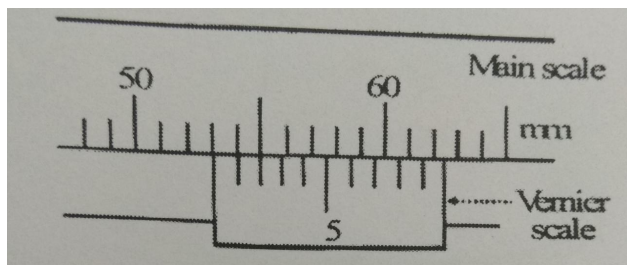


1.

The reading of vernier scale shown in the figure is:

(Given that 10 vernier scale divisions coincide with 9 main scale divisions)



- (1) 54.6 mm
- (2) 53.2 mm
- (3) 52.7 mm
- (4) 54.7 mm

2.

A student measures the distance traversed in free fall of a body, initially at rest in a given time. He uses this data to estimate g , the acceleration due to gravity. If the maximum percentage errors in measurement of the distance and the time are e_1 and e_2 respectively, the percentage error in the estimation of g is:

- | | |
|----------------|-----------------|
| 1. $e_2 - e_1$ | 2. $e_1 + 2e_2$ |
| 3. $e_1 + e_2$ | 4. $e_1 - 2e_2$ |

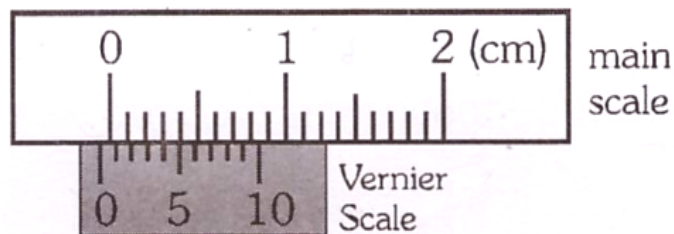
3.

One cm on the main scale of vernier callipers is divided into ten equal parts. If 20 divisions of the vernier scale coincide with 8 small divisions of the main scale, what will be the least count of the vernier callipers?

1. 0.06 cm
2. 0.6 cm
3. 0.5 cm
4. 0.7 cm

4.

Find the zero correction in the given figure. Given that 10 vernier scale divisions coincide with the 9 main scale divisions.



1. -0.6 mm
 2. +0.6 mm
 3. 0.4 mm
 4. -0.4 mm
- 5.

In an experiment four quantities a , b , c and d are measured with percentage errors of 2%, 3%, 1%, and 0.5% respectively. A quantity Q is defined as:

$Q = \frac{a\sqrt{b}}{c^{3/2}d^4}$. The maximum percentage error in the calculation of Q will be:

1. 5%
2. 6%
3. 7%
4. 9%

6.

The thickness of a pencil measured by using a screw gauge (least count 0.001 cm) comes out to be 0.802 cm. The percentage error in the measurement is:

1. 0.125%
2. 2.43%
3. 4.12%
4. 2.14%

7.

A physical quantity P is given by $P = \frac{A^3 B^{\frac{1}{2}}}{C^{-4} D^{\frac{3}{2}}}$. The quantity which brings in the maximum percentage error in P is:

- (1) A
- (2) B
- (3) C
- (4) D

8.

A physical parameter 'a' can be determined by measuring the parameters b, c, d and e using the relation, $a = \frac{b^{\alpha} c^{\beta}}{d^{\gamma} e^{\delta}}$

. If the maximum errors in the measurement of b, c, d and e are $b_1\%$, $c_1\%$, $d_1\%$ and $e_1\%$, then the maximum error in the value of 'a' determined by the experiment is:

- (1) $(b_1 + c_1 + d_1 + e_1)\%$
- (2) $(b_1 + c_1 - d_1 - e_1)\%$
- (3) $(\alpha b_1 + \beta c_1 - \gamma d_1 - \delta e_1)\%$
- (4) $(\alpha b_1 + \beta c_1 + \gamma d_1 + \delta e_1)\%$

9.

A student measures the mass of an object five times. The data are 2.46 kg, 2.47 kg, 2.42 kg, 2.41 kg and 2.44 kg. The reported mean mass with error should be:

1. 2.44 ± 0.01 kg
2. 2.44 ± 0.02 kg
3. 2.44 ± 0.03 kg
4. 2.44 ± 0.04 kg

10.

A wire has a mass of 0.3 ± 0.003 g, a radius of 0.5 ± 0.005 mm and a length of 0.6 ± 0.006 cm. The maximum percentage error in the measurement of its density is:

- (1) 1
- (2) 2
- (3) 3
- (4) 4

11.

The radius of a sphere is (5.3 ± 0.1) cm. The percentage error in its volume is:

- (1) $\frac{0.1}{5.3} \times 100$
- (2) $3 \times \frac{0.1}{5.3} \times 100$
- (3) $\frac{0.1 \times 100}{3.53}$
- (4) $3 + \frac{0.1}{5.3} \times 100$

12.

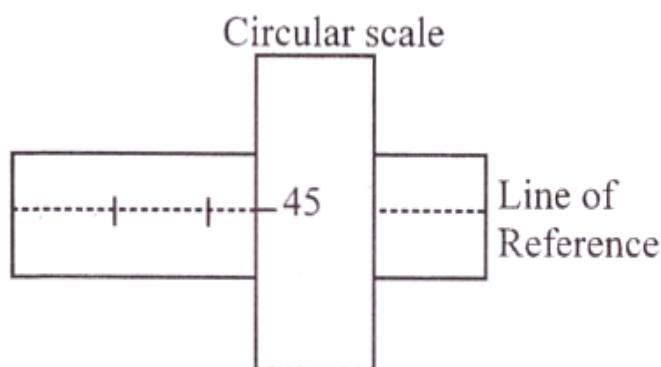
A screw gauge has least count of 0.01 mm and there are 50 divisions in its circular scale.

The pitch of the screw gauge is:

- (1) 0.25 mm
- (2) 0.5 mm
- (3) 1.0 mm
- (4) 0.01 mm

13.

Consider a screw gauge without any zero error. What will be the final reading corresponding to the final state as shown? It is given that the circular head translates P MSD in N rotations. One MSD is equal to 1 mm.



The circular scale has 100 divisions

1. $\left(\frac{P}{N}\right) \left(2 + \frac{45}{100}\right)$ mm
2. $\left(\frac{N}{P}\right) \left(2 + \frac{45}{N}\right)$ mm
3. $P \left(\frac{2}{N} + \frac{45}{100}\right)$ mm
4. $\left(2 + \frac{45}{100} \times \frac{P}{N}\right)$ mm

14.

The pitch of a screw gauge is 1.0 mm and there are 100 divisions on the circular scale. While measuring the diameter of a wire, the linear scale reads 1 mm and the 47th division on the circular scale coincides with the reference line. The length of the wire is 5.6 cm. Find the wire's curved surface area (in cm^2) in an appropriate number of significant figures.

1. 2.4 cm^2
2. 2.56 cm^2
3. 2.6 cm^2
4. 2.8 cm^2

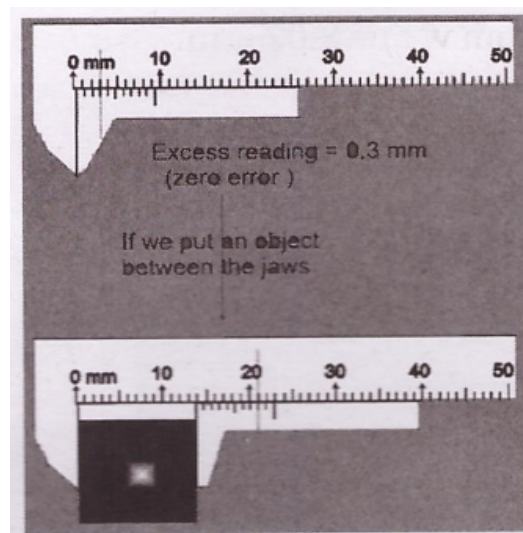
15.

The pitch of a screw gauge is 1 mm and there are 100 divisions on its circular scale. When nothing is put in between its jaws, the zero of the circular scale lies 4 divisions below the reference line. When a steel wire is placed between the jaws, two main scale divisions are clearly visible and 67 divisions on the circular scale are observed. The diameter of the wire is:

1. 2.71 mm
2. 2.67 mm
3. 2.63 mm
4. 2.65 mm

16.

In the vernier callipers, 9 main scale divisions matched with 10 vernier scale divisions. Assume the edge of the vernier scale as the '0' for the vernier Scale. The thickness of the object using the defected vernier callipers will be:



- (1) 13.3 mm
- (2) 13.4 mm
- (3) 13.5 mm
- (4) 13.6 mm

17.

In a vernier calliper N divisions of vernier scale coincides with (N-1) divisions of the main scale (in which length of one division is 1 mm). The least count of the instrument should be:

- (1) N mm
- (2) $(N - 1) \text{ mm}$
- (3) $\frac{1}{10N} \text{ cm}$
- (4) $\frac{1}{(N-1)} \text{ mm}$

18.

In an experiment, the height of an object measured by vernier callipers having the least count of 0.01 cm is found to be 5.72 cm. When no object is there between jaws of vernier callipers, the reading of the main scale is 0.1 cm and the reading of the vernier scale is 0.3 mm. Find the correct height of the object:

1. 5.72 cm
2. 5.59 cm
3. 5.85 cm
4. 5.69 cm

19.

A body travels uniformly a distance of (13.8 ± 0.2) m in a time (4.0 ± 0.3) sec. The velocity of the body within error limits is:

1. $(3.45 \pm 0.2) \text{ ms}^{-1}$
2. $(3.45 \pm 0.3) \text{ ms}^{-1}$
3. $(3.45 \pm 0.4) \text{ ms}^{-1}$
4. $(3.45 \pm 0.5) \text{ ms}^{-1}$

20.

If there is a positive error of 50% in the measurement of the velocity of a body, then the error in the measurement of kinetic energy is:

- (1) 25%
- (2) 50%
- (3) 100%
- (4) 125%

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