



STEPPING STONE SCHOOL (HIGH)

CLASS – IX

PHYSICS

WORKSHEET- 5

Date – 18/05/2020, (Day- 5)

Chapter- MEASUREMENT (V)

Topic- Screw Gauge (Numericals)

Time limit: 30 minutes.

Please go through the solutions carefully and on the basis of it copy down the numericals and solve them on a sheet of paper date wise. Keep the worksheet ready in a file to be submitted on the opening day.

Numericals (solved):

Problem 1:

The circular head of a screw gauge is divided into 50 divisions and the screw moves 1mm ahead in two revolutions of the circular head. Find its (a) pitch and (b) least count.

Solution:

No. of divisions on Circular head = 50

Distance moved in two revolutions = 1mm

(a) Pitch = distance moved ahead in 1 revolution

$$= \frac{1}{2} \text{ mm} = 0.5 \text{ mm} = 0.05 \text{ cm}$$

Pitch

$$\begin{aligned} \text{(b) Least Count} &= \frac{\text{Pitch}}{\text{No. of divisions on circular head}} \\ &= \frac{0.05 \text{ cm}}{50} \\ &= 0.001 \text{ cm} \end{aligned}$$

Problem 2:

The pitch of a screw gauge is 1 mm and there are 100 divisions on the circular head. While the main scale reads 3 mm and the 55th division is in line with the base line. Find the diameter of the wire.

Solution:

$$\text{Pitch} = 1 \text{ mm}$$

$$\text{No. of divisions on circular head} = 100$$

$$\text{Main Scale Reading (MSR)} = 3 \text{ mm}$$

$$\text{Circular Scale Coincidence} = 55$$

Pitch

$$\begin{aligned} \text{Least Count} &= \frac{\text{Pitch}}{\text{No. of divisions on circular head.}} \\ &= \frac{1 \text{ mm}}{100} \\ &= 0.01 \text{ mm} \end{aligned}$$

$$\text{CSR} = 55 \times 0.01 = 0.55 \text{ mm}$$

Diameter of the wire

$$\begin{aligned} &= \text{MSR} + \text{CSR} \\ &= 3 \text{ mm} + 0.55 \text{ mm} \\ &= 3.55 \text{ mm} \end{aligned}$$

Exercise:

- (1) The pitch of a screw gauge is 0.5mm and the head scale is divided in 100 parts. What is the least count of screw gauge?
- (2) The thimble of a screw gauge has 50 divisions. The spindle advances 1mm when the screw is turned through two revolutions.
 - (i) What is the pitch of screw gauge?
 - (ii) What is the least count of the screw gauge?
- (3) The pitch of a screw gauge is 1mm and its circular scale has 100 divisions. In measurement of the diameter of a wire, the main scale reads 2m and 45th mark on circular scale coincides with the base line. Find: (i) the least count and (ii) the diameter of the wire
- (4) When a screw gauge of least count 0.01 mm is used to measure the diameter of a wire, the reading on the sleeve is found to be 1mm and the reading on the thimble is found to be 27 divisions (i) what is the diameter of the wire in cm? (ii) If the zero error is + 0.005 cm, what is the correct diameter?
- (5) A screw has a pitch equal to 0.5 mm. What should be the number of divisions on its head so as to read correct up to 0.001mm with its help?
- (6) A screw gauge has 50 divisions on its circular scale and its screw moves by 1mm on turning it by two rotations. When the flat end of the screw is in contact with the stud, the zero of circular scale lies below the base line and 4th division of circular scale is in line with the base line. Find (i) the pitch (ii) the least count and (iii) the zero error of the screw gauge.

Please tap on the hyperlink below to watch the video content of the topic screw gauge numericals.

<https://www.youtube.com/watch?v=wNY4X44oYsl>
