CHAPTER-2
PHYSICAL QUANTITIES AND MEASUREMENT
EXERCISE

Date
Page

A(1) (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(a) The S.I. unit of length is meter of time is second of mass is Kilogram.

b) °C is the unit of temperature.

c) 1 metric tonne = 1000 Kg

d) The zero mark in 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°C or 98.6°F

(g) The mass of an object is measured with help of a beam balance.

3)

Column A	Column B
(a) Length of a housing plot	(i) Clock
(b) Breadth of a book	(ii) Beam balance
(c) Mass of an apple	(iii) Thermometer
(d) period of time for study	(iv) Measuring tape
(e) Temperature of a body	(v) Graph paper
(f) Surface area of a leaf	(vi) Metre rule

Ans:- (a) - (iv), (b) - (vi), (c) - (ii), (d) - (i), (e) - (iii), (f) - (v)

4(a) The symbol of degree Celsius is:-
ans:- (i) °C

(b) 10 mm is equal to:-
ans:- (i) 1 cm

(c) The amount of surface occupied by an object is called its:-
ans:- (ii) area

(d) A metre ruler is graduated in:-
ans:- (iii) mm

(e) A thermometer is graduated in:-
ans:- (ii) °C

B/(1) Measurement is a comparision 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.

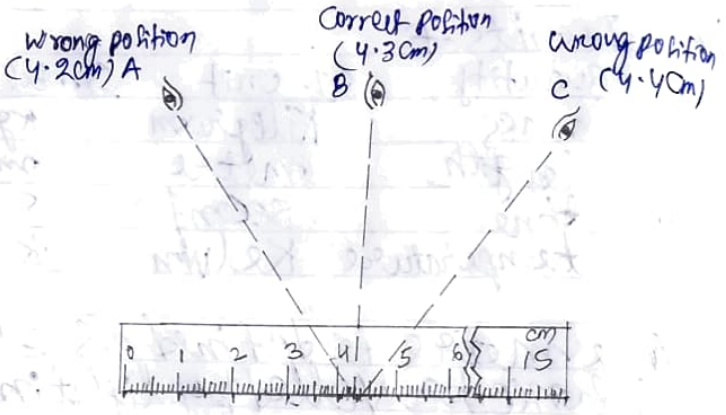
(2) Two characteristics of a unit are
1. It should be of convenient size.
2. It must be universally accepted, I.e. its value must remain same at all places and at all times.

3) In our daily life we measure the following four basic physical quantities.
1. Length
2. Mass
3. time
4. Temperature

4) S.I units of

	Quantity	S.I. unit	Symbol of S.I. unit
(i)	mass	Kilogram	Kg
(ii)	length	metre	m
(iii)	time	second	S
(iv)	temperature	Kelvin	K

5) 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
Submultiple of metre = centimetre



measuring the length of a rod PQ with a meter ruler

6) (a) 12 inch = 1 ft

(b) 1 ft = 30.48 cm

(c) 20cm = 0.2 cm

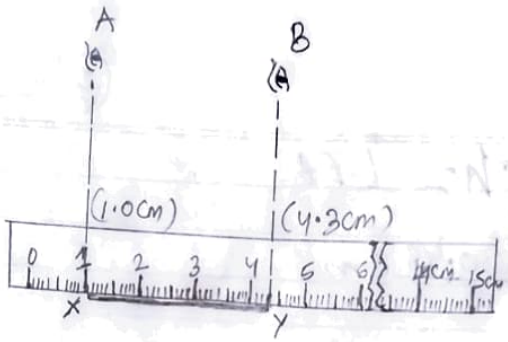
(d) 4.2m = 420 cm

(e) 0.2 Km = 200 cm

(f) 0.2cm = 2 mm

(g) 1 yard = 0.91 m

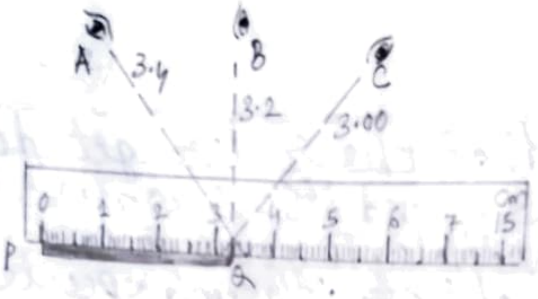
7) (a) To measure the length of a pencil using a metre rule, place metre rule with its marking close to the object. Let PQ be a pencil. The end P of the pencil coincides with the zero mark on the ruler. The end Q of the pencil is read by keeping the eye at the position 'B' vertically above the end Q. So the length of pencil is 4.3 cm.


A
B
(1.0cm)
(4.3cm)
0
1
2
3
4
5
6
14cm
15cm
X
Y

(b) 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 difference of the two readings gives the length of the object. In fig. the reading on ruler at the end X is 1.0 cm and at the end Y is 4.3 cm. So the length of the rod XY is 4.3 − 1.0 = = 3.3 cm.

8) 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.

9) The diagram 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
3.4
B
3.2
C
3.00
0
1
2
3
4
5
6
7
cm
5
P
Q

a) Length of stick PQ from
position A = 3.4 cm
position B = 3.2 cm
position C = 3.00 cm
No they are not same.

b) 'B' is the correct position of the eye. Correct length of the stick PQ = 3.2 cm

10) The mass of a body is the quantity of matter contained in it. The S.I. unit of mass is Kilogram. In short form it is written as Kg.
In C.G.S. system, the unit of mass is grams (symbol g).
in F.P.S. system, the unit of mass is pound. (symbol lb)

11) (a) 1000 Kg = 1 metric tonne
$1\,Kg = \frac{1}{1000}$ metric tonne
$\therefore 2500\,Kg = \frac{1}{1000} \times 2500$ metric tonne
$= 2.5$ metric tonne

(b) $100\ kg = 1\ quintal$

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

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

$= 1.5\ quintal.$

(c) $1\ lb = 453.59\ g$

$= 453.59 \times \frac{1}{1000}\ kg = 0.45359\ kg$

$\therefore 10\ lb = 0.45359 \times 10$

$= 4.5359\ kg$

(d) $1000\ g = 1\ kg$

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

$\therefore 2500\ g = \frac{1}{1000} \times 2500\ kg = 2.5\ kg$

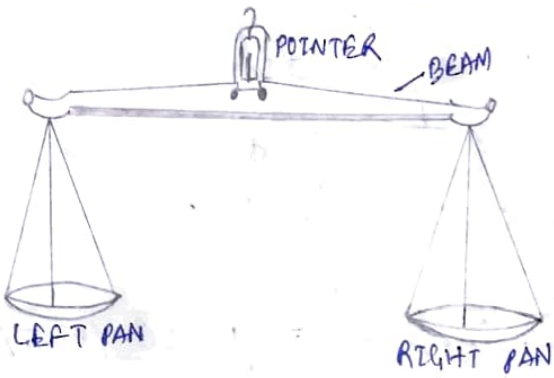
(e) $1\ kg = 1000\ g$

$\therefore 0.01\ kg = 1000 \times 0.01\ g$

$= 10\ g$

(f) $5\ mg = \frac{5}{1000}\ g = 5 \times 10^{-3}\ g$

$= \frac{5}{1000}\ kg$ or $5 \times 10^{-3}\ g = \frac{5}{1000 \times 1000} = 5 \times 10^{-6}\ kg$


SUPPORT TO HOLD THE BALANCE
POINTER
BEAM
LEFT PAN
RIGHT PAN

12) Instrument commonly used to measure the 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 weight 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.

13) The mass of 1 litre of water at 4°C is taken as 1 Kilogram
1 quintal = 100 Kg
1 metric ton = 10 quintal = 1000 kg

14) The S.I. unit of time is second. In short form we write it as 'S'. One second is the time interval between the two consecutive ticks that you hear from pendulum wall clock.

P.T.O →

1 min = 60s.
1 h = 60 min = 3600s.
1 day = 24 h = 86400s.
1 year = 365 days = 3.15×10^7s.

15) Two devices used to measure the time interval of an event are :- (a) Stop clock
(b) Stopwatch

16) 1. 3 minute = 15 second
1 minute = 60 second
3 minutes 16 second = 60 × 3 + 15
= 180 + 15
= 195 seconds

2. 1 minute = 60 second
2 minutes = 2 × 600 = 120 second .... (1)
1 hour 3600 second
5 hour 3600 × 5 = 18000 second .... (2)
3. 5 hour 2 minutes and 5 second
= 18000 + 120 + 5 = 18125 seconds

17) Temperature measures the degree of coldness and hotness of a body.

P.T.O →

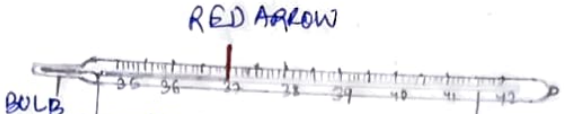


FIG. (CLINICAL THERMOMETER)

18) The S.I. unit of temperature is Kelvin (symbol K).
Common unit of temperature is degree centigrade (symbol °C)

19) clinical thermometer - diagram - refer.

20) The temperature of

1. melting ice = 0°C
2. boiling water = 100°C

21) Doctors use a special thermometer called the clinical thermometer for measuring the

temperature of the patient's body. The thermometer has the markings from 35°C to 42°C. It has a slight bend or kink in the stem just above the bulb. This kink is called the constriction. This constriction prevents the mercury from falling back all by itself. The temperature of a

P.T.O →

healthy person is 37°C. This temperature is marked by a red arrow.

22) 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°C, he is said to suffer with fever.

23) NO a clinical thermometer cannot be used to measure the temperature of boiling water. The reasons are

1. It has a very small range.
2. It can break on cooling and on excess heating.

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

25) The S.I. unit of area is square meter or meter2 which in short form is written as m2.

26) (i) Square yard: one square yard is the area of a square of each side 0.836 metre

1 square yard = 1 yard x 1 yard
= 0.914m x 0.914m
= 0.836m^2 (or 0.84 m^2 nearly)

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

1 hectare = 100 metre x 100 metre
= 10000 metre^2 (or 10^4m^2)

(iii) Km^2 = one square kilometre is the area of a square of each side 1 kilometre

Thus,
1 Km^2 = 1 Km = 1000m x
x 1000m = 10^6 m^2

(iv) $cm^2 = 1cm^2 = \left[\frac{1}{100}m\right] \times \left[\frac{1}{100}m\right] =$
$= \frac{1}{10000} m^2$

$= 10^{-4} m^2$

(v) $mm^2 = 1mm^2 = 10^{-4} m^2$

2) The area of a square can be calculated by using the following formula—
1. Area of square of side 1
= side x side
$= 1 \times 1 = L^2$
The area of a leaf is obtained by using a graph paper. It has small squares of each side 1mm. The area of each big square is $1 cm^2$.
Procedure: Place the leaf on graph paper. Draw its out-line 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) x area of one square.