

AIM: To measure diameter of a small spherical/cylindrical body using Vernier Callipers.



APPARATUS

Vernier Callipers, a spherical body (pendulum bob) or a cylinder and a magnifying lens.

THEORY

If with the body between the jaws, the zero of vernier scale lies ahead of N th division of main scale, then main scale reading (M.S.R.) = N .

If n th division of vernier scale coincides with any division of main scale, then vernier scale reading (V.S.R.)

$$= n \times (\text{L.C.}) \quad (\text{L.C. is least count of vernier callipers})$$

$$= n \times (\text{V.C.}) \quad (\text{V.C. is vernier constant of vernier callipers})$$

$$\text{Total reading, T.R.} = \text{M.S.R.} + \text{V.S.R.} \quad (\text{L.C.} = \text{V.C.})$$

$$= N + n \times (\text{V.C.}).$$

DIAGRAM

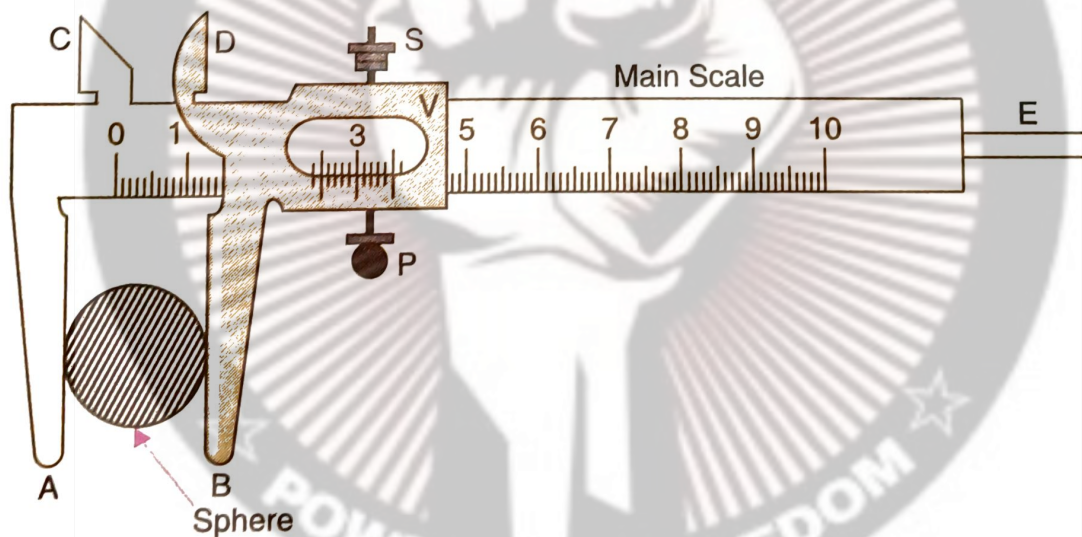


Fig. Vernier Callipers—Measuring diameter of a sphere.

PROCEDURE

1. Determine the vernier constant (V.C.) i.e. least count (L.C.) of the vernier callipers and record it stepwise.



2. Bring the movable jaw BD in close contact with the fixed jaw AC and find the zero error. Do three times and record them. If there is no zero error, record **zero error as nil**.
3. Open the jaws, place the sphere or cylinder between the two jaws A and B and adjust the jaw DB , such that it gently grips the body without any undue pressure on it. Tighten the screw S attached to the vernier scale V .
4. Note the position of the zero mark of the vernier scale on the main scale. Record the main scale reading just before the zero mark of the vernier scale. This reading (N) is called main scale reading (M.S.R.).
5. Note the number (n) of the vernier scale division which coincides with some division of the main scale.
6. Repeat steps 4 and 5 after rotating the body by 90° for measuring the diameter in a perpendicular direction.
7. Repeat steps 3, 4, 5 and 6 for three different positions. Record the observations in each set in a tabular form.
8. Find total reading and apply zero correction.
9. Take mean of different values of diameter and show that in the result with proper unit.