

# Physical Quantities and Measurement.

classmate

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1) What is measurement? How is a measurement expressed?

Measurement is a comparison of an unknown quantity with a known fixed quantity of the same kind.

A measurement is expressed as ~~the~~ numbers in its unit.

For eg:- If the length on measuring is 15 times of the unit metre, then we write length = 15 metre.

2) State two characteristics of a unit.

The two characteristics of a unit are:-

- (i) It should be of convenient size, and,
- (ii) It must be universally accepted, i.e. its value must remain same at all places and at all times.

3) Name four basic measurements in our daily life.

The four basic measurements in our daily life are - length, mass, time, temperature.

4) What are the S.I units of (i) Mass (ii) Length (iii) Time and (iv) Temperature? Write their names and symbols.

| Quantity    | S.I unit                     | Symbols. |
|-------------|------------------------------|----------|
| Mass        | Kilogram<br><del>metre</del> | kg       |
| Length      | metre                        | m        |
| Time        | Second                       | s        |
| Temperature | Kelvin                       | K        |

- 5) Define one metre, the S.I unit of length. state its one multiple and one sub multiple.

One metre is defined as the distance travelled by light in air in  $\frac{1}{3 \times 10^8}$  of a second.

One multiple unit of length is Kilometre

one sub multiple unit of length is centimetre

- 6) Convert the following quantities as indicated :-

(a) 12 inch = 1 ft.

(b) 1 ft = 30.48 cm.

(c) 20 cm = ...?.. m.

$$1 \text{ cm} = \frac{1}{100} \text{ m}$$

$$20 \text{ cm} = \frac{20}{100} \text{ m}$$

$$= 0.2 \text{ m}$$

$$(d) 4.2 \text{ m} = \underline{\hspace{2cm}} ? \text{ cm}$$

$$1 \text{ m} = 100 \text{ cm}$$

$$4.2 \text{ m} = 4.2 \times 100 \text{ cm} \\ = 420 \text{ cm}$$

$$(e) 0.2 \text{ km} = \underline{\hspace{2cm}} ? \text{ m}$$

$$1 \text{ km} = 1000 \text{ m}$$

$$0.2 \text{ km} = 0.2 \times 1000 \text{ m} \\ = 200 \text{ m}$$

$$(f) 1 \text{ yard} = \underline{0.91} \text{ m}$$

7) (a) Describe in steps how would you measure the length of a pencil using a metre ruler.   
 Draw diagram if necessary.

We can measure the length of a pencil using a metre ruler in the following steps —

- (i) The ruler is placed close to the object
- (ii) Then the zero mark on the ruler is made to coincide with one end of the object —
- (iii) Now the position of the other end of the object is read on the ruler

This reading gives the length of the pencil.

(b) Explain with an example how you will use the metre ruler in part (a) if the ends are broken.

Sometimes the ends of a ruler get damaged with use, and its zero mark may not be visible. To measure the length of an object with such a ruler, the object is placed close to a specific marking on the ruler and positions of both ends of the object are read on the ruler. The difference of the two readings gives the length of the object.

8) Name the device which you will use to measure the perimeter of your play ground. Describe in steps how you will use it.

The device which we will use to measure the perimeter of our playground is measuring tape.

We can find the perimeter of playground by following the steps -

- (i) Place the measuring tape at one end A and unwind it along with the boundary till it reaches another end B.
- (ii) Similarly, place the measuring tape at end B and stretch it along till the end C. and note the reading.
- (iii) Place the tape at end C and spread along the length till it reaches the final end D. and note the reading.
- (iv) Similarly, note the reading from end D to A.
- (v) Calculation the sum of  $AB + BC + CD + DA$ .  
The result is our required perimeter.

9) The diagram below shows a stick placed along a metre ruler. The length of the stick is measured keeping the eye at positions A, B and C.

(a) Write the length of stick PQ as observed, for each position of the eye. Are they all same?

(b) Which is the correct position of the eye? Write the correct length of the stick.

(a) From position A, length = 3.4 cm  
From position B, length = 3.2 cm.  
From position C, length = 3 cm.

No ) they are not same.

(b) The correct position is B.

Length of the stick = 3.2 cm.

- 10) Define mass. State its (i) S.I, (ii) c.g.s and (iii) F.P.S units. How are they related.

The mass of a body is the quantity of matter contained in it.

S.I unit is Kilogram.

c.g.s unit is Gram.

F.P.S unit is Pound.

$$1 \text{ g} = 10^{-3} \text{ kg}.$$

$$1 \text{ lb} = 453.59 \text{ g}.$$