

Working formula to determine volume and density:

- If, $t = \text{thickness of given test plate}$ [measured using the spherometer]
- $A = \text{area of given test plate}$ [measured from graph (being irregular shaped)]
- $m = \text{mass of given test plate}$ [measured from digital balance (weighing balance)]

Then, $\text{Volume} = \text{Area} \times \text{thickness}$

and $\text{Density} = \frac{\text{mass}}{\text{Volume}}$

[We expect the density of the given glass plate to be 2.5 gram cm^{-3} .]

PROCEDURE

1. The least count of the spherometer is determined.
2. The given test plate is placed on the base plate. The spherometer is placed over the test plate in such a way that its central leg lies over the test plate and outer legs lie on the base plate.
[Hold the spherometer in the mentioned position.]
3. The central leg is rotated down so as to just touch the test plate. The initial circular scale reading on the test plate (x) is noted.
4. The test plate is now removed. The central leg is further rotated down so as to just touch the base plate. The total number of complete rotations (n) is noted. The final circular scale on the base plate (y) is also noted.
5. Procedures 2, 3 and 4 are repeated three times on one side of the test plate.
6. The test plate is turned over and the above three readings are repeated.
7. The mean of these six readings is calculated (*obeying significant figure rules*). Thus, obtained mean value is the thickness (t) of the given test plate.
8. The test plate is now placed over a graph paper and its outline is drawn (*two outlines for two sides*). Counting the number of small boxes, the mean area (A) of the test plate is determined.
9. The mass of the test plate is measured by using weighing balance (or digital balance).

OBSERVATIONS

The pitch of the screw, $P = \dots \dots \dots$ (= value of 1 main scale division)

Number of circular scale divisions, $N = \dots \dots \dots$

$\therefore \text{Least count of spherometer, } LC = \frac{P}{N} = \dots \dots \dots \text{ mm}$

Mass of given test plate, $m = \dots \dots \dots \text{ gram}$