LECTURE NOTE-(SCREW GAUGE AND VERNIER CALLIPER)

PREPARED AND DEVELOPED BY

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Aim of the Experiment:-

To determine the Volume of hollow cylinder by using Vernier Calliper.

Apparatus required:-

i) Vernier Calliper
ii) Hollow Cylinder
iii) Geometry box

Theory:-

- The Vernier Calliper is also known as Slide Calliper. The Slide calliper is used to measure the distance between two points on a flat surface.
- The Vernier Calliper consists of two scales - Vernier scale and main scale, the vernier scale is moveable and the scale slips over the main scale and has a moveable jaw.
- By using these moveable and fixed jaws we measure the internal and exterior of hollow cylinder.

Least Count of Vernier Calliper:-

- The Smallest measurement that can be measured by the Vernier Calliper is called the least count of vernier Calliper.
- The least count of Vernier Callipers is also known as the Vernier constant. It is mathmatically given as
- Least Count = 1 Main Scale division − 1 Vernier Scale division

$$LC = 1\ MSD - 1\ VSD$$

- Vernier Coincidence (VC):-

Vernier Coincidence is the division of Vernier which coincides with one of the divisions of the main scale

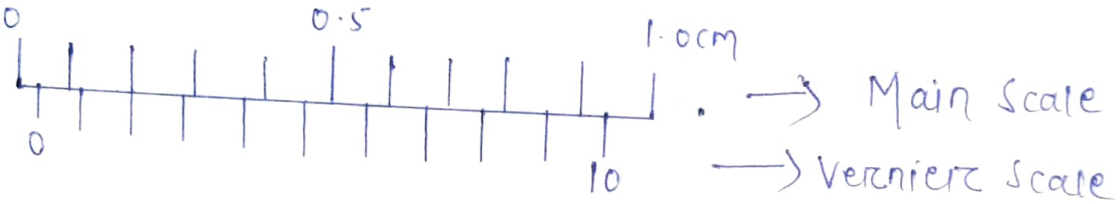
Actual reading = observed reading ± Zero error

Zero error :- Three type of zero error

(i) No Zero error:- When the Zero of Vernier Scale Coincide with zero of main scale it is called No Zero error.

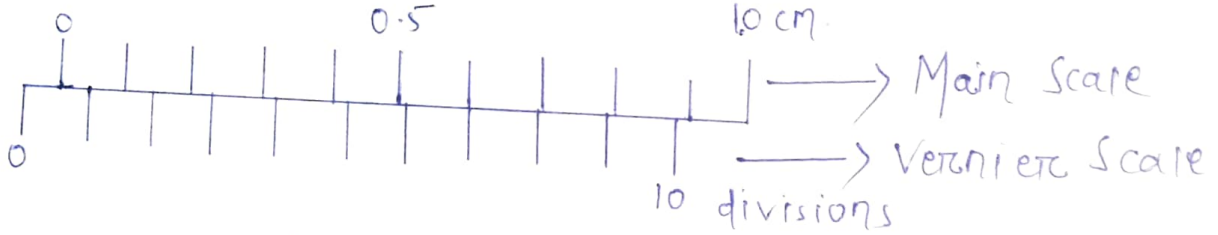
No Zero error

ii) positive zero error: When the zero of vernier scale lies to the right of zero of the main scale then it is called positive zero error.



iii) Negative Zero error: When the zero of vernier scale is at the left of the zero of the main scale then it is called Negative zero error

- The value of Negative Zero error is added to the observed reading.



Calculation of Zero error:

Positive Zero error = Least Count × Vernier Coincidence
= L.C × V.C

Negative Zero error = (N − V.C) × Least count

(N is total no. of division on the V.S)

Working Formula:-

Volume of hollow cylinder

$$V = \frac{\pi}{4}(D^2 - d^2)h$$

D = External diameter
d = Internal diameter
h = height or length

Aim of the Experiment:-

To Determine the cross sectional area of a wire by using a Screw Gauge.

Apparatus Required:-

i) Screw Gauge
ii) Given wire
iii) Instrument box

Theory:-

- The Screw Gauge is an instrument to measure the dimensions of very small objects as small as 0.01 mm. The Screw Gauge Consist of two scale, the Circular scale and Main Scale or linear scale.
- The Screw Gauge is works on the principle of Screw.
- Screw Gauge is known as micrometer Screw because it can measure very small lengths.
- The distance moved by the spindle per revolution is Called pitch of the Screw Gauge. pitch of screw Gauge is 0.1 cm or 0.01 cm, In micrometer Screw it can be 0.5 mm or 1mm.
- Least Count = $\frac{\text{pitch}}{\text{Total number of divisions on Circular Scale}}$

  = _____ cm
- The total number of divisions on Circular Scale can be 50, 100, 200.

Defination of Least Count:-

- The smallest measurement that can be measure by the Screw Gauge is called the least Count of the Screw Gauge.
- The least Count of the Screw Gauge is 0.001cm or 0.0005cm

Working formula:-

Crossectional Area of a wire

$$A = \pi \times \frac{D^2}{4}$$. (D = Mean diameter of given wire)