EXPERIMENT: No. 1 Reg No.: 21BCE1297

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EXP: Determination of refractive index of a dispersing triangular prism for spectroscopic applications

- AIM: Given the angle of prism, aim of the experiment is to determine the angle of minimum deviation of the prism and hence calculate its refractive index.

- APPARATUS REQUIRED: Spectrometer, given prism, Mercury Vapour lamp, etc.

- FORMULA USED:

Refractive index (μ) of the prism is given by

$$\mu = \frac{\sin\frac{\alpha+\delta}{2}}{\sin\left(\frac{\alpha}{2}\right)}$$

Where α is the angle of prism
δ is the angle of minimum deviation.

- RESULT:

The refractive index (μ) of given prism is 1.519 ≈ 1.52

TABULATIONS:

Angle of prism = 60°
Least count of spectrometer = 1°

TR = MSR + (VSC * LC)

READING FROM		VERNIER 1			VERNIER 2		
		MSR	VSC	TR	MSR	VSC	TR
Refracted Ray (i)	V	131°	15'	131° 15'	311°	2'	311° 2'
	G	132°	19'	132° 19'	312°	13'	312° 13'
	Y	132°	26'	132° 26'	312°	29'	312° 29'
	R	133°	0'	133°	313°	0'	313°
Direct Ray (ii)		171°	19'	171° 19'	351°	12'	351° 12'
Difference between (ii) and (i)	V	40°	4'	40° 4'	40°	10'	40° 12'
	G	39°	0'	39° 0'	39°	-1'	38° 59'
	Y	39°	-7'	38° 53'	39°	-17'	38° 47'
	R	38°	19'	38° 19'	38°	12°	38° 12'
Mean Value (δ)	V	40° 8'					
	G	38° 29.5'					
	Y	38° 50'					
	R	38° 15.5'					
Mean Value of D (δm)		38° 55.75' = 38.9°					

Calculations:

According to formula, $\mu = \frac{\sin\left(\frac{\alpha+\delta}{2}\right)}{\sin(\alpha/2)}$

$\Rightarrow \mu = \frac{\sin\left(\frac{60+38.9}{2}\right)}{\sin\left(\frac{60}{2}\right)}$

$\Rightarrow \mu = \frac{\sin(49.45)}{\sin(30)}$

$\Rightarrow \mu = 1.5196 \Rightarrow \boxed{\mu = 1.52}$