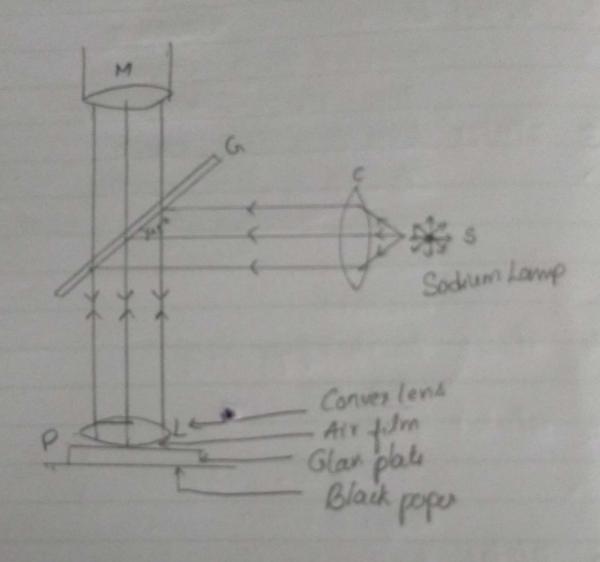
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the indecalculation of the party of the part	mean angle of mining the material related using the melone position for any to mesults are to be to cautions: observation must be slit should be as not telescope and colli	taken without panalla	line the netnactive navelength (line) can be moved up of the material ned using the nelation
4. The	eye-piece should but: The dispensive	e adjusted so that canon power of the material Iculated and results ar	of the paism for
4. The Res	ult: The dispensive exent colours is cal	power of the material	of the paism for
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I Year PHYSICS PRACTICALS SEMESTER-II PAPER-II

- 1. Determination of Radius of curvature of a given convex lens- Newton's Rings.
- 2. Dispersive Power of a Prism.
- 3. Determination of wave length of light using diffraction grating-Minimum deviation method.
- 4. Regolving Power of a Telescope.
- 5. Determination of Refactive Index of Liquid - Boye's method.
- 6. Abbrigations Determine the reflective Index of the material of a convex lens.

Diagram:



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dim: To determine the radius of curvature of a given lens by forming Newton's rings apparatus:

about 100 cm (8) a plano convex lens of large -ck cloth & paper, travelling mixoscope, a condens-ing lens, sodium vapour lamp, spherometer.

Formula:

R = Dm - Dn cm

Where R= radius of curvature of the surface of the lens in contact with the glas plate Dm = diameter of mth dark sing (from graph) Dn = diameter of nth dark sung (for graph) min = number of the imonochromatic source of light (sodium dight); chosen vings Gom

2 - wavelength of the monochromatic source of light (sadium light)

= 5893 × 108 cm

Description:
S' es a monocheromatic source of

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Graph: No of doork sung

elight which is averanged at a suitable distance from a condensing less c'Cie, at its focus such that a parallel bears of light rays will incident on the glax plate or averaged at 45° to the hoizontal. The glas place G' in turn partially suffects the beam and this turne it by 90° and mates it incident nomally on the experimental den I, which encloses a thin film of air bln its lower swiface and the glass plate P. A part of the incident eight is neflected by the swifale of the lens I and a part is transmitted which is reflected from the surface of the plane glax plate. These two reflected says, as these are delived from the same sousce interfere and give riese to an interference paltur in the arm of wrecular sings when these owings are viewed through a microscope of forused on the air film atternate dark and bright oring are called Alewton's sunge

Annangement of the microscope:
The glass plate P and the convex lens
I's hould be cleaned will with a lens paper. The
glass plate on a black paper and keep a while
paper often

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3,90 18	27 27 20	3.25	12	3.262	0.641	6.47
12 3.85 23	3118	3.30	32	3.332	985.0	0.343
	3.873	3.35	John Holling Control	3.355	815.0	0.268
\$ 3.80 32	3.832	3.240	42	3.44	0.89	6.182
4 53.75 10	3.760	3.45	00	3.468	0.2%	0.085

Procedure:

Weaving therough the microscope the sungs thus formed, more the microscope's vertical vertical piller hoizontally on the box such that the point of intersection of the oronwire cornudes with the antra dark spot By wunting the untral spot as Zero, more the microscope to the left side using the slow motion sorew counting the dark sings when the vertical crox wire is stangential to the 20th sing. note the main scale reading and the vernier connect dence. Now, more the microsupe towards the centre If the owing system and make the vertical cross-wir coincide with 18th, 16th, 12th, 12th, 10th, 8th, 6th, 21th and and sung and note down the readings of MS.R and Vic as above then, more the microscope dowards the right side of the central spot and note the readings for 2nd, 4th, 6th, 8th etc.

The difference bln the readings of any particular ring on left side (de) and right side (de) gives the diameter of the particular ring. The square of the diameter to cael ring can be found

Graph:

Draw a graph with no of dark suings on the x-axis and the squar of the diameter of the suings on y axis. A straight him paring

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and nth surge are be called in forme the given lens can be	and Do Korresponding to mit of the noted. By substituting the wall of found.
Observations:	
ruowpe:	liameter Dq darkings: Travelling
Alo of divisons on	the yennierscale N = 0.001 cm
Pore cautions:	
1. Light should be in	wident nomally on the lene
3. the lens and the Cleaned with ben	gene plate should be thoought
Kaclius of curvature	e of the given convex lens R 95.4522 cm
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> Lamplagercury & soclium s Prism table Telescope The combal spot whould be done me how and the gas plate should be theoryth cleaned with tenjeur Rodins of warden of the given

Diffraction Givating-Minimum DeviationDate 2/11/21 Expt. No. ___3 Page No. 10 Method din: To delumine the wavelength of a given in the minimum derivation position apparatus: Plane diffraction grating, spectrometer, spirit level, reading lens, merciving vapour lamp (& sodium daviation por lamp) and hand damp. Formula: 1 = 2sin(0/2) Where, 1 = wavelength of light of particular colour of radiation Angle of minimum deviation N = number of dines per cm on the grating (15000 / 2.54) = 5906 n = Oder of the spectrum. Description: (A) plane transmission grating: An avangement consisting of a parallel sided glass plate with a large no. of parallel of egilal width and seperated form one another by opaquespaus is called ediffaction grating when a wave pont is insident on a grating swiface light is transmitted through the slits and obstructed by the opaque postions. such a grating is called a transmission grating 15,000 lines per Signature :

inch are normally drawn an the student grating cas To set the grating plane vertical and its sulings Make the positioninary adjustments of the spectrometer as given in expro. 2. illuminate the slit with the given source of light whose warelen -get is to be determined place the grating on the pous m table vertically so that its plane in parallel to the line joining two of the travalling levelle ng scrows as shown in the fig 7.1. Turn the tele-- ally reflected image of the slit from the grating is clearly missible through the telescope. Then, adjust the soieurs x and y so that the image of the Mot is centrally situated in the field of view, Alow, in the prism table such that the grate -ng is approximately at 45° to the invident bear on the other side. Relense the telescope and catch the partially reflected image on that side and cadjust the third some such that the image as at the centre in the field of view. This is optical levelling) flow, notate the prism table until the ruled surface of the grating is nomal to the anis of the spectrometer and the reatings on the grating are parallel to the slit.

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beouding: viewing through the telescope observe the direct image of self. Reduce the width of the slit so that a sharp of destined image of the slit is clearly seen for the delescope opposite to the collinate and adjust its position with slow motion some until the mertical crox-wire coincides & (point of interaction of the brox-wires is on the slit) with the simage of the slit. Alole the mainscale reading and nervice coincidence on both the vernier (Ni and V). find the total readingd, on each vernier (Now, turn the telescope to one side, say left and observe the sliftacted image of the first oder, If mercury rapour lamp is used, then the spectrum with width, violet, show, blue-green gereen, yellow-1, yellow-2 and red lineappear. If sodium light is used, then Diand D, wires appear.

Then, suclear the prism table and notate it slowly to the left following the spections we observe the spectral line moving towards sight as we continue to notate the poism table in the same direction in one particular position, the spectrum, spectral lines suddenly retrace their path, when, the spectrum is about to retrace its path, then clamp the position table and adjust the position of the telescope with slow motion sown until the vertical cross-wise eximates with, say Blue

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Observations:

Value of one main scale (1 M. S.D); 3 = 0.1

Total number of divisions on the veenies, Nt-001

Least wount of the vernies of the spectrometer,

Le = 5/N = 0.001

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line of the spectrum of first older. Then, note the Mis. R and V. C on both the verniers (V, and V). Find the total reading do on each verner. The difference between the reading in the direct image polition d, and the reading de in the minimum deviation D, for Blue- line in the first oder spectrum similarly, the difference between the reading in the direct image position and unininum deviation position on the vernies-2 gives the range of minimuon derication D, for the same line of the spectrum Then, the mean angle of minimum dentation D is Obtained from the relation D= DAD2

Repeat the experiment for other spectral lines, and in each east find the value of D. Repeat the procedure Case find the value of D. prepeat the providure of the suond oder spectrum also. Similarly, find the angles of ninimum deviation to the first and word oder spectrum to the same line in the night side also Tabulate the observations in the table 7.1.

Pouceautions:

1. The michanical and optical adjustments of the spectrometer should be made oritially.

2. The plane of the getting should do adjusted

minimum Dewation & fund To delinion the angle of

num angle of Mean nivinum of deutation minimum of	Total reading Use at	19516 1436 1426 713 4254xis	19519 15°16 1587 15°19 736 4478×168		1996 1920 196 1923 926 5744 xie	1937 1926 9'ST 5793 X108	301°51 3015 6937 1826 9°51 5793×6 1	202'11' 21'17' 32"11 2029 10215 6345×10
Colour deviation position harm	Rectum MS.P. V.C. Juading MS.P. V.C.	13/	47	1986 100 100 100 100 100 100 100 100 100 10		20 15	2030 20 20,50 2010	oud 21° 21 21°17' 202° 11

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nomal to the incident light

3 The sucled surface of the grating should face the
telscope

4. The sect should be as narrow as possible and
parallel to the ruled lines of the grating

5. The suled surface of the grating should never be
touched

Result: The wavelength of light for different colour in the ninimum deviation is colourated.

Violet = 4254 x 168

Blue = 4880 x 168 24478 x 106 cm

Blush green = 4478 x 108 4820 x 108 cm

green = 5744 x 108 cm

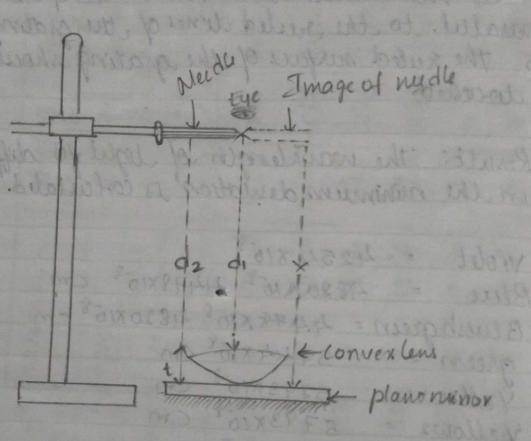
Yellow = 5793 x 108 cm

Yellow = 5793 x 108 cm

Same = 6345 x 108 cm

4 10 m/2

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sucted surper of the grating should for the

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Refy	ractive Indu	n of a lens cu	nd of a liqu	uid - Boy's	nethod
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dish,	a plane me	ires and m	eter scale		
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	+	f ₂			
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Mu	combined = repactive	e index of.	wales		
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Pouce	edure:				
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Month hought both Meedle was a sent of the Image of needle Shollow Mercury deshall evilen to food fingly of the corner. Justine or radiculation comment of med surface of conserver

¿ of the convex lens: plane misois method Take a convex lens and clean it with a lens paper place the plane miser of a set of tand) with als reflecting surface facing up wards, place the given convex lens where focal length is to be determined on the plane misso as shown in fig 5.1. of a subber with the tok is clamped to a retobstand so that the tip of the needle is held vertically above the centre of the lens. First more the typ of the needle neares to the lens and adjust its height so that the tipof the needle passes through the axis of the lens. virtual imag will be formed at this position (u<f), their the keep eye above the tip of the needly and gradually more it vertically upwards until a real and invested image appears close the left six, spen the right eye and looking nestically downwards from above the tip of the needle, acquest the height Eof the needle centil the resoll invested image of the tip of the needle winders stand. The convex less is allowed to float on the surface of the mercury fix the needle horizontally through a subbar cok (the cold is clamped to a rutole stand) so that the tip needle is held nestically above the centre of the tens to ones the principal axis of the

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Observations:

Table 5.1 to determine the focal length of and thick

-	DOTAL DIRECTOR - STORE A CO. ADD. TO		
tr	Distance of top of the needle from?	Focal length	thickness
SNO	upper surface of the upper screpace of	fiz ditdz cm	ted d
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44	he filmed at this position to	nd mag will	Brive
10	there the tip of the mode and	the keep will	, letter

.. Average focal length of conven len f= 9.9 cm Average thickness of commen len t= 0.8 cm

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contract the tour to open the principal and of the

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leve adjust the height of the needle until the tip of the invested image of the needle exactly without without parallax between them Measure the distance of between the trip of the needle and the upper surface of the cless them, add half the thickness of the lens to the distance het it by u. Then the radius of curation of the first surface of the lens in contact with muxuery can be obtained using the formula,

81 = Uit
f-11

Now, reverse the less so that the second surface of the lens is in contact with mercury and superat the experiment as above. If do is the distance between the tip of the needle and with the tip of the object needle without parallex maxves the distance do dutwern the tip of the H and the upper surface of the lens with a meter reale. Then, summer the lip of the needle, and upper surface of plane mins. The mean of the two sundings gives the focal length of the lens the difference between the two sundings gives the two sundings gives the two sundings gives the two sundings gives the standard the two sundings gives the standard the two sundings gives the the superiment the two sundings gives the thick next to the length of the lens the difference between the two sundings gives the the superiment the two sundings gives the the superiment the two sundings gives the thick next to the length of the lens the difference between the two sundings gives the thick next to the length of the lens the difference between the two sundings gives the thick next to the length of the lens the difference between the two sundings gives the thick next to the lens the Observation in table 6.1 tindes

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To soletermine the dombined focal length For the

Distence of tip of	the needle from	Albania Maria
en diem	plane mirro d, o cm	combine docal
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the few compacts of the world	A B WALLE	12+18:32
- filmulo	or have the principals	15+15.7
	1,11	= 15.35
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The property to	of the diese so the	More such

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the average focal length and thickness of the lens (when the tip of the object needle without is exactly at the fours of the lens, the says from the conver lens after passing through the lens because become parallel . These parallel says they are incidently nomally after suffection from the plane misso retrace their path and converge to the focus of the lens. Thus the distance between the Centre of the lens and the needle gives the focal length of the conventers) 2. Determination of radii of eurvolure (rand r,) of the two surfaces of the connect line using mescury Boy's method. Jake a clean and dry mercury in a shallow dish and place it on a stool of (restot? ban of the retait the upper sustall of the lens, then the read-- ises of curvatione of the second merface can be obtained using the famula,

3. Determination of the combined focal length Fof the comeen lens and the liquid concour lens: Lique & worker dons method.

pour a few drops of the given liquid (like water) on the plane mixers . Over the leguid

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to determine the combined focal length of F of the

1			
5	the tip of the needle and upper surface of	Disform between the needle and centre of the lens to com	surature on
1		The 1910 Page 1930 1932 19	
"	Const Fordselling all	or the side of the roll of	11-8
	bath found contrage &	wind rection sheet	
	he distance betieves		
	note after the food		to expend
10	constant trandr		
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" We write I are the splane missio due the hapited

	place the convex len with its surface, of radius
	of unatur or as in constact with the liquid then,
	the liquid between the lonver lens and the plan
	mirro is squeezed and takes the form of a plano-
	Convane liquid lens. Fix a needle il hoiz ontally
	with the help of a rubber cok which is clamped
	to a retort stand, so that the tip of the needless
	held vertically above the centre of the lons.
	le, F= di+d2
	4. determination of 2 the focal length for of the
	grane with ugua ser
	For a lens combination, we have,
	F = + + + + + + + + + + + + + + + + + +
	(2 p)
	$\frac{1}{f} = \frac{1}{f} - \frac{1}{f} = \frac{f - F}{f}$
	:. f : ft
	lether a front largable of the improve lens.
	Where f specal length of the sonvex lens. F = combined focal length Since, the liquid lens is plano-concave, the value
	en the liquid land it plans concars. He value
	of Consequenting
	of fi a negative. 5. Determine of the repartion index the of the given
3300	
	Mu repactive index of the gover liquid (water) Combe calculated from the formula,
	Com be contented down the should.
	current quite for the prizer
	(Signature:)

Calculation:

$$S_1 = [d + \frac{1}{2}]$$
 $U = [d + \frac{1}{2}]$
 $U = [5 + 0.8]$
 $= [5 + 0.4]$
 $= [5 + 0.4]$
 $= 15.35(9.9)$

ii
$$r = \frac{uf}{f_1 - u}$$
 $f_1 - u$
 $= (5-4)(9.9)$
 $= (5-4)(9.9)$
 $= 1 + \frac{y}{f_2}$
 $= 1 + \frac{11.8}{27.8}$
 $= 1.42$

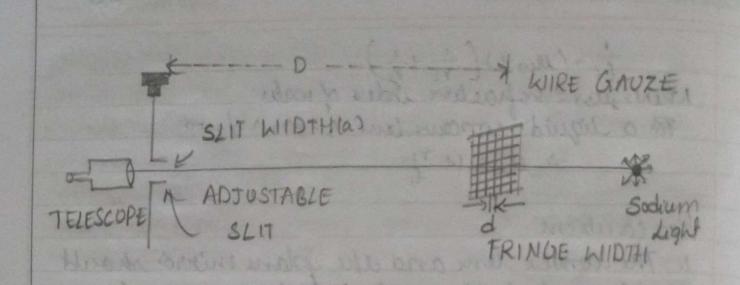
If
$$2f_1$$
 and $2f_2$ and $2f_3$ and $2f_4$ and $2f_4$

Determine of whe refaction Podes Hun of Mer on

the refactive under of the gover liquid function

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LAPE. 140.	Page No.
1 = / 10. 1	(-11)
Where we = relian	(tre index of water
For a liquid co	nouve lens 3, = 0 . 1 /2, =0
-> Llw=	14 VI
-	7
Pou cautions	
1. The sonvex les	u and the plane misero should
2 The models we	de performing the experiment
that the image	coper bankt
3. Mercury shoul	should be properly illuminated so appear bought the pure with a clean sufferting
mustal.	
4. Parallox show	ld be removed carefully
	and are the motivation to the stanty
	mushald down in the water
Repactive Endex	of the conven leve u= 1.59
Repentite index of	the liquid (water) Mw= 1.42
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e de	Lead countries pass of
to/II/S	
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	MICH AN COLUMN THE PARTY OF THE



Observation:

screwgrage.

pitch of the screw: Distance moved on the petch scale

for a rotations

2 nm had scale (n).

9

don: To determine the resolving power of a telescope apparatus: A telescope, evis-guaze with fine uniform mesh sodium vapowi lamp, travelling microscope, measuring tape of a long thread, a rectangular slit of adjustable width attached to a micrometer society and a reading lens The resolving power of a telescope is given by 1. Thoutetal, R.P = a cm 2. Experimental, R.P = D cm where, A= 1 = warre Longth of sortium light (5893 Kism) a = width of the rectangular Kit, when the two point Objects are just resolved d = voruerage distance between any two adjacent neitres of the mesh. De distance between the wire-george and the Objective of the telescope Description:

The experimental arrangement is shown in fig. is a monochromotic source of light (sodium lamp). Awire - going gauge with uniform much fixed to a settlet stand is placed before the source of light. A telescope provided with a adjustable

Signature :

	Distant Toleston &	The Man	Tolestian		Medal state	le:	3450	-	72	24
0140		-	and i	a rangered	61		1	gringe	a	-
2.5	HH KCODO	MA	Myt vide	1	Roll	Right side		width	1.221	21-
	400	MS.R	NC	a+n72c	M.S.R	7/2	-anne	148x		0
7	200	5.5	8.5	5.5025	9:5	3.3	5.6033	0.1008	1,402.05	1,257.86
7	200	4.50	32	7.232	4.33	22	7.372	7110	1,943.	1,886.79
	1000	20 P	Sep. 1	A STATE OF THE STA		. 10	index 9 m		3 8 5 3	
-	nut Townelling	unde	o mo	nut Townelling microscope	*****	memen.	Lue da	facent	po mony	She
160	Uplus of on disting on	v dim	Mon 6	n abo n	main state		m = 3.	m.		
8	tal num.	for not	John	total number of columnons on	the verme, n	win	N =			

Subhodaya

. Least count of the neuro La - she : mm, em

a distance of about 3 to 4 meter from the wive graze

Poweederse:

1. To determine the width of the slit:

shount the wive-guaze ventically on a onetool stand at a suitable height and place it enfort of the sodium light. Asserage the belescope adjust the position of the eye-piece by moning it in I out until the coox wines are clearly usible Now illuminate the wive gauge with sodium light. Focus the telescope on the webre-gauge so that the yesteral and horizontal seizes of the men are distinctly seen in the plane of the oronioures. Find the least count of the miscometer source, Mount the adjustable set fixed to the micrometer society, on the Objective of fixed to be miorometer screws on the Objective of of the testescope. Adjuts the position of the micromder socieus so that the slet is Vertical and parallel to the vertical wires of mesh Now, open the Slub and Observe the restical and horizontal wires of the mesh, then, gradually reduce the neight of the slet by twining the micrometer 2. To determine the distance of between the lux adjacent wire of the mesh

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	bridehay 5 intempar	Chr.	0.159			500	ut, of	em 0.159
100	hen the edge of	Offernu	984.0	0.791	408.9	0.797	0.795	
	microscope un	Total andling Outerm	1,039	1.825	2.616	3.42	4.219	For an
The state of the s	ading won Uhr	2.7	39	25	16 16 16 16 16 16 16 16 16 16 16 16 16 1	20	10 10	luturen two radjacent wire d= x/5.
The state of the s	Holizondal stall suading use the microstape when the vertical won-wise is Langential to the left edge of its nextical wise	14.5.R	SON TO SOLVE SOLVE SON TO SOLVE SOLVE SON TO	1.80	2.60	3.40	4.20	0
	No-9 lbs	Luter	0	5	0)	51	20	druege width
	20,0	20	-	à	3.	7.	·s ·	B

Subhodaya

the box of the travelling miocoscope. Find the deast count of the travelling microscope dolyust The position of the eye piece by moving it indo focus the niverscope on the mesh and Observe the magnified vertical and hosizontal wires of the mesh newing through the eye prece, more the microscope hoizontally to one side (any left side) of the mesh Such that the point of intersection of the cross-wires is tangential to the intersection of the cros-wises is tangerdial to the centre of the vertical wires say first wire (near the entum left of the mesh). Then cafter tighteneng the free motion sown, with the help of a tangential row, adjust the microscope such that the vectoral own-were is tangential to the left edge (of right edge) of the vertical neine of the mesh. Note the rask and V. Chet the total reading be Ro for convenience, Ineat the first wire as Oth wire. Now, by weenting the member of vertical wire, more the micros cope so that the restical crosswire is tangential to the left edge of the 5th wine Again, Note the M.S.R and V.C. Let the total reading be Re Repeal the experiment and note the observations lin table) for the coth, 15th, 20th, 20th, 25th, 30th Vertical wiru. Tabulate the observation in table 13.2

Signature :

the difference Sutwern (Ro) the Levo Reading RoandR, your the distance between 5 interspace of the mests Find the average bet width of 5 interspace. Forom this, find the width of one interspace which is equal to the average distance of between two adjusent him of the mesh, the thoosetical and experimental value of the R. P. of the telescope carrier calculated using the formula.

Precoutione:

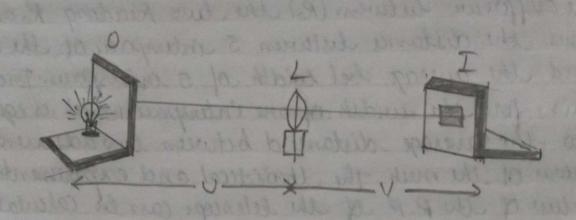
1. The plane of the adjustable Mit should be parallel to the Vertical wire of the mesh. 2 The adjustable Mit and wire-gauge should be kept at the same height in the vertical position.

Result:
The Shistical and Experiment Values of the
Rp of the telescope are Calculated and compared
they are found to be equal

S-NO	b	thesitical a 11.221	Experiment	Difference
1.	200	1,402.05	1,257.86	144.19
2.	300	1,947.29	1,886.79	60.5

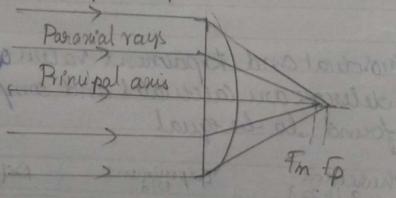
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of the adjustable til and will gain stone

Marginal rays



1 200 b402.05 1257.86 1941 9 500 1294129 12816 39 605

Subhodaya

Aim: To g determine the longitudinal spherical aberration of a donver lens Apparatus: A convex lens ; sodicens corpous lamp, optical bench a socien, scale Formula: 6 clonge tudinal spherical aberration = fp-fm 2. longetudinal Chromatic aberration = fp - fs. 3. The paraxial for al length of the lens can be Calculated tp = av cm 4. The marginal focal length of the lens can be calculated fm = uv CM 5. The focal length for of the lens can be calculated 6. The focal length for of the len can be Calculated fb= uv cm Description: the experimental arrangement is shown un figure. The optical bench consists of a long

Observations:

To determine the paraxeal focal length fp of the convex lens;

OIA2	Object distance u (cm)	Imagi distanu	fp = uv com
1	36	42.1	19.40
2	38	40.2	19.19.53 19.53
3.	40	38.7	19.66
4.	42	37.2	19.72
2.	44	34.7	1940

Ang (4p) = 19.54" im

to determine the marginal focal length for of the conver lens.

	U (em)	Amage distance	fm = uv (em)
1	34	42	18.78
2	36	38-9	18-69
3.	38	38-4	19.09
4	40	36.7	19.13
2.	42	34.3	18.8

dry(+m)= 18.91

cm

heavy metal bax MM (cast is non) of double rod type nearly 2 meters long one arm of the bench us graduated in millimeters. Four levelling sources are provided at the bax of the binch by means of which the applical bench can be made hosizontal. The various components used like the slut object, sonvex lens and the screen

Theory: Parallel roup after passing through a lens converge at different points on the for paso principal anis. The rough which over close to the poinciple axis ar called paranial ray and the rays which are away for the principal and are called marginal sup the lens can be divided ento circular Lones. So, different zones have different focal lengths. The marginal verys after repartion come to focus on the pountupal axis at Fm. The differ distance bla Fm and the optical certire is called the marginal focal length for the pararual rays meet the principal and at to and the distance of a Fp and the optic Centre is called the parazual focal length fp. The pararial rays form the image at a point distance than the merginal rays. Therefore, the image is not May at any point on the axis. The defect is called spherical aberoation the difference ben to and fin giver ite longetudinal spherical aberration.

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(43)

to determine the focal length for of the conven lens

for sed wolous:

3.No.	Object distance	Amagi distance 4 (cm)	fr = UV lenx
10 males	34	41.5	18.68
Charles of	36	405	19.05
	38	39	19.24
	40	37.5	19.35
STATE OF THE PARTY	42	35.8	19.32

Ang (AR), 19.12 cm

To determine the focal length to of the convex lens for Blue colours.

s.vu.	O byent distance lusern	Image distance	fr 2 UV cm
	34	40	18.37
	36	38.8	18.67
	38	36.5	18.61
	40	34.8	18.60
9/10	42	329	18,44

colly (f3) = 18.53 cm



the differece by fp and fm gives the longitudinal spherical abservation.

Powedwe:

1. To determine the longitudinal pherical aberration: Level the optical bounch so that it is perfectly horsontal by means of the convex lens of focal length about 20 cm; mount it on one of the uprights and place it at distance of your form the object. The soun it to be placed on the fourth upright beyond the common len in older to observe the image of the

Take a thin ownered could board and make a small circular hole at its anto. For this cord board on one side of the lens which grem. Due to this only peranial rain are allowed to par through the low whereas the marginal rays are cert off. Adjust alte distance of the screen sentile a clear and bright image of the object is formed on the socien. then the distance u of the object from the lene and the distance V of the image from the lens the paraxial focal length to of the lens can be calculated using dhe formula

-fp = UY

Signature :

the distance up the object from the lens and the distance was the image from the lens. The marginal focal length of the lens can be calculated eving the firmula.

fm = uv cm

Repeat the experiment 30° 4 times by placing alto Object at various distance. Find the average paranial focal length Take Observation in table

2. To determine the longitudinal deromatic atternation

In older to find out the longitural chromatic aberration. The sud saller allows light of single wavelength which falls in the sud sugron.

More the convex lons set a distance "u' from the slet.

Adjust position of the eye-prece until the sied image of the slet is clearly wisible. Moto the distance for a united the distance.

FR = UV CM

take observations in the table. The longitudinal chrom--atic aberation can be calculated. Using above famula

Signature :_

,	Date
Expt. No6	Page No. 48
Poucautions:	
I the Optical brench	should be made perfectly hoizon
2 the stil should be the	stital and narrow loud be mounted at the same
height	The second secon
0	FOH
Result:	6 457
1. dongitudinal spherica	1 aberration - 0.63 Cm
2 donge teedenal chros	nate aberration 0.59 cm
Justinus Carrieras	
2/11/21	
100	
	(Signature: