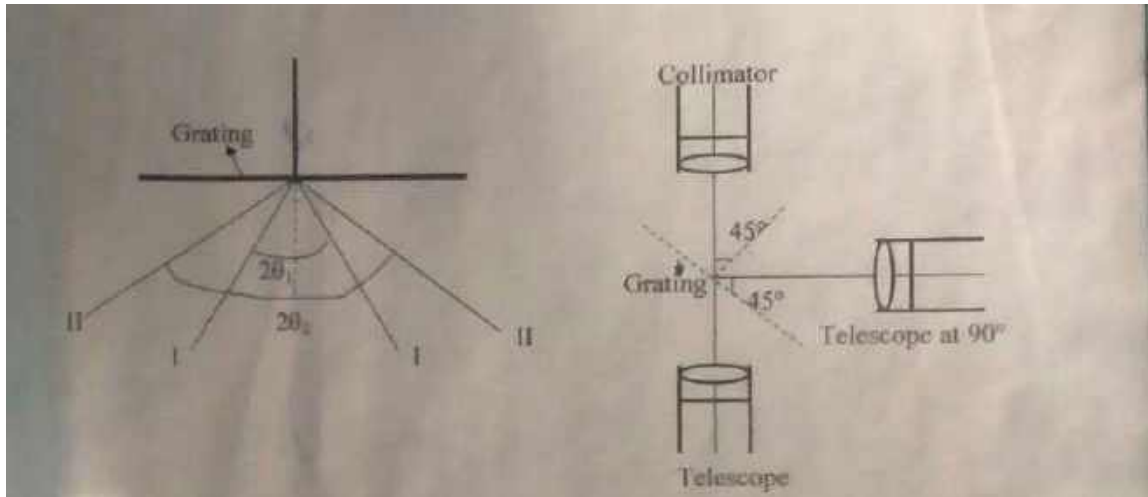


## SUBJECT – APPLIED PHYSICS (LAB)

### EXPERIMENT No-----

OBJECT: To determine the wavelength of sodium light with a diffraction grating.

APPARATUS: A spectrometer, a diffraction grating of known grating element, sodium lamp and a reading lens.



### METHOD:

1. Fix the grating stand on the circular table.
2. Place the telescope in line with the collimator so that the direct image of the slit falls on the vertical cross wires of the eye piece of the telescope. Read the position of telescope say it is  $\alpha$
3. Rotate the telescope to  $(\alpha+90)$  position so that the axes of the Collimator and the telescope are at right angles to each other.
4. Place the grating on its stand and rotate the graduated disc slowly so that the brightest possible reflected image of the slit falls on the vertical cross wire of the telescope.
5. Grating is inclined at an angle of  $45^\circ$ , turn the graduated disc towards the collimator through  $45^\circ$ . So that now light is incident normally to the plane of grating.
6. Move the telescope to left, obtain the image of the slit in first order read the position of the telescope on both the vernier.
7. Move the telescope to right, Read the position of the telescope for the image of the slit.

### OBSERVATION:

(A) Measurements of the angle of diffraction,

Value of one main scale division =.....min.

Total no of vernier division=.....sec.

Least count=.....sec.

Order of spectrum	Vernier	Spectrum left of direct image			Spectrum right of direct image			20	0
		Main scale reading	Vernier scale reading	Total reading (e)	Main scale reading	Vernier scale reading	Total reading (d)		
1	V <sub>1</sub>								
	V <sub>2</sub>								
2	V <sub>1</sub>								
	V <sub>2</sub>								

(B) Determination of the grating element (e + d);

$$N(e + d) = 1 \text{ inch} = 2.54 \text{ cm}$$

Where, N is the total no of lines on the grating.

$$\text{Grating element } (e + d) = 2.54/N$$

**CALCULATION:**

$$(e+d)\sin\theta = n\lambda \quad \text{where , n is the order of spectrum}$$

$$(e+d)\sin\theta/n = \lambda$$

$$\lambda = \dots\dots\dots \text{A}^\circ$$

**RESULT:** The mean wavelength of sodium light =.....A°

**PRECAUTION:**

1. The mechanical adjustments of the telescope should be correct.
2. The optical adjustment of the spectrometer must be made correctly.
3. The slit used should be as narrow as permissible.
4. In handling the gratings do not touch the face of the glass;  
Hold it between the thumb and fingers by the edges.