WORKSHEET ①

A. Tick (✓) the correct option.

1. The SI unit of plane angle is

   a. pascal.   b. steradian.   c. newton.   d. radian.

2. The instrument which can accurately measure the diameter of a wire is

   a. Vernier callipers.   b. screw gauge.   c. metre scale.   d. none of these.

3. The thimble of a screw gauge has 50 divisions. The screw advances 3 mm when it is turned through 6 rotations. What is its pitch?

   a. 0.05 mm   b. 0.5 mm   c. 0.15 mm   d. 0.1 mm

4. The time taken by a vibrating body to complete one vibration or oscillation is called its

   a. frequency.   b. time period.   c. oscillation time.   d. all of these.

5. A pendulum whose time period is two seconds is called

   a. second's pendulum.   b. minute's pendulum.   c. Newton's pendulum.   d. none of these.

B. Fill in the blanks.

1. _____ is the comparison of unknown physical quantity with a known fixed unit quantity.

2. _____ is a device used to measure lengths accurately up to 1/100th of a millimetre.

3. The SI unit of length is _____

4. _____ is the SI unit of luminous intensity.

5. The International Bureau of Weights and Measures at _____ near Paris in France.

C. State whether the following statements are true or false.

1. The unit of acceleration can be expressed in the fundamental units of length and time, i.e. m/s^2.

2. The SI unit of amount of substance (or quantity of matter) is kelvin.

3. One astronomical unit is equal to 1.496×10^{11} m.

4. The Vernier constant of the instrument tells us about the smallest length that can be accurately measured with the instrument.

5. The motion of a simple pendulum is an example of circulatory motion.

D. Match the following.

1. Volume $kg\ m\ s^{-1}$

2. Density $m\ s^{-1}$

3. Velocity $m\ s^{-2}$

4. Acceleration $kg\ m^{-3}$

5. Momentum m^3

Name: ....   Teacher's signature: ....

Class: .... IX ....   Date: ....

E. Answer the following questions.

Very short answer questions

1. Name the factors that affect the time period of a simple pendulum.
2. What are derived units?

Short answer questions

1. What is the principle of micrometre screw gauge?
2. Write any three rules that should be strictly followed while writing SI units.

Long answer questions

1. How do you measure the diameter of a small spherical body using Vernier callipers?
2. Define the following terms:
   a. Frequency of a pendulum
   b. Amplitude of a pendulum
   c. Effective length of a pendulum.

ANSWERS

WORKSHEET 1

A. Tick (✓) the correct option.

1. d   2. a   3. b   4. b   5. a

B. Fill in the blanks.

1. Measurement   2. Screw gauge   3. metre   4. Candela   5. Sevres

C. State whether the following statements are true or false.

1. T   2. F   3. T   4. T   5. F

D. Match the following.

1. Volume m^3
2. Density $kg\ m^{-3}$
3. Velocity $m\ s^{-1}$
4. Acceleration $m\ s^{-2}$
5. Momentum $kg\ m\ s^{-1}$

E. Answer the following questions.

Very short answer questions

1. a. Length b. Acceleration due to gravity.

2. The units of measurement of all other physical quantities which can be expressed in terms of the fundamental units (i.e. mass, length and time) are called derived units.

Short answer questions

1. When a screw is rotated clockwise or anticlockwise, there are two types of motions associated with it, viz. linear motion and rotational motion. Direct reading on the standard micrometre is obtained for greater accuracy of measurement of smaller thickness up to 0.001cm.

2. Three conventions (rules) that should be strictly followed while writing SI units are as follows:

   i. In writing the value of a physical quantity, the number and the unit are separated by a space. For example, 100 m is correct but not 100m.

   ii. No space is to be given between number and °C, degree, minute and second of a plane angle.

   iii. The symbols for the units of quantities, which are not named after scientists, are written in small letters. For example, the symbol for metre is 'm' and that for kilogram is 'kg'.

Long answer questions

1. To measure the length (or diameter) of an object using Vernier callipers, following procedure is adopted:

   1. Determine the least count (Vernier constant) of the Vernier callipers.

   2. Bring the movable jaw QD in close contact with the fixed jaw PC and record the zero error. In case there is no zero error, this too should be recorded as nil.

   3. To measure the diameter, place the spherical body between the two jaws C and D and adjust the screw so that the spherical body is gripped gently without any undue pressure between the jaws. Now fix the screw M attached to the Vernier scale V.

   4. Note the position of the zero mark of the Vernier scale V on the main scale. For this, record the main scale reading just before the zero mark of the Vernier scale. Note the **Vernier division** of the Vernier scale that coincides exactly with some division of the main scale. However, the coinciding division is counted from the zero end of the Vernier.

   5. Multiply this number of Vernier division with the least count. This is the Vernier scale reading.

   6. Add the main scale and the Vernier scale reading. From this, subtract the zero error with its proper sign to obtain the correct measurement of the given object.

   $$\text{Observed reading} = \left[\begin{array}{l} \text{Main scale reading} + \\ \text{Vernier scale reading} \end{array} \right.$$

   $$\text{Correct reading} = \left[\begin{array}{l} \text{Observed reading} - \\ \text{Zero error (with sign)} \end{array} \right.$$
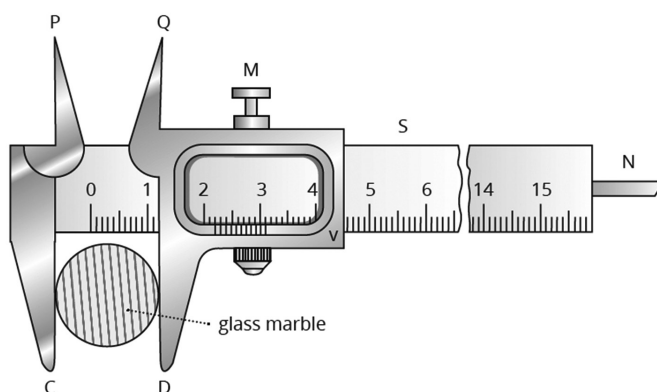
   Measuring the diameter of a spherical body by
   using a pair of Vernier callipers

2. a. The number of complete vibrations made by a vibrating body in one second is called its frequency. It is denoted by n or f. The SI unit of frequency is hertz (Hz). Frequency (f) = 1/Time Period (T) or $T = 1/f$.

   b. The maximum displacement of a vibrating body on either side of its mean position is called its amplitude of vibration. It is denoted by the letter a or A. It is measured in metre.

   c. The distance between the point of suspension and the centre of gravity of the bob is the effective length of a pendulum. It is generally denoted by the letter l. It is measured in metre.