**APPLIED PHYSICS LAB ASSIGNMENT NO. 1**

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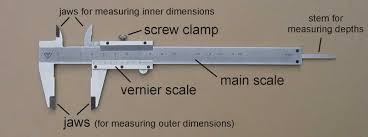
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**Experiment: Measuring Quantities Using Vernier Caliper**

Vernier Caliper:

It is a measuring instrument may be used to measure outer dimensions of objects (using the main jaws), inside dimensions (using the smaller jaws at the top), and depths (using the stem).

Instruments Required:

* Vernier Caliper
* Cylinder
* Sphere

Procedure for Measuring Length of Cylinder:

1. Look for the zero-error.

2. Hold the object from its ends using the lower jaws of the vernier caliper.

3. Note the reading on the main scale that lies just to the left of the vernier scale zero mark.

4. Now look for the mark on the vernier scale which lines up with a mark on the main scale.

5. Count the number of divisions up to that mark. This is known as the Vernier Coincidence which is denoted by n.

6. Multiply the Vernier coincidence with the least count to get the Vernier Scale Reading (V.S.R.)

7. Now find the Total reading by adding the Vernier Scale reading to the Main Scale Reading.

8. Add zero correction to obtained answer we will get final reading.

Observation and Calculations:

Calculations for Cylinder:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Zero Error  (a) | Main Scale Reading  (x) mm | Vernier Scale Reading  (n) | Diameter(y)  y = x + (n \*L.C) | Length(o)  o = x(n\*L.C) | Surface Area  2πrl  mm² | Cross-sectional Area  πr²  mm² | Volume  πr²l  mm³ |
| 0 | 6 mm | 0.5 | 6 + (0.5 \*0.1)  =  6.05 mm |  |  |  |  |
| 0 | 75mm | 3 |  | 75+(3\*0.1) =  76.3 mm | 1450.3  mm² | 28.75  mm² | 2193.4 mm³ |

Calculations for Sphere:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Zero Error  (a) | Main Scale Reading  (x) mm | Vernier Scale Reading  (n) | Diameter(y)  y = x + (n \* L.C) | Area  4πr²  mm² | Volume  4/3 πr³  mm³ |
| 0 | 2 mm | 3.5 | 2.5 + (3.5 \* o.1) =  25.35mm | 2018.86  mm² | 8529.68  mm³ |