

Objective / Aim of the Experiment

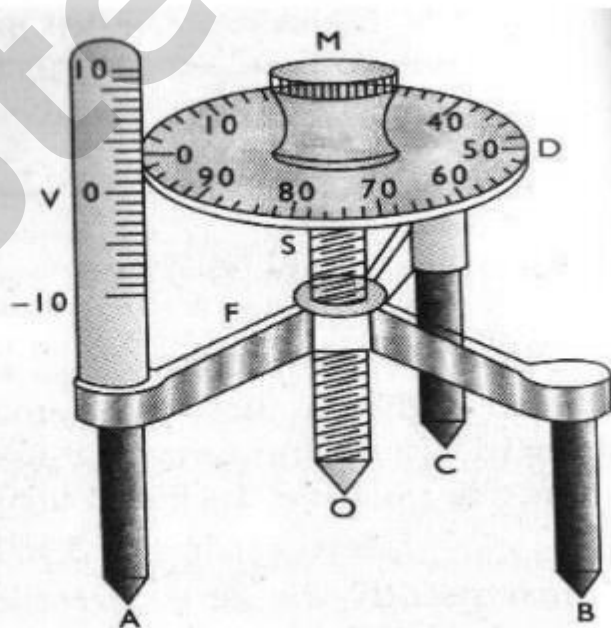
To measure radius of curvature of given curved surface using spherometer.

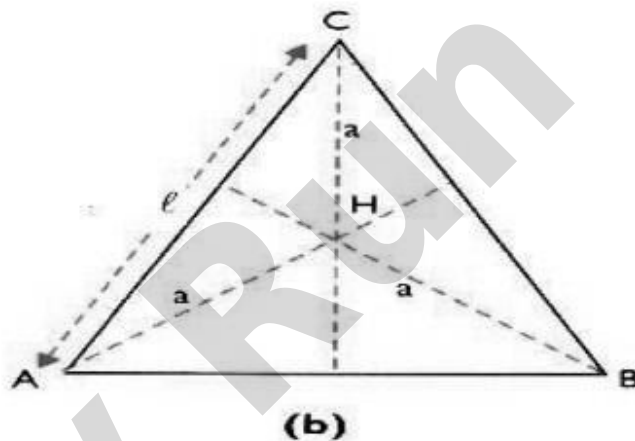
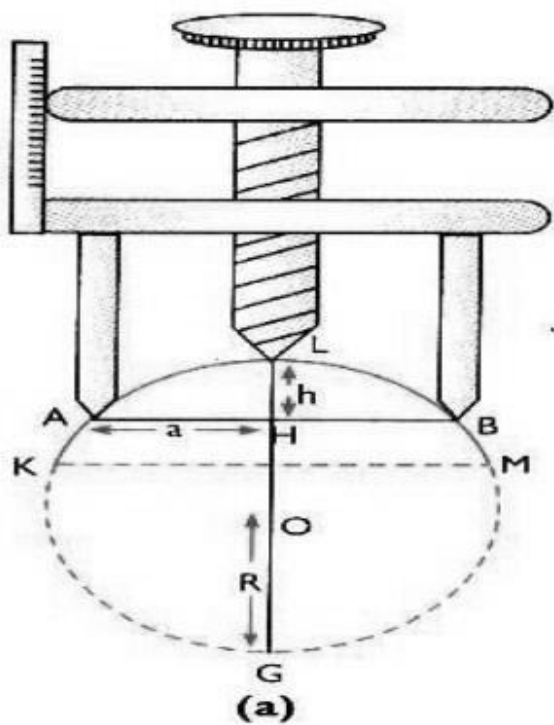
Apparatus / Equipment Required

Spherometer
Convex (curve) surface
A big size plane glass slab

Procedure

1. Raise the central screw of the spherometer and press the spherometer gently on the practical note book so as to get pricks of the three legs. Mark these prick as A B and C.
2. Measure distance between the pricks (points) by joining the points as to form a triangle ABC.
3. Note these distances (AB,BC AC) on notebook and take their mean.
4. Find the value of one vertical (pitch) scale division.
5. Determine the pitch and the least count of the spherometer and record it stepwise.
6. Raise the screw sufficiently upwards.
7. Place the spherometer on the convex surface so that its three legs rest on it.
8. Gently turn the screw downwards till the screw tip just touches the convex surface.(The tip of the screw will just touch its image in the convex glass surface)
9. Note the reading of the circular (Disc) scale which is in line with the vertical (pitch) scale. Let it be a (It will act as reference).
10. Remove the spherometer from over the convex surface and place over a large size plane glass slab.
11. Turn the screw downwards and count the number of complete rotation (n_1) made by the disc (one rotation become complete when the reference reading crosses the past the pitch scale).
12. Continue till the tip of the screw just touches the plane surface of the glass slab.
13. Note the reading of the circular scale which is finally in the line with the vertical (pitch) scale . Let it be b.
14. Find the number of circular (disc) scale division in the last incomplete rotation.
15. Repeats the step 6 to 14 , three times. Record the observation in tabular form.





Observation

1. Distance between two legs of the spherometer In triangle ABC marked by legs of the spherometer.

AB = cm

BC = cm

AC = cm

Mean value of $l = (AB + BC + CA) / 3 = \dots\dots\dots$ cm

2. Least count of spherometer.

One pitch scale division = 1mm

Number of full rotations given to screw = 5

Distance moved by the screw = 5 mm

Hence, pitch $p = 5\text{mm} / 5 = 1\text{mm}$

Number of divisions on circular (disc) scale = 100

Hence, Least count = $1\text{mm} / 100 = 0.01\text{mm} = 0.001\text{cm}$

Table for sagitta (h).

Serial No. Of Observation	Circular (Disc) scale Reading		Number of complete rotations on plane (n_1) glass sheet	No of disc scale divisions in incomplete rotation $x=(a-b)$ or $(100+a)-b$	Total Reading $h = n_1xp+x$ X (L C) mm
	On convex surface initial (a)	On plane glass sheet Final (b)			
(a)	(2a)	(2b)	(3)	(4)	(5)
					$h_1 =$ $h_2 =$

Calculations

1. Find value of h in each observation and record it in column 5.

2. Find mean of value of h recorded in column 5.

Mean value of $h = (h_1 + h_2 + h_3) / 3 \text{ mm} = \dots\dots\dots\text{mm} = \dots\dots\dots\text{cm}$.

3. Calculate $R = l^2/6h + h/2 \text{ cm} = \dots\dots\dots\text{cm}$.

Result

The radius of curvature of the given convex (curve) surface is $\dots\dots\dots\text{cm}$.

Precaution

1. The screw should move freely without friction.
2. The screw should be move in same direction to avoid back ?lash error of the screw.
3. Excess rotation should be avoided.

Sources of error

- The screw may have friction.
- The spheremeter may have back-lash error.
- Circular (Disc) scale division may not be of equal size.

Steady Run