GARVIT SHAH
F-24

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- **Aim :** To determine the angle of prism

- **Apparatus :** Spectometer, prism, magnifying glass, sodium vapour lamp.

- **Theory :**
  When a beam of light strikes on the surface of transparent material. (glass, water, quartz, crystal etc) a portion of the light is trasmitted and the other portion is reflected. When a beam of light strikes on a plan surface, the angle of reflection will be same as the angle of incidence.

$$A = \theta/2$$

- **Controls :**

1. SWITCHES -
   - Switch ON/OFF light : used to turn light ON/OFF
   - Place prism / Remove prism : this switch is used to place the prism on the prism table or remove prism from the prism table.

2. SLIDERS -
   - Slit Focus : This slider used to focus other slit while looking through telescope.
   - Slit width : using this slider, width of the slit can be adjusted

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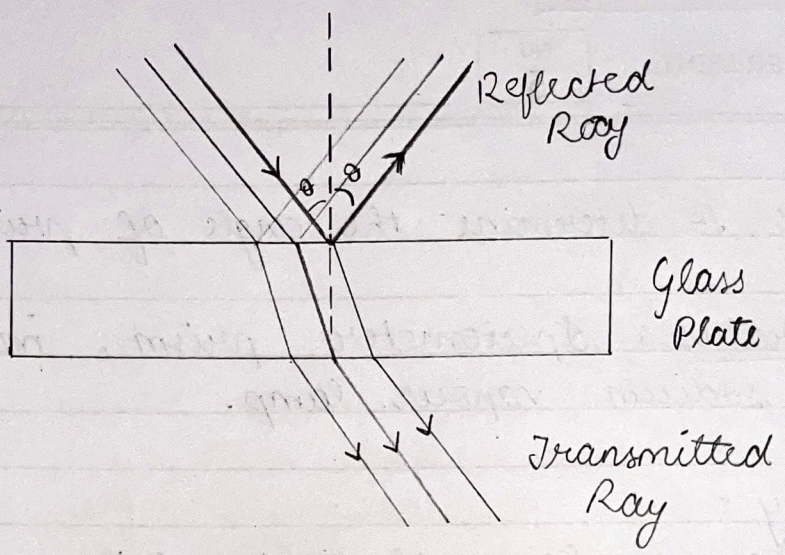

Fig 1

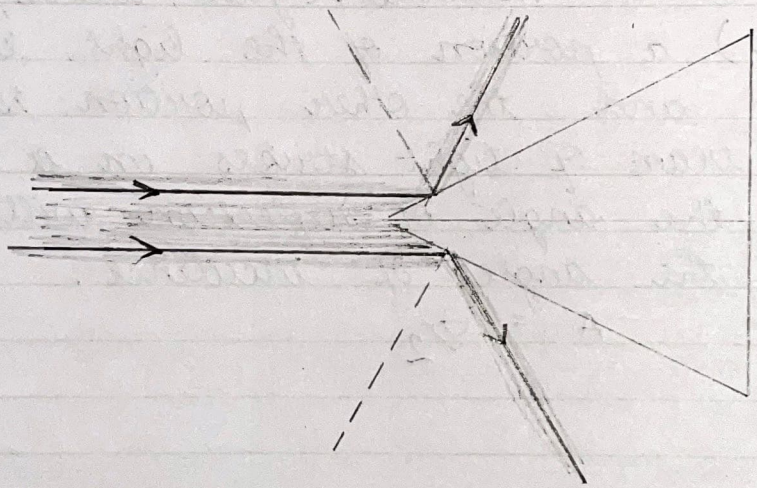

Fig 2

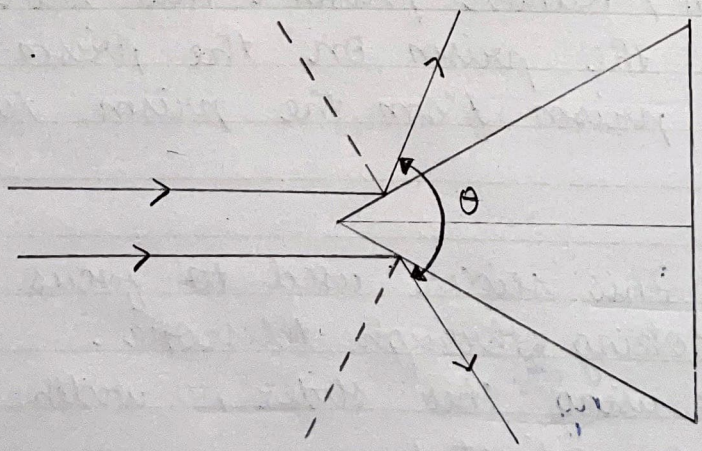

Fig 3

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- Telescope : using this slider one can move the telescope from its position.
- Vernier Table : vernier table can be rotated using this slider.

3. FINE ANGLE ADJUSTMENT
- Telescope : this is used to fine adjust the telescope.
- Vernier Table : using this slider we can rotate fine angle.

4. MEASUREMENTS
- Here we get the zoomed view of vernier I & II by placing mouse over it.

- Procedure :

PRELIMINARY ADJUSTMENT

A. Performing in Simulator -
1. Focus telescope on distant object
2. When focus is correct, start button ~~can~~ is activated. Now click start button.
3. Switch ON the light by clicking switch ON light button.
4. Focus the slit using slit focus slider.
5. Adjust the slit width using slit width slider.
6. Coincide the slit with cross wire in the telescope.

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B. Performing Real Lab :-

1. Turn the telescope towards the white wall screen and looking through eye-piece adjust its position till the cross wires are clearly seen.
2. Turn the telescope towards window, focus the telescope to a long distant object.
3. Place the telescope parallel to collimator
4. Place the collimator directed towards sodium vapor lamp switch ON the lamp.
5. Focus collimator slit using collimator focusing adjustment.
6. Adjust the collimator slit width.
7. Place prism table, note that the surface of the table is just below the level of telescope & collimator.
8. Place spirit level on prism table. Adjust the base ~~to~~ levelling screw till the bubble come at the center of spirit level.
9. Clamp the prism holder.
10. Clamp the prism in which the sharp edge is facing towards the collimator and base of the prism is at the clamp.

TO DETERMINE THE ANGLE OF THE PRISM

A Performing Simulator

- Click place prism button.
- Place the edge of prism, pointed towards

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collimator

- Move the telescope slider up to see the slit on side
- Coincide the slit with the cross wire using fine angle adjusting slider, Then note the reading in the tabular column.
- Move the telescope between two angle i.e 2θ. Hence, find the angle of prism i.e θ.

B Performing in Real Lab —

1. Prism table is rotated in which the sharp edge of the prism is facing towards the collimator.
2. Rotate the telescope in one direction up to which the reflected ray is shown through the telescope.
3. Note corresponding main scale & vernier scale reading in both vernier.
4. Rotate the telescope in opp. direction to view the reflected image of the collimator from the second face of prism.
5. Note corresponding main scale & vernier scale reading in both vernier.
6. Find the difference between two readings i.e. θ.
7. Angle of prism, $A = \theta/2$

- Result :

Angle of prism, $A = 60°2'$

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Observation :

- Least count of spectrometer –

  1MSD = 0.5° = 30′

  No. of vernier scale divisions = 30 (n)

  ∴ LC = $\frac{MSD}{n}$ = 1′

Observation Table :

Reading of reflected ray from	Vernier 1			Vernier 2		
	MSR	VSR	Total	MSR	VSR	Total
Face 1 (A)	310°	4′	310°4′	130°	5′	130°5′
Face 2 (B)	70°	1′	70°1′	250°	7′	250°7′
Difference between a & b			240°3′			

Mean θ = 120°4′ Angle of Prism = 60°2′ RESULT

Calculations –

In Vernier 1, difference = 240°3′

Final Angle = 360 – 240°3′ = 119°7′

θ = 119°7′ and 120°2′

Mean Angle = $\frac{119°7' + 120°2'}{2}$ = 120°4′