

## TEST YOURSELF

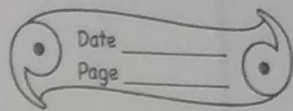
### A. ~~Obj~~ Objective Questions.

1. Write true or false for each statement.
  - a) S.I. unit of temperature is Fahrenheit. False
  - b) Every measurement involves two things - a number and a unit. True
  - c) Mass is the measure of quantity of matter. True
  - d) The S.I. unit of time is hour. False
  - e) The area can be expressed as the product of lengths of two sides. True

### 2. Fill in the blanks.

- a) The S.I. unit of length is metre, of time is second, of mass is kilogram.
- b)  $^{\circ}\text{C}$  is the unit of temperature.
  - 1) 1 metric tonne = 1000 kg.
- d) The zero mark in the Celsius thermometer is the melting point of ice.
- e) The thermometer used to measure the human body temperature is called the clinical thermometer.
- f) The normal temperature of human body is  $37^{\circ}\text{C}$  or  $98.6^{\circ}\text{F}$ .
- g)  The mass of an object is measured with the help of a beam balance.

## Test Yourself



A-3. Column A	Column B
a) Length of a housing plot	iv) Measuring tape
b) Breadth of a book	vi) Metre ruler
c) Mass of an apple	ii) Beam balance
d) Period of time for stud	i) Clock
e) Temperature of a body	iii) Thermometre
f) Surface area of a leaf	v) Graph paper

4. a) The symbol of degree celsius is:

Ans  $\rightarrow$   $^{\circ}\text{C}$

b) 10 mm is equal to:

Ans  $\rightarrow$  1 cm

c) The amount of surface occupied by an object is called its:

Ans  $\rightarrow$  area

d) A metre ruler is graduated in:

Ans  $\rightarrow$  mm

e) A thermometer is graduated in:

Ans  $\rightarrow$   $^{\circ}\text{C}$

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### B. Short / Long Answer Questions:

2) State two characteristics of a unit.

Ans  $\rightarrow$  Two characteristics of a unit are:-

① It should be of ~~convier~~ convenient size.

② It must be universally accepted that is its value must remain same at all places and at all times.

3) What are the S.I. units of i) mass ii) length iii) time and iv) temperature? Write their names and symbols.

Ans) S.I. units are as follows: -

<u>Quantity</u>	<u>S.I Unit</u>	<u>Symbol of S.I. Unit</u>
i) Length	Metre	m
ii) Mass	Kilogram	kg
iii) Time	Second	s
iv) Temperature	Kelvin	K

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

Ans) One metre is defined as the distance travelled by light in air in  $\frac{1}{299,792,458}$  of a second.

Multiple of metre - kilometre

Sub-multiple of metre - Centimetre

6) Convert the following quantities as indicated:

a) 12 inch = 1 ft

b) 1 ft = 30.48 cm

c) 20 cm = 0.2 m

d) 4.2 m = 420 cm

e) 0.2 km = 200 m

$$f) 0.2 \text{ cm} = 2 \text{ mm}$$

$$g) 1 \text{ yard} = 0.91 \text{ m}$$

$$c) 20 \text{ cm} =$$

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

$$\Rightarrow 20 \times \frac{1}{100} \times 20 \text{ m} = 0.2 \text{ m}$$

$$d) 1 \text{ metre} = 100 \text{ cm}$$

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

$$= 100 \times \frac{42}{10} \text{ cm}$$

$$= 420 \text{ cm}$$

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

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

$$= 1000 \times \frac{2}{10} \text{ m}$$

$$= 200 \text{ m}$$

$$f) 1 \text{ cm} = 10 \text{ mm}$$

$$\therefore 0.2 \text{ cm} = 10 \times 0.2 \text{ mm}$$

$$= 10 \times \frac{2}{10} \text{ mm} = 2 \text{ mm}$$

B-1) Short/Long Answer Questions.

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

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

The value obtained on measuring a quantity is called its magnitude. The magnitude of a quantity is expressed as numbers in its unit.

3) Name four basic measurements in our daily life.

Ans) In our daily life we measure the following four basic physical quantities:-

1. Length
2. Mass
3. Time
4. Temperature

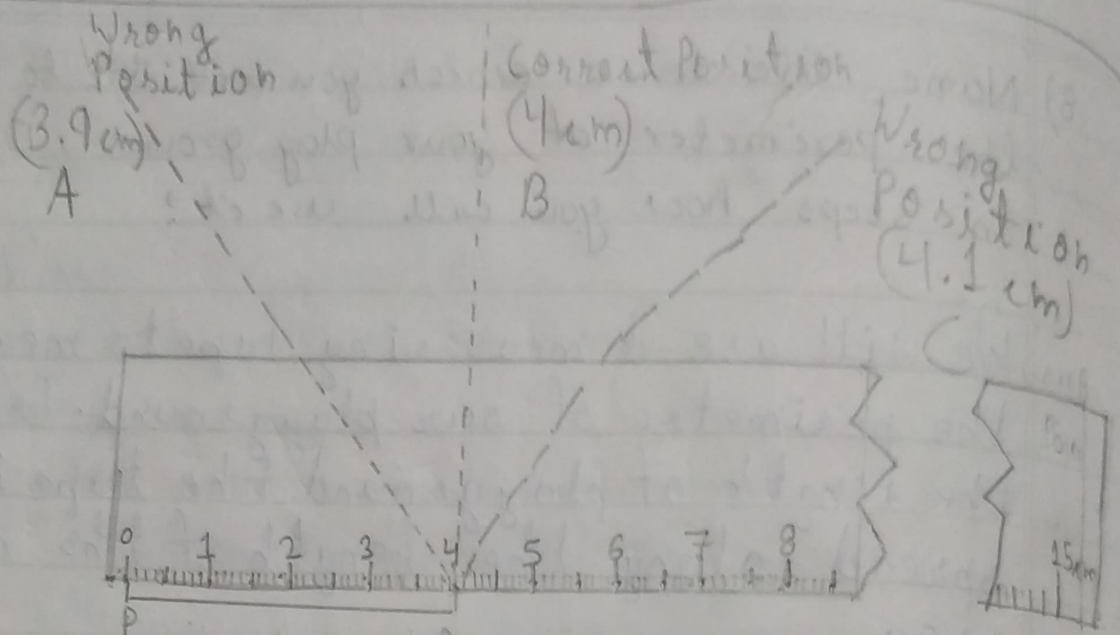
8) Name the device which you will use to measure the perimeter of your play ground. Describe in steps how you will use it?

Ans) We will use a measuring tape to measure the perimeter of our playground. To measure the length of playground the tape is spread along the length of the curved area.

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

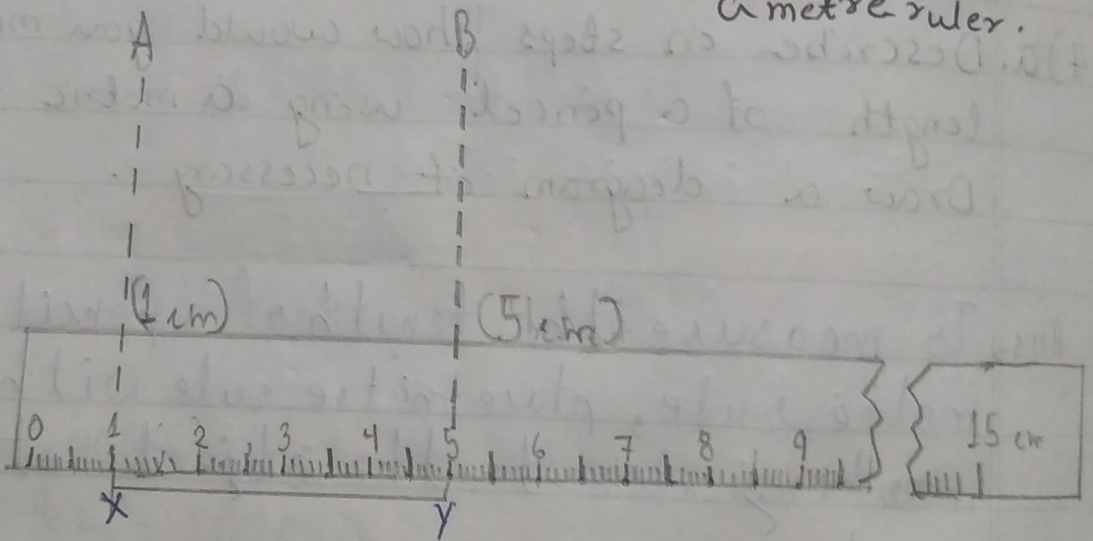
Ans) To measure the length of a pencil using a metric ruler, place metric ruler with its marking close to the object. Let  $PQ$  be a pencil.

The end  $P$  of the pencil coincides with the "0" mark on the ruler. The end  $Q$  of the pencil is read by keeping the eye at the position "B" vertically above the end  $Q$ . So, the length of pencil is 4.3 cm.



Measuring the length of a rod PA with a metre ruler.

b)



The difference of the two readings gives the length of the object. In the above figure the reading on ruler at the end of X is 1 cm and at the end Y is 5 cm.

So, the length of the rod XY is  $5 - 1 = 4$  cm.



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

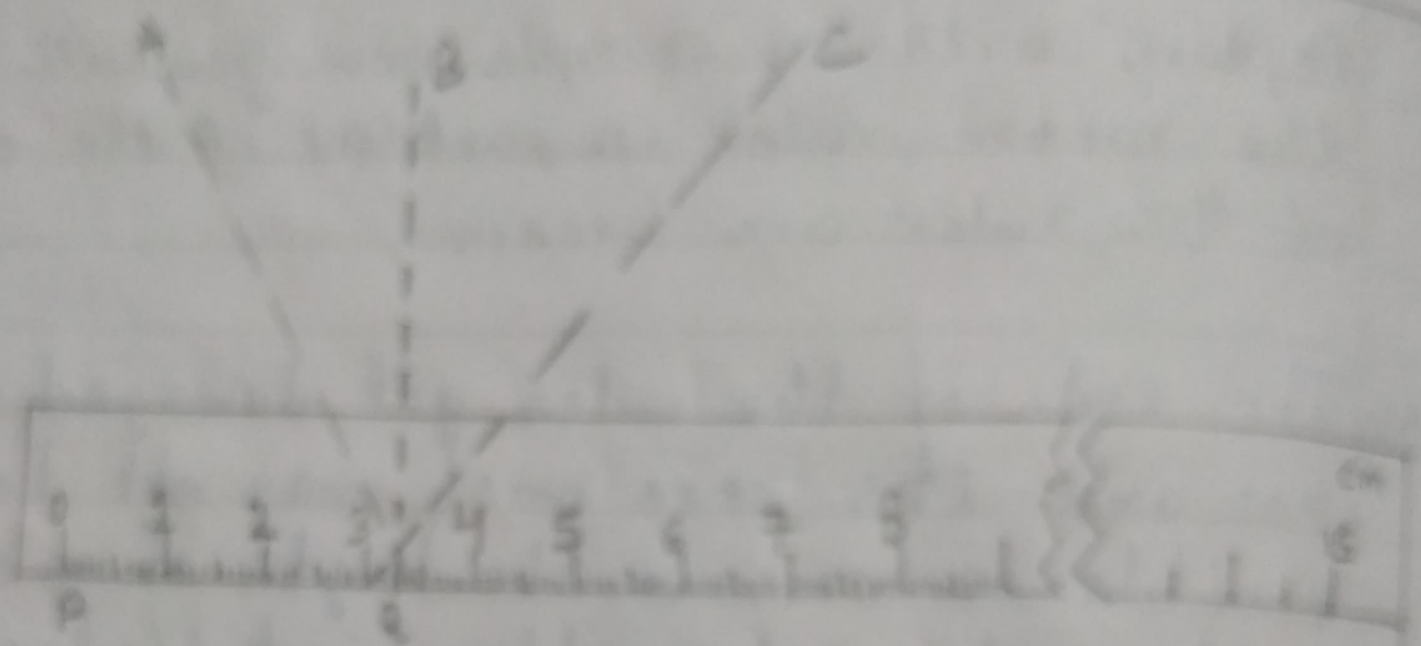
Ans) The ends of the ruler get damaged with use and its zero mark may not be visible. To measure the length of an object with such a ruler, the object is placed close to a specific markings on the ruler and positions of both ends of the object are read on the ruler.

The

9) The diagram below shows a stick placed along a metric 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?

Ans) Length of stick PQ from  
Position A = 3.4 cm  
Position B = 3.2 cm



Position C = 3.00 cm

No they are not the same.

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

Ans) 'B' is the correct position of eye. Correct length of the stick  $PQ = 3.2 \text{ cm}$

10) Define mass. state its i) S.I ii) C.G.S and iii) F.P.S units. How are they related?

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

The S.I. unit of mass is kilogram. In short it is written 'kg'.

In C.G.S system the unit of mass is gram. symbol (g)

In F.P.S system the unit of mass is pound. symbol (lb)

Relationship between kilogram, gram and pound is  
 $1 \text{ gram} = 10^{-3} \text{ kg}$

$1 \text{ pound} = 453.59 \text{ g}$

11) Convert the following quantities as indicated.

a)  $2500 \text{ kg} = \underline{\hspace{2cm}}$  metric tonne.

~~1 kg = 1~~

$1000 \text{ kg} = 1 \text{ metric tonne}$

$1 \text{ kg} = \frac{1}{1000} \text{ metric tonne}$

$2500 \text{ kg} = 2500 \times \frac{1}{1000} \text{ metric tonne}$

$= \frac{2500}{1000}$

$= 2.5 \text{ metric tonne.}$

b)  $150 \text{ kg} = \underline{\hspace{2cm}}$  quintal

$100 \text{ kg} = 1 \text{ quintal}$

$1 \text{ kg} = \frac{1}{100} \text{ quintal}$

$150 \text{ kg} = 150 \times \frac{1}{100} \text{ quintal}$

$= 1.5 \text{ quintal}$

c)  $10 \text{ lb} = \underline{\hspace{2cm}} \text{ kg}$

$$\begin{aligned} 1 \text{ pound} &= 453.59 \text{ g} \\ &= 453.59 \times 10^{-3} \text{ kg} \\ &= 0.45359 \text{ kg} \end{aligned}$$

$$\begin{aligned} 10 \text{ lb} &= 0.45359 \times 10 \text{ kg} \\ &= 4.5359 \text{ kg} \end{aligned}$$

d)  $2500 \text{ g} = \underline{\hspace{2cm}} \text{ kg}$

$$1 \text{ kg} = 1000 \text{ g}$$

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

$$\begin{aligned} 2500 \text{ g} &= 2500 \times 10^{-3} \text{ kg} \\ &= 2.5 \text{ kg} \end{aligned}$$

e)  $0.01 \text{ kg} = \underline{\hspace{2cm}} \text{ g}$

$$1 \text{ kg} = 1000 \text{ g}$$

$$\begin{aligned} 0.01 \text{ kg} &= 0.01 \times 1000 \text{ g} \\ &= 10 \text{ g} \end{aligned}$$

f)  $5 \text{ mg} = \underline{\hspace{2cm}} \text{ kg}$

$$1 \text{ kg} = 1000 \text{ g}$$

$$1 \text{ g} = 1000 \text{ mg}$$

$$1 \text{ mg} = \frac{1}{1000} \text{ g}$$

$$5 \text{ mg} = 5 \times \frac{1}{1000} \text{ g}$$

$$= 0.005 \text{ g}$$

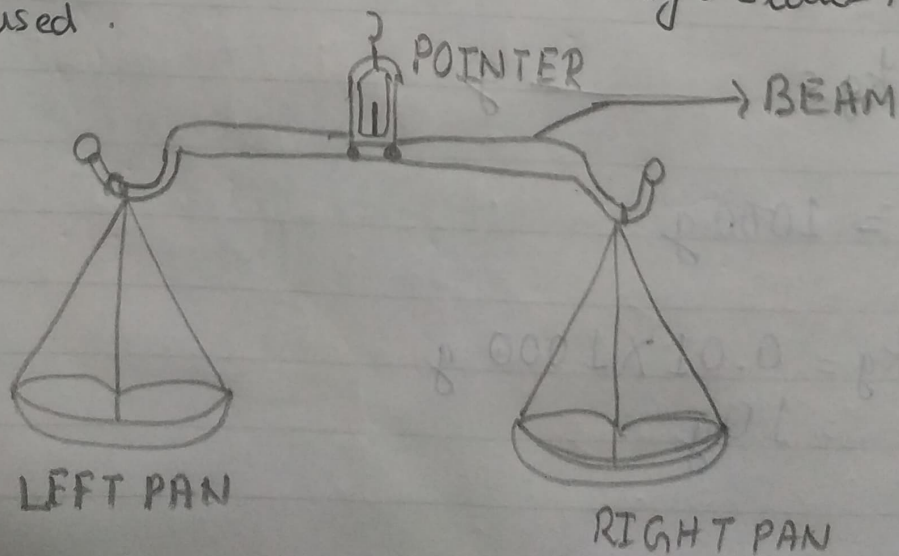
$$= 0.005 \times 10^{-3} \text{ kg}$$

$$= 0.000005 \text{ kg}$$

$$= 5 \times 10^{-6} \text{ kg}$$

- 12) Name the instrument which is commonly used to measure the mass of a body - state how it is used.

Ans



Ans → Instrument commonly used to measure mass of a body is the beam balance.

When we hold up the balance we observe that when there is nothing on either pan, the beam is horizontal. The body whose mass is to be measured is placed on the left pan. The standard weights are put on the right pan. They are so adjusted that the beam is again horizontal on holding the balance up. The total of the standard weights gives the mass of the given body.

15) Name two devices used to measure the short time interval of an event.

Ans → Two devices used to measure the short time interval of an event are: -

① Stop clock

② Stop watch

16) Express in second i) 3 minute 15 second and  
ii) 5 hour 2 minute 5 second.

i) 3 minute 15 second =  $3 \times 60 + 15$  s  
 $= 180 + 15$  s  
 $= 195$  s

ii) 5 hour 2 minute 5 second =  $5 \times 60 \times 60 + 2 \times 60 + 5$  s  
 $= 18,000 + 120 + 5$  s  
 $= 18,125$  s

17) What does the temperature measure?

Ans → Temperature measures the degree of coldness and hotness of a body.

18) Name the

a) S.I. unit and

b)

20. Write the temperature (i) melting ice and (ii) boiling water.

Ans → The temperature of

(i) Melting ice =  $0^{\circ}\text{C}$

(ii) Boiling water =  $100^{\circ}\text{C}$



22) What is the normal temperature of the human body? How is it indicated on a clinical thermometer?

Ans) Normal temperature of a human body is  $37^{\circ}\text{C}$  or  $98.6^{\circ}\text{F}$ .

To measure the temperature of a patient's body, its bulb is kept either below the tongue or under the arm's pit of the patient for about a minute. Then the thermometer is taken out and its reading is noted. When the temperature of patient's body is above  $37^{\circ}\text{C}$ , he is said to suffer with fever.

23. Can a clinical thermometer be used to measure the temperature of boiling water? Give reason for your answer.

Ans) No, a clinical thermometer cannot be used to measure the temperature of boiling water.

The reasons are

- a) It has a very small range.
- b) It can break on cooling and expand on heating.

24) Explain the term 'area of a surface'.

Ans) The total surface occupied by an object is called its area or surface area.

25) Name the S.I. unit of area and define it.

Ans) The S.I. unit of area is square metre or  $\text{metre}^2$  which in short form is written  $\text{m}^2$ .

26) How are the units

i) square yard

ii) hectare

iii)  $\text{km}^2$

iv)  $\text{cm}^2$

v)  $\text{mm}^2$

related to the S.I. unit of area?

Ans i) Square yard: One square yard is the area of a square of each side 0.9144 metres

$$1 \text{ square yard} = 1 \text{ yard} \times 1 \text{ yard}$$

$$= 0.9144 \text{ m} \times 0.9144 \text{ m}$$

$$= 0.836 \text{ m}^2 \text{ (or } 0.84 \text{ m}^2 \text{ nearby)}$$

ii) Hectare: One hectare is the area of a square of each side 100 metre.

$$1 \text{ hectare} = 100 \text{ metre} \times 100 \text{ metre} \\ = 10000 \text{ metre}^2$$

iii)  $\text{km}^2$ : One square kilometre is the area of a square of each side 1 kilometre

$$1 \text{ km}^2 = 1 \text{ km} \times 1 \text{ km} \\ = 1000 \text{ m} \times 1000 \text{ m} \\ = 10^6 \text{ m}^2$$

$$\text{iv) } \text{cm}^2 = \left( \frac{1 \text{ m}}{100} \right) \times \left( \frac{1 \text{ m}}{100} \right) = \frac{1}{40000} \text{ m}^2 \\ = 10^{-4} \text{ m}^2$$

$$\text{v) } \text{Mm}^2 = 1 \text{ mm}^2 = 10^{-6} \text{ m}^2$$

27) Explain how you will measure the area of  
i) a square    ii) a leaf?

Ans i) The area of a square can be calculated by using the formula -  
Area of square of side l

$$A = \text{side} \times \text{side} \\ = l \times l = l^2$$

ii) The area of a leaf is obtained by using a graph paper. A graph paper has small squares of each side 1 mm. The area of each big square is  $1 \text{ cm}^2$ .

Procedure: Place the leaf on graph paper. Draw its outline on the paper and remove it.

Now count the number of complete squares.

To this add the number of incomplete squares which are half or more than half. Ignore the squares which are less than half.

Thus,

Approximate area = (No. of complete squares + no. of half or more than half of incomplete squares)  $\times$  area of one square.

Exercise - B

Q. 13

Q1. Define one kilogram, SI unit of mass.  
How is it related to i) quintal  
ii) metric tonne  
and iii) gram.

Ans → One kilogram was defined as the mass of a cylinder of platinum-iridium alloy kept at the International Bureau of Weights and Measures at Sevres near Paris.

Relationship of kilogram with the following units is:-

i) Quintal - 1 quintal = 100 kg

ii) Metric tonne - 1 metric tonne = 1000 kg

iii) Gram - 1 gram =  $\frac{1}{1000}$  kg

Q. No. 14

2. Name and define the S.I. unit of time.  
How is it related to i) minute  
ii) hour  
iii) day and  
iv) year?

Ans → The S.I. unit of time is second.

One second is defined as  $\frac{1}{86400}$  part of a mean solar day i.e.,

$$1 \text{ s} = \frac{1}{86400} \times \text{one mean solar day.}$$

Relationship of second with the following units is: -

i) Minute - 1 minute = 60 seconds

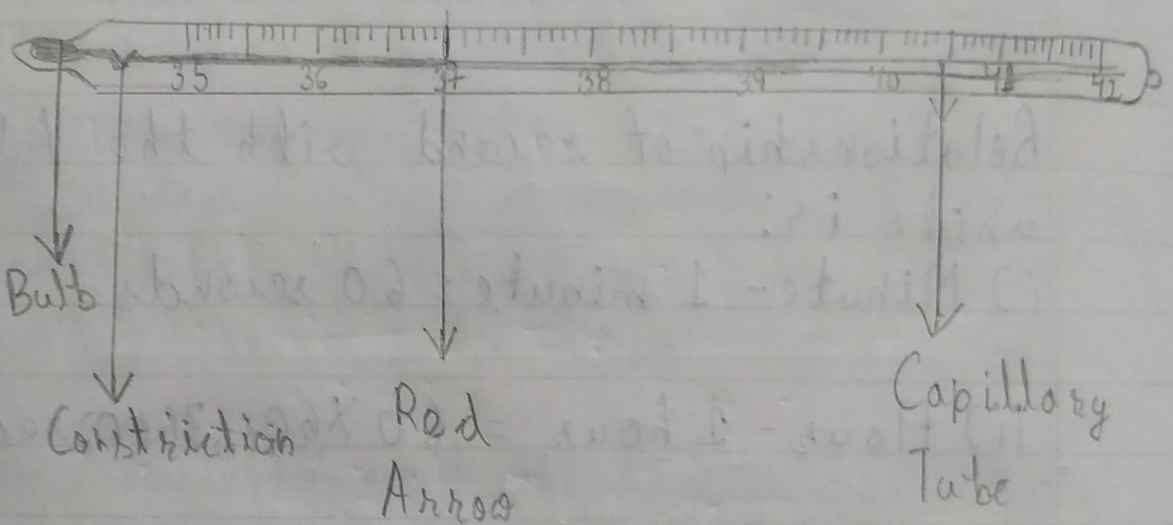
ii) Hour - 1 hour =  $60 \times 60 = 3600$  seconds

iii) 1 day = 24 hours  
 $= 24 \times 60$  mins  
 $= 1440$  mins  
 $= 1440 \times 60$  s.  
 $= 86400$  s

iv) 1 year = 365 days  
 $= 365 \times 86400$  s  
 $= 3.15 \times 10^7$  s

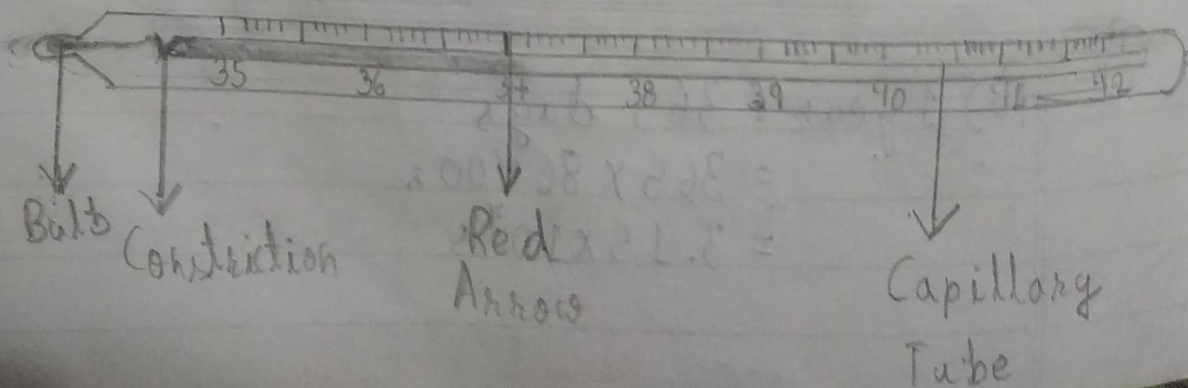
Q. 19 3. Name the instrument used for measuring of the temperature of a person. Draw its labeled neat diagram.

Ans) The instrument used for measuring of the temperature of a person is clinical thermometer.



Q. 21 4) What is a clinical thermometer? state its special feature. Draw a labeled neat diagram of a clinical thermometer showing the range of temperature marked on it.

Ans)



Ans → Clinical thermometer is a special thermometer used to measure the temperature of a patient's body.

A clinical thermometer has markings from  $35^{\circ}\text{C}$  to  $42^{\circ}\text{C}$ . It has a slight bend or kink in the stem just above the bulb. This kink is called constriction. This constriction prevents the mercury from falling back all by itself.

Q.No.  
18 5) Name the S.I. unit and one common unit of temperature. Write their symbols also.

Ans → The S.I. unit of temperature is kelvin (symbol K)

Common unit of temperature is, <sup>degree</sup> celsius (symbol  $^{\circ}\text{C}$ )