Assignment-7 Experiment-7

DETERMINATION OF WAVE LENGTH OF MERCURY SPECTRUM-DIFFRACTION SPECTROMETER

AIM:

To determine the wave length of the mercury spectrum using diffraction grating.

APPARATUS:

A spectrometer, mercury vapour lamp, grating, spirit level, reading lens etc.

FORMULAE:

Wavelength (λ) = Sinθ / mN (Å)

λ – Wavelength of different colours in mercury spectrum (Å)

m – Order of the spectrum

N - No. of lines per meter of the given grating
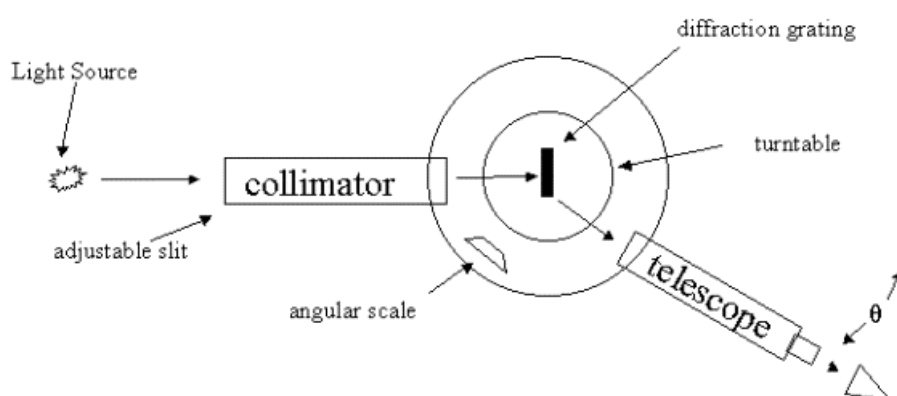
θ – Mean Angle

Fig. 7.1. Spectrometer Grating Normal Incidence position

$$LC = \frac{\text{Value of one MSD}}{\text{No. of div on VS}} = \frac{30'}{30} = 1'$$

OBSERVATIONS

Number of lies per meter of grating N = 15000 LPI = 6 x 10^5 Lines/m

Order of Diffraction m = 1

	Spectrometer Reading (Right)		Spectrometer Reading (Left)		2θ		Mean 2θ	θ	$\lambda = Sin\theta/mN$ Å
	V_A	V_B	V_A	V_B	V_A	V_B			
Violet	296º3'	116º4'	270º4'	90º5'	?	?	?	?	?
Blue	298º8'	118º7'	268º14'	88º7'	?	?	?	?	?
Green	301º29'	121º5'	263º17'	84º10'	?	?	?	?	?
Yellow	302º16'	122º7'	262º13'	82º12'	?	?	?	?	?
Orange	303º5'	123º7'	261º9'	81º7'	?	?	?	?	?
Red	305º5'	125º5'	259º10'	79º10'	?	?	?	?	?

Assignment Question:

1. From the spectrometer readings (Right and Left) to find the difference between V_A Right ~ V_A Left and V_B Right ~ V_B Left, and enter same in the tabular coloum (2θ).

2. Calculate the mean value of 2θ from V_A and V_B and then calculate the θ value. Enter the same in the respective coloums.

3. From the values of θ, N and m, calculate the wavelength of each colour using the formula and enter values in the respective coloum in terms of Angstrom unit (Å-Order of 10^{-10} m).

4. Write the result in the following order

          The wave lengths of colors of mercury spectrum are calculated and the values are tabulated.

    Finally, submit the scanned copy of your observation note book in GCR on (or) before THREE working days from the date of experiment.