

## 14. Measuring Instruments

### Part-A

#### 1. Question

Screw Gauge is an instrument used to measure the dimensions of very small objects upto \_\_\_\_\_ (0.1 cm, 0.01 cm, 0.1 mm, 0.01 mm)

#### Answer

0.01 mm

**Explanation:** The least count of screw gauge is given by;

$$\frac{\text{Pitch}}{\text{No. of divisions on circular scale}} = \frac{1\text{mm}}{100} = 0.01\text{ mm}$$

Where pitch is the distance moved on the linear scale of the screw gauge in one rotation.

#### 2. Question

In a Screw Gauge, if the zero of the head scale lies below the pitch scale axis, the zero error is \_\_\_\_\_. (positive, negative, nil)

#### Answer

The zero error in this case is positive.

**Explanation:** In a Screw Gauge, if the zero of the head scale lies below the pitch scale axis, the zero error is positive by convention and it's then subtracted from the final measured value. If the zero of the head scale lies above the pitch scale axis, the zero error is considered negative and it's then added to the final measured value.

#### 3. Question

The Screw Gauge is used to measure the diameter of a \_\_\_\_\_ (crowbar, thin wire, cricket ball )

#### Answer

Thin wire.

**Explanation:** A screw gauge is used for measuring very small diameters of the order of 0.01 mm. So it's suitable only for measuring the diameter of a thin wire.

#### 4. Question

One light year is equal to \_\_\_\_\_.

i)  $365.25 \times 24 \times 60 \times 60 \times 3 \times 10^8$  m

ii)  $1 \times 24 \times 60 \times 60 \times 3 \times 10^8$  m

iii)  $360 \times 24 \times 60 \times 60 \times 3 \times 10^8$  m

#### Answer

(iii) is correct.

**Explanation:** A light year is the distance traversed by light in one year. So it is given by

Speed of light  $\times$  No. of seconds in a year =

$$365.25 \times 24 \times 60 \times 60 \times 3 \times 10^8 \text{ m}$$

The no. of seconds in a year is given by the no. of days in a year  $\times$  no. of hours in a day  $\times$  no. of minutes in an hour  $\times$  no. of seconds in a minute.

#### 5. Question

One astronomical unit is the mean distance between the centre of the Earth and centre of the \_\_\_\_\_ i)

Moon ii) Sun iii) Mars

### Answer

(ii) is correct.

**Explanation:** An astronomical unit is defined as the distance between the centre of the Earth and the centre of the Sun.

## Part-B

### 1. Question

Correct the mistakes if any, in the following statements:

i) Astronomical unit is the mean distance of the surface of the sun from the surface of the earth.

ii) Light year is the distance travelled by light in one year in vacuum at a speed of  $3 \times 10^8$  m per minute.

### Answer

(i) False.

**Explanation:** An astronomical unit is defined as the distance between the centre of the Earth and the centre of the Sun.

ii) False.

**Explanation:** Light year is the distance travelled by light in one year in vacuum at a speed of  $3 \times 10^8$  m per second.

### 2. Question

Match the items in group A with the items in group B:

Sl.No.	Group - A	Group - B
1.	Small dimensions	Kilometre
2.	Large dimensions	Screw gauge
3.	Long distance	Scale
4.	Small distance	Light year
		Altimeter

### Answer

1. Small dimensions- Screw gauge, Scale

2. Large dimensions-Altimeter

3. Long distance – Light year

4. Small distance-Kilometre

### 3. Question

Fill in the blanks:

The special methods adopted to determine very large distances are \_\_\_\_\_ and (Laser pulse method, Light year method, Radio echo method, Astronomical method)

### Answer

Radio echo method, Laser pulse method.

**Explanation:** Radio echo method using three receivers spaced on the ground by 4 km has been used to determine the orbits of individual meteors.

In laser pulse method, a laser pulse is reflected from the object from which distance is to be measured. The time taken is measured and using the speed of light, the distance is calculated.

### 4. Question

Least count of a screw gauge is an important concept related to screw gauge. What do you mean by the term least count of a screw gauge?

### Answer

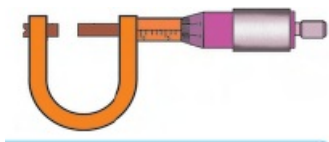
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### 5. Question

Label the following parts in the given screw gauge diagram.



i) Head scale ii) Pitch scale

iii) Index line iv) Ratchet

### Answer

