Chapter - 10 : Motion and Measurement of Distances.

Grade : VI

Subject : Science

BASIC CONCEPTS – A FLOW CHART

Living things

Measurement

- Comparison of an unknown quantity with some known quantity of the same kind.
- Measurement of an object consists of the unit of measurement, and the number of units the object measures

Conventional Methods of Measurement

- Conventional measurements have been only approximate measurements.
- Differ from person to person.
- Lack precision

Handspan

Length between the tip of thumb and little finger.

Cubit

Length between the tip of middle finger and elbow.

Cubit

Length from shoulder to the tip of middle finger.

Cubit

It is the distance covered by a step.

Standard Units of Measurement

- It is a unit to measure any quantity completely and uniformly.
- Standard units for measuring length-metre, Mass-kilogram, time-second.

Motion

- When the position of a body does not change with the passage of time, the body is said to be at **rest.**
- When the position of a body changes with the passage of time, the body is said to be in **motion.**

Linear Motion

Rectilinear Motion

- Object moves from one position to another along a straight line
- Example : group of ants moving in a line

Curvilinear Motion

- Object moves along a curved line.
- Example: a car moving along a curved road.

Oscillatory Motion

- Sitting in the rocking chair you may move back and forth along the same path after a regular interval of time.
- Object moves between two points along the same path, it is said to be in oscillatory motion.
- Example : a person sitting on a rocking chair.

Vibratory Motion

- Object moves to and fro very fast.
- Example: Strings of a guitar when plucked.

Non-uniform Motion

- Object do not repeat motion at regular intervals of time.

Random Motion

- Object moves form one position to another and changes direction in an irregular manner.
- Example : Butterfly flies randomly in garden.

Circular Motion

- Object moves in a circular manner in relation to its own axis or around a fixed centre.
- Object remains at the same distance from a fixed point which is the centre of the path of the motion.

Revolution

- Object moves as a whole around a fixed centre.
- Example : earth revolving around the sun in a define orbit.

Rotation

- Object moves in a circular path in relation to its own fixed axis.
- Example : Blades of a moving fan, windmill, etc

Oceans

- Object oscillates to and fro along the same path again and again and with the same speed.
- Time taken by an object to complete one oscillation is same, no matter how many oscillations the object takes.
- Example : Heartbeat pendulum of a clock.

Non-uniform Motion

- Object do not repeat motion at regular intervals of time.

Uniform Motion

- When the body covers equal distance in equal time interval.

I. Know the Terms

- **Measurement:** The process of finding an unknown quantity by comparing it with a known fixed quantity of the same kind.
- **Standard unit:** A unit of measurement accepted universally and not change place to place
- **Estimation:** To guess the amount of anything without actual measurement.
- **Motion:** The change in position of an object with time, relative to its surroundings.
- **Translational motion:** A motion in which an object moves in the same direction and covers equal distance in a given interval of time.
- **Rectilinear motion:** A motion in which an object moves along a straight line.
- **Rotational motion :** A motion in which an object moves about an axis.
- **Periodic motion:** A motion that repeats itself in equal intervals of time.
- **Circular motion:** A motion in which an object moves along a circular path.
- **Distance:** the length of the space between two points is called distance. In other words, how far a place/thing is from a point is known as distance.
- **Uniform motion:** If a body covers equal distances in equal intervals of time, the motion is called uniform motion.
- **Non-uniform motion:** When a body covers unequal distances in equal intervals of time, the motion is called non-uniform motion (or) equal distances in unequal intervals of time.

Objective Type Questions

(1 Mark each)

I. Multiple choice questions

1. Curved length can be measured by

a. Metre scale b. Cubit c. Measuring tape d. All of these

2. Find the odd one out :

(a) Rotation of earth about its axis (b) Tabla surface

(c) Blades of rotating fan (d) Moving vehicle on straight road

3. S.I. unit of length is :

(a) Centimetre (b) 10 mm (c) Metre (d) Kilometre

4. One decametre is equal to :

(a) 10 cm (b) 10 mm (c) 10 m (d) 10 km

5. 1 metre is equal to :

(a) 10 cm (b) 10 decimetre (c) 10 decametre (d) None of these

6. An example of rectilinear motion is :

(a) A free falling apple from tree

(b) A stone thrown downward with force

(c) A stone thrown horizontally with great force

(d) None of these

7. Motion of Potter's wheel is :

(a) Circular (b) Rotational (c) Oscillatory (d) Periodic

8. A flying kite's motion in the sky is :

(a) Linear motion (b) Circular motion (c) Random motion (d) Vibrational motion

9. Which of the following is not a combination of two motions ?

(a) Movement of bicycle (b) Movement of a player on ground

(c) Motion of a ball on ground (d) Rotation of earth.

10. A means of transport along water routes is :

(a) Boat (b) Train (c) Bicycle (d) Bus

11. The distance between Delhi and Mumbai is usually expressed in units of : **[NCERT Exemplar]**

(a) decametre (b) metre (c) centimetre (d) kilometre

12. Which of the following does not express a time interval ? **[NCERT Exemplar]**

(a) A day (b) A second

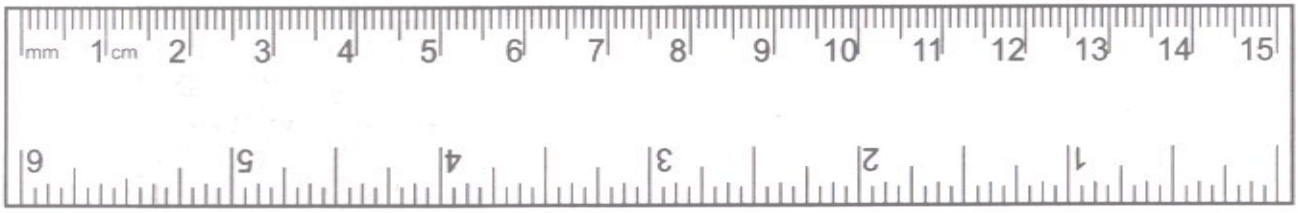
(c) A school period (d) Time of the first bell in the school

13. Fig. shows a measuring scale which is usually supplied with a geometry box. Which of the following distances cannot be measured with this scale by using it only once ?

[NCERT Exemplar]

(a) 0.1cm (b) 0.15 cm (c) 0.2 cm (d) 0.05 cm

14. A piece of ribbon folded five times is placed along a 30 cm long measuring scale as shown in Fig.



The length of the ribbon is between **[NCERT Exemplar]**

(a) 1.15 cm - 1.25 cm (b) 1.25 cm - 1.35 cm

(c) 1.50 cm - 1.60 cm (d) 1.60 cm - 1.70 cm

15. Paheli moves on a straight road from point A to point C. She takes 20 minutes to cover a certain distance AB and 30 minutes to cover the rest of distance BC. She then turns back and takes 30 minutes to cover the distance CB and 20 minutes to cover the rest of the distance to her starting point. She makes 5 rounds on the road the same way. Paheli concludes that her motion is : **[NCERT Exemplar]**

(a) only rectilinear motion (b) only periodic motion

(c) both rectilinear and periodic (d) neither rectilinear nor periodic.

16. Bholu and Golu are playing in a ground. They start running from the same point A in the ground and reach point B at the same time by following the paths marked 1 and 2 respectively as shown in Fig. Which of the following is /are true for the given situation ? **[NCERT Exemplar]**

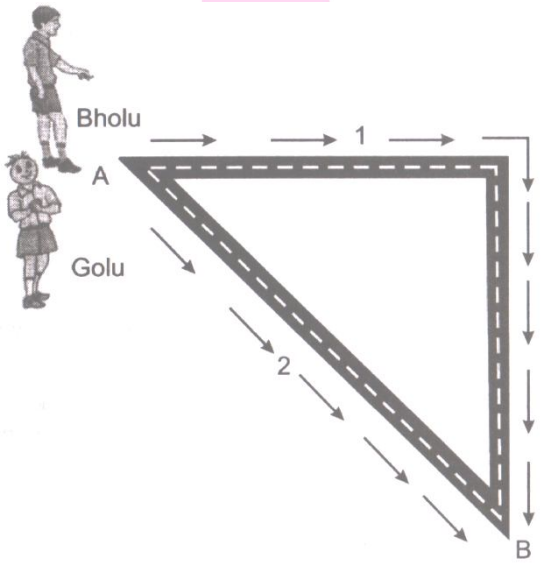
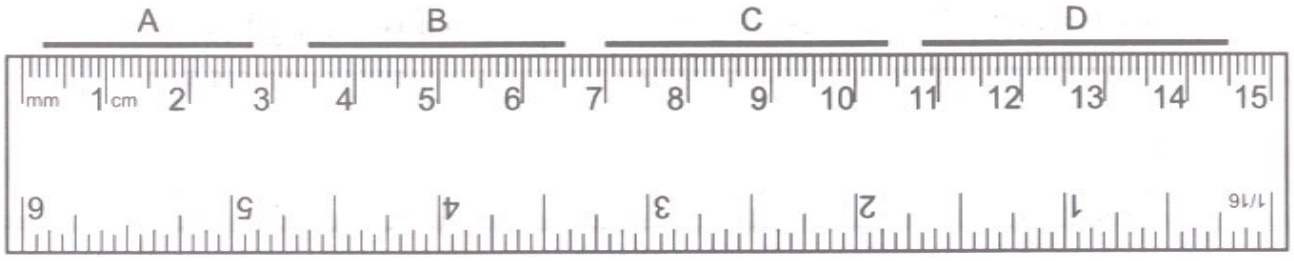


Fig. As compared to Golu, Bholu covers a :

(a) longer distance but with a lower speed. (b) longer distance with a higher speed.

(c) shorter distance with a lower speed. (d) shorter distance with a higher speed.

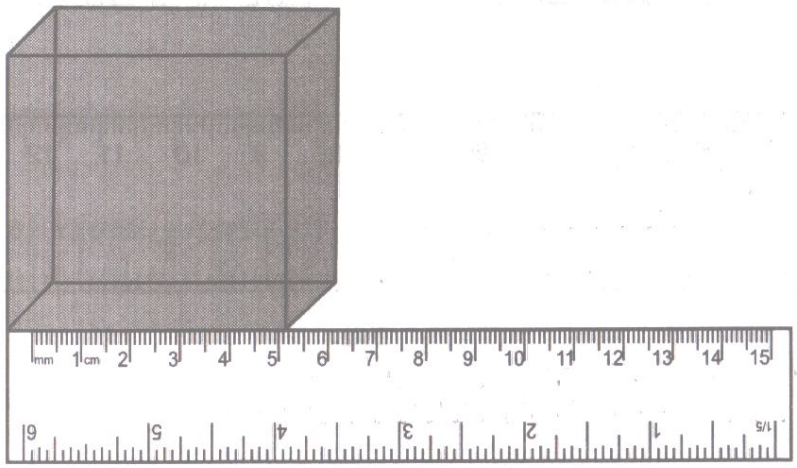
17. Four pieces of wooden sticks A,B,C and D are placed along the length of 30 cm long scale as shown in Fig. Which one of them is 3.4 cm in length ? **[NCERT Exemplar]**



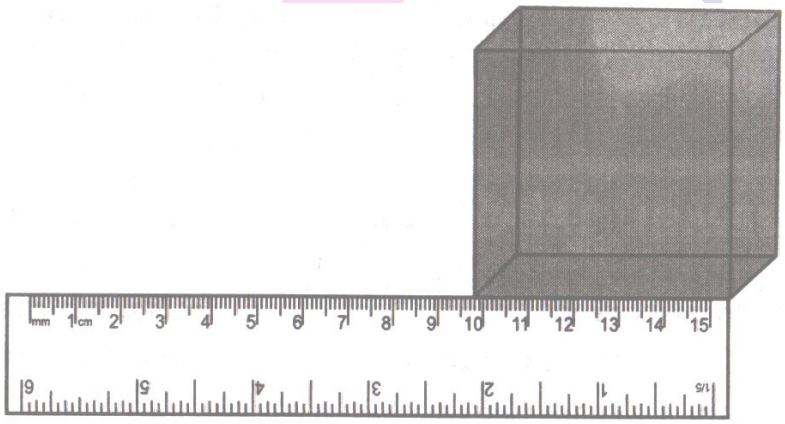
(a) A (b) B (c) C (d) D

18. Which of the following figures shows the correct placement of a block along a scale for measuring its length ? **[NCERT Exemplar]**

(a)



(b)



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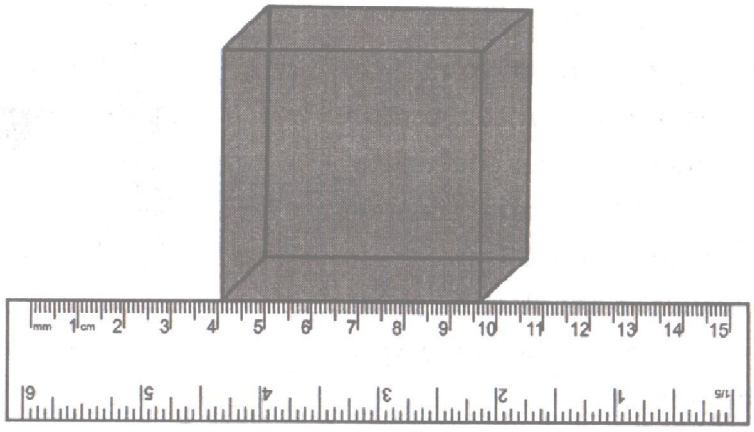
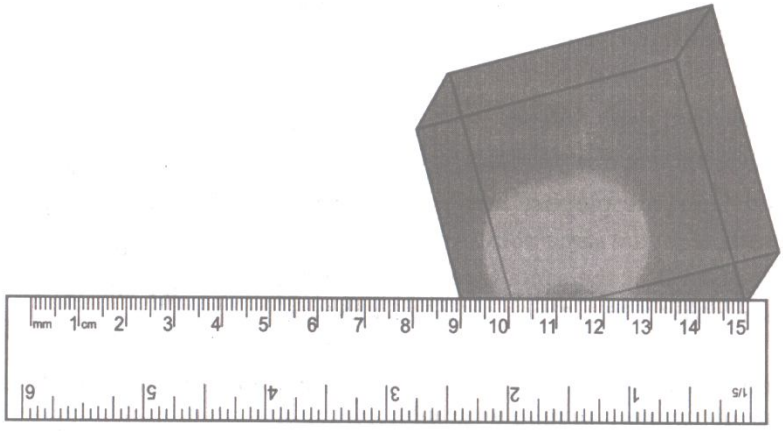
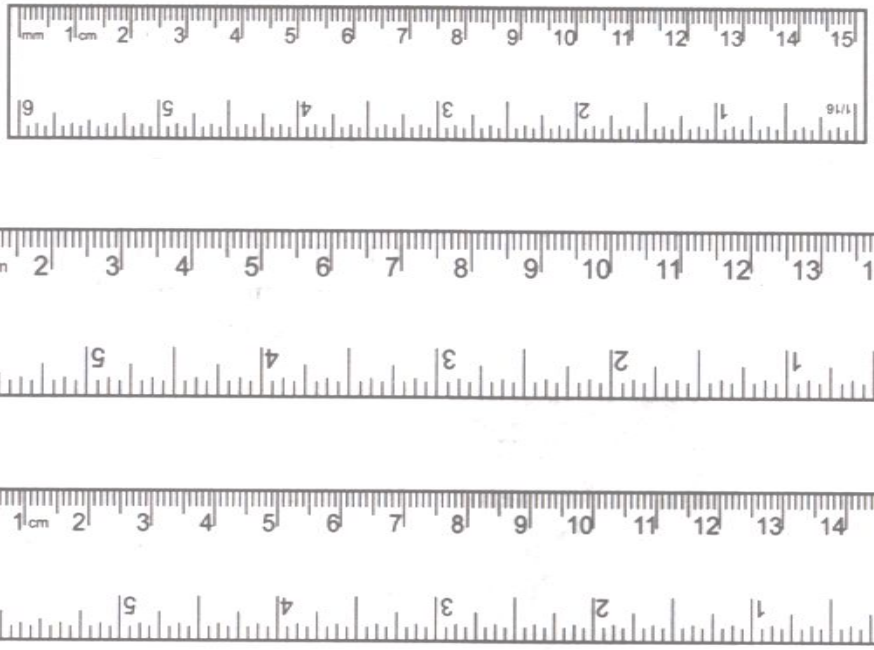


(d)



19. You are provided three scales, A, B and C as shown in Fig. to measure a length of 10 cm.



For the correct measurement of the length you will use the scale. **[NCERT exemplar]**

a. A only b. B only c. C only d. any of the three scales

1. c	2. d	3. c	4. c	5. b	6. a	7. b	8. c	9. b	10. a
11. d	12. d	13. b&d	14. c	15. c	16. b	17. c	18. c	19. d	

II. Multiple choice questions

1. Which one from the following is not the 20th century contribution?

(a) Electric train (b) Motorised boats (c) Monorail (d) Supersonic aeroplanes

2. In 1790, the French created a standard unit of measurement called the

(a) metric system (b) French system

(c) measurement system (d) Standard system

3. Each metre (m) is divided into 100 equal divisions, called

(a) millimetre (b) centimetre (c) decimetre (d) kilometre

4. A ball rolling on the ground represents

(a) rectilinear motion (b) rotational motion

(c) both (a) and (b) (d) none of these

5. Transport along water routes are

(a) boats (b) train (c) cycle (d) bus

6. We measure the length of a room in the unit

(a) kilometre (b) metre (c) both (a) and (b) (d) None of these.

7. What do we use to measure curved lengths?

(a) thread (b) wood (c) sand (d) paper

1. (b)	2. (a)	3. (b)	4. (c)	5. (a)	6. (b)	7. (a)

I. Match the following.

(I) Column A	Column B
(a) 1 metre	(i) 1 decimetre
(b) 100 decametre	(ii) 1000 metre
(c) 100 millimetre	(iii) 10 decimetre
(d) 1 kilometre	(iv) 10 metre
(e) 1 decametre	(v) 1 kilometre

a. iii	b. v	c. i	d. ii	e. iv

(II) Column A	Column B
(a) Motion	(i) Potter's wheel
(b) Rectilinear motion	(ii) Spinning top
(c) Rotatory motion	(iii) Any moving object
(d) Periodic motion	(iv) Car moving on straight road
(e) Circular motion	(v) Motion of earth

a. iii	b. iv	c. ii	d. v	e. i

II. Match the following.

(I) Column A	Column B
a. 100 cm	i. Rectilinear motion and rotation motion
b. 1 cm	ii. 10 mm
c. March-past of soldiers in a parade	iii. Periodic motion
d. The motion of blades of an electric fan	iv. 1 m
e. The motion of strings of a guitar	v. Rectilinear motion
f. The ball rolling on the ground	vi. Circular motion

a. iv	b. ii	c. v	d. vi	e. iii	f. i

III. Match the following.

Column I	Column II
a. A moving wheel of a sewing machine	i. Circular motion
b. Movement of tip of the minute hand a clock in the hour	ii. Rotational motion
c. A moving swing	iii. Periodic motion

a. ii	b. i	c. iii

I. True or False

1. The SI unit of distance is cm.
2. The motion of a spinning top is linear motion.
3. The motion of a body falling freely under gravity is linear motion.
4. A ruler / metre rod can be used for measuring a curved line.
5. Motion of a fly is an example of translatory motion.
6. In ancient times, people used length of a foot as a unit of measurement.

7. A rotating fan is an example of rotational motion.

8. Motion of a wheel of a car is rectilinear as well as circular motion.

9. A cloth merchant uses a metre rod to measure the length of cloth.

10. A child swinging on a swing shows rectilinear motion.

11. The object which does not change its position with time is said to be at rest.

12. The needle of a swing machine is random motion.

13. Metre is the unit of length is SI system.

14. A flying bird in the sky is at rest.

1. False	2. False	3. True	4. False	5. False
6. True	7. True	8. True	9. True	10. False
11. True	12. True	13. True	14. False	

I. Fill in the blanks.

1. Motion and rest are _____ terms.

2. Invention of _____ changed the mode of transport significantly.

3. Every measurement consists of _____ and _____.

4. Motion of a child on a swing is _____.

5. Motion of needle of a sewing machine is _____.

6. _____ involves the comparison of an unknown quantity with a known quantity.

7. _____ is the SI unit of length.

8. When you push a box on the floor, it undergoes _____ motion.

1. relative	2. wheel	3. number, unit	4. periodic
5. periodic	6. Measurement	7. Metre	8. rectilinear

II. Fill in the blanks.

a. One metre is _____ centimetre.

b. Five kilometre is _____ metre.

c. Motion of child on a swing is _____.

d. Motion of the needle of a sewing machine is _____.

e. Motion of a wheel of a bicycle is _____.

a. 100	b. 5000	c. oscillatory motion
d. Periodic motion	e. Circular motion	

III. Fill in the blanks.

1. A _____ is used for measuring the length of table.

2. 2000 cm is equal to _____ metre.

3. The length of a curved line can be measured by using a _____.

4. The motion of moon around earth is _____.

5. A plunked string of a sitar executes _____ motion.

6. Motion that _____ itself after same period of time is called periodic motion.

7. The earth moving in its orbit shows _____ as well as _____ motion.

8. The metric system for measurement was created by the _____.

9. 1 km is equal to _____ m.

10. Different modes of _____ are used to go from one place to another.

11. 1 cm = _____ mm.

12. 1 cm = _____ m.

13. We can use a _____ to measure the size of our chest.

14. We can use a _____ to measure curved length.

15. Motion of blade of an electric fan is an example of _____ motion.

i. measuring tape	ii. 20	iii. thread or measuring tape	iv. periodic
5. Periodic oscillatory	6. repeats	7. circular, rotational	8. French
9. 1000	10. transport	11. 10	12. 1000
13. measuring tape	14. thread	15. circular	16. oscillatory

Quiz Time

1. **Which invention made a great change in modes of transport?**
2. **What introduced a new source of power in the 19th century to replace dependence on animal power to transport?**
3. **Which years saw the development of aeroplanes?**
4. **What is the contributions of 20th century in the field of transportation?**
5. **What do you mean by SI unit?**
6. **What is the SI unit of length?**
7. **How many millimetre (mm) a metre has?**
8. **What is rectilinear motion?**
9. **Give one example of periodic motion.**
10. **What is the SI unit of time?**

1. Invention of wheel	2. the invention of steam engine
3. The early years of 1900.	4. Electric trains, monorail, supersonic aeroplane
5. International system of units	6. A metre
7. 1000 mm	8. When an object moves along a straight line, the motion is said to be rectilinear motion.
9. Motion of a pendulum or motion of a child on a swing.	10. Second

NCERT Corner

Intext Questions

1. **Name any of the early modes of transport that are not in use today.**

   Bullock cart, camel cart etc.

2. **How do people know how far they have travelled?**

   By measuring distance by a particular standard unit of measurement.

3. **How can we use a string to measure distances less then the length of the string?**

   By marking 1/2 , ¼ and 1/8 of string length.

4. **Will the measurement of a room using feet of different persons be equal or not?**

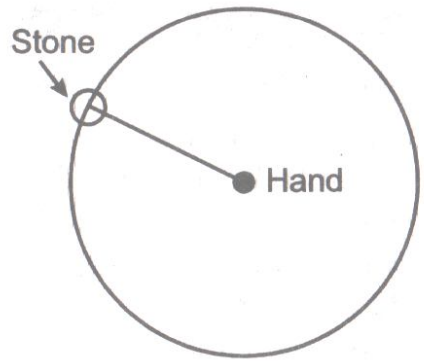
   The measurement of a room using feet of different persons will not be equal because every person does not have same foot length.

5. How would you decide whether an object is in motion or at rest?

An object is said to be at rest when it does not change its position with time. While an object is said to be in motion when it changes its position with time.

6. Boojho is not sure why we say that the distance of the stone from our hand is same when we whirl it around? Can you help him understand this? Remember that stone is held with string.

Distance means length between two places. When we whirl the stone, the length between hand and stone does not change. So distance is same. It is shown in following figure.



Textbook Questions

1. Give two examples for each of the modes of transport used on land, water and air.

Land transport - Bus, train

Water transport - Ship, Boat

Air transport - Aeroplane, Helicopter

2. Why can a pace or a footstep not be used as a standard unit of length?

Since the length of a pace or footstep differs for every individual, so a pace or a footstep can not be used as a standard unit of length.

3. Arrange the following lengths in their increasing magnitude:

2 metre, 1 centimetre, 1 kilometre, 1 millimetre

4. The height of a person is 1.65 m. Express it in cm and mm.

Height of the person = 1.65

| 1 m = 100 cm

and 1 m = 1000 m

| 1.65 m = 1.65 x 100 cm = 165 cm

and 1.65 m = 1.65 x 1000 mm = 1650 mm

5. The distance between Radha's home and her school is 3250m. Express this distance in km.

Distance between Radha's home and her school

$= 3250$ m

1 km $= 1000$ m

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

3250 m $= \frac{3250}{1000}\ km$

$= 3.25$ km

6. While measuring the length of a knitting needle the reading of the scale at one end is 3 cm and at the other end is 33.1 cm. What is the length of the needle?

Length of the needle $= (33.1 - 3.0)$ cm

$= 30.1$ cm

7. Write the similarities and differences between the motions of a bicycle and a ceiling fan that has been switched on.

Similarities : Wheel of a bicycle and ceiling fan (when switched on) both rotate such that their distance from a fixed point remains the same, which means that they both show circular motion.

Differences : Wheel of a bicycle shows circular motion as well as rectilinear motion while fan shows only circular motion.

Wheel of a bicycle moves forward in same direction due to its rectilinear motion while fan remains at the same point.

8. Why could you not use an elastic measuring tape to measure distance? What would be some of the problems you would meet in telling someone about a distance you measured with an elastic tape?

Elastic substances have the property of elasticity, i.e., these can be stretched by applying some force. So, elastic tape cannot be used to measure distance. In elastic tape measurement, measurement of same object may be different due to its stretching.

9. Give two examples of periodic motion.

i. Motion of a pendulum.

ii. Motion of a needle of sewing machine.

I. Very Short Answer Type Questions.

1. What is motion ?

If a body moves from its position, then it is said to be in motion.

2. What is straight line motion ?

When a body moves in a straight line, it is called rectilinear motion.

3. What is the current unit of measurement of length ?

Metre.

4. What is the current system of measurement of length ?

SI system.

5. Hour hand of a clock does not seem to be moving. Is it at rest ?

No, it is moving slowly.

6. Arrange the following in increasing order. Centimetre, decametre, metre, millimetre, decimetre.

Millimetre, centimetre, decimetre, metre, decametre.

7. What kind of motion do wheels of moving bike perform ?

Wheels make rotational motion.

8. How many mm^3 are there in 1 cm^3 ?

1 cm = 10 mm

1 cm^3 = 10 mm x 10 mm x 10 mm = 1000 mm^3.

9. Define year.

Time taken by the earth to revolve around the sun is called a year.

10. What is measurement?

The comparison of an unknown quantity with a standard known quantity is known as measurement.

11. What is a unit?

A quantity adopted as a standard of measurement of a physical quantity is called a unit.

12. Correct the following.

i. The motion of a swing is an example of rectilinear motion.

ii. 1 m = 1000 cm **[NCERT exemplar]**

i. The motion of a swing is an example of periodic motion.

ii. 1 m = 100 cm

13. Fill in the blanks.

i. Motion of an object or a part of it around a fixed point is known as _____ motion.

ii. A body repeating its motion after certain interval of time is in _____ motion.

iii. in rectilinear motion, object moves _____ a _____ line.

iv. SI unit of length is _____. **[NCERT Exemplar]**

i. Circular ii. Periodic iii. in, straight iv. metre

14. Write an example for each of the following types of motion.

i. Rectilinear ii. Circular iii. Periodic iv. Circular and periodic **[NCERT Exemplar]**

i. Motion of bicycle moving in straight line.

ii. Motion of blades of a fan.

iii. Motion of a simple pendulum.

iv. Motion of the earth around the sun.

15. Arrange the following lengths in their increasing magnitude.

1 metre, 1 centimetre, 1 kilometre, 1 millimetre

1 millimetre < 1 centimetre < 1 metre < 1 kilometre.

16. Give two examples of modes of transport used on land.

Bus and car.

II. Very Short Answer Type Questions.

1. Are senses reliable for accurate measurement?

Our senses are not reliable for accurate measurement.

2. Why can hand span and arm length not be used as standard units of length?

Because these vary from person to person.

3. How many centimetres are there in 1 m?

100 cm.

4. Name the measuring device which can be used for measuring the girth of a tree.

Measuring tape.

5. Give one example of linear motion.

Motion of stone falling from a certain height.

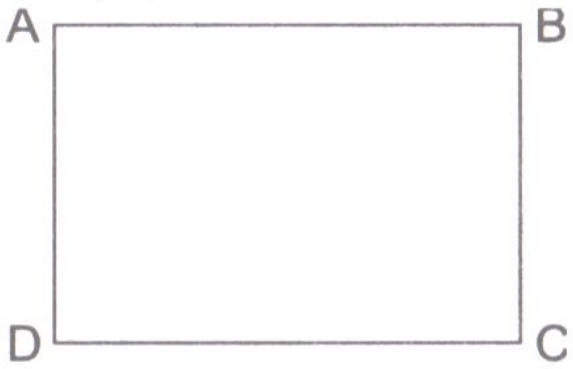
6. Give an example of circular motion.

Motion of arms of watch.

7. Name the types of motion in which a body moves along a straight path.

Rectilinear or linear motion.

8. Find the length and breadth of given rectangle in mm and cm. A



Ans. Using measuring scale (15 cm scale), Length AB = 3 cm and breadth BC = 2 cm.

AB = 3 x 10 = 30 mm

BC = 2 x 10 = 20 mm.

9. Give the unit for measuring the following:

(a) Distance between Delhi and Jaipur.

(b) Thickness of a coin.

(c) Length of your eraser.

(d) Length of your shoe lace.

(a) Kilometre

(b) Millimetre

(c) Centimetre

(d) Centimetre.

10. Name the device used to measure the following:

(a) Size of your shoulder.

(b) Size of your wrist.

(c) Your height.

(d) Your weight.

(e) Cloth for curtain.

(f) Circumference of round table.

(a) Measuring tape

(b) Measuring tape

(c) Measuring tape

(d) Weighing balance

(e) Metre scale or measuring tape

(f) A long thread or measuring tape.

11. Which invention led to a great change in modes of transport?

Invention of wheel.

12. Which invention as new source of power led to development of railroads?

Steam engine.

13. One metre has 10 equal parts called.

Decimetres

14. Motion of wheel of a car is an example of

Circular motion

15. What is the S.I. unit of length?

Meter

16. What type of motion does the seconds hand in a clock have?

Rotational motion.

17. Write the name of two devices used to measure length.

i. Meter scale ii. Screw gauge.

I. Short Answer Type Questions.

1. When you are travelling in plane, are you in motion or rest ?

Relative two earth, we are in motion and relative to plane or any other thing in plane, we are at rest.

2. Give two examples of each of the following mode of transport used by humans—

(a) Land, (b) Water, (c) Air

(a) Land—motorcycle, cat (b) Water—Boat, steamer. (c) Air—Aeroplane, helicopter.

3. Name two devices that are used to measure length.

The two devices that are used to measure length are : (i) Metre scale (ii) Screw gauge.

4. The height of a person is 1.965 m. Express it in cm and mm.

1 m = 100 cm = 1000 mm The height of the given person in cm is = 1.965 x 100 = 196.5 cm The height of the given person in mm is = 1.965 x 1000 = 1965.0 mm.

5. Give two examples of a periodic motion.

The two examples of a periodic motion are motion of a pendulum and motion of a child on a swing.

6. What are the inexact methods of measurement ?

Foot, handspan and arm length are used to measure the length. These are inexact methods of measurement.

7. Give an example for the following types of motion :

(i) Linear motion

(ii) Circular motion

(iii) Rotatory motion.

(i) Linear motion : A car moving in a straight line is an example of a linear motion.

(ii) Circular motion : Motion of blades of fan is an example of circular motion.

(iii) Rotatory motion : Rotation of earth on its axis is an example of rotatory motion.

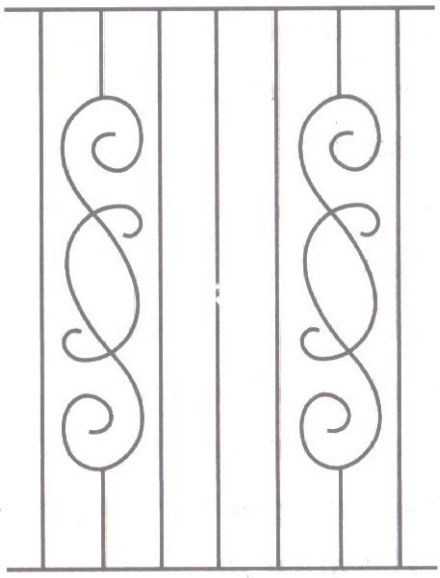
8. Describe three rules to measure length.

(i) Length of the scale, that you are using to measure, must be greater than the length of the object.

(ii) The eye must be placed just above the point, that you are reading, otherwise there will be an error due to parallax.

(iii) If the zero mark of the scale is damaged or the edge of the scale is not smooth, then start the measurement from another mark.

9.



The photograph given as Fig. above shows a section of a grille made up of straight and curved iron bars. How would you measure the length of the bars of this section, so that the payment could be made to the contractor ? [NCERT Exemplar]

The straight part of iron bars is measured by measuring tape while the curved part of iron bars is measured by thread and length of thread is measured by using measuring tape.

10. Identify the different types of motion in the following word diagram given as Fig.

Y	O	U	N	G	C	C	N	T	E	R
L	E	V	E	L	P	I	E	E	A	R
A	L	L	O	T	O	P	P	E	A	I
N	O	T	E	P	A	D	N	E	C	K
O	W	O	N	E	W	I	Y	Z	S	E
I	E	V	O	R	L	O	A	D	W	P
T	R	G	N	I	C	E	D	R	I	L
A	Z	H	T	O	N	G	U	E	N	A
T	X	C	R	D	E	P	T	H	G	R
O	E	Y	C	I	R	C	U	L	A	R
R	T	L	C	C	O	P	P	E	R	T

[NCERT Exemplar]

The different types of motion are represented in word diagram, as shown below :

Y	O	U	N	G	C	C	N	T	E	R
L	E	V	E	L	P	I	E	E	A	R
A	L	L	O	T	O	P	P	E	A	I
N	O	T	E	P	A	D	N	E	C	K
O	W	O	N	E	W	I	Y	Z	S	E
I	E	V	O	R	L	O	A	D	W	P
T	R	G	M	I	C	E	D	R	I	L
A	Z	H	T	O	N	G	U	E	N	A
T	X	C	R	D	E	P	T	H	G	R
O	E	Y	C	I	R	C	U	L	A	R
R	T	L	C	C	O	P	P	E	R	T

(i) Rectilinear (ii) Circular (iii) Periodic

11. Four children measure the length of a table which was about 2 m. Each of them used different ways to measure it.

(i) Sam measured it with a half metre long thread.

(ii) Gurmeet measured it with a 15 cm scale from her geometry box.

(iii) Rena measured it using her handspan.

(iv) Salim measured it using a 5 m long measuring tape. Which one of them would get the most accurate length ? Give reason for you answer. [NCERT Exemplar]

Salim will get the most accurate length of the table because the length of table is 2 m, which can be measured by the tape or scale having length greater than 2 m. Measuring tape of 5 m long is used to measure the 2 m length accurately.

II. Short Answer Type Questions.

1. State two precautions to be observe while measuring length with the help of a metre scale.

Two precaution are.

i. The initial point of distance must coincide with the zero reading of metre scale.

ii. The eye should be kept in line with the point of measurement.

2. Define rest and motion.

The objects which do not change their positions with time are said to be at rest.

The object which change their positions with time are said to be in motion.

3. Define the term standard unit.

The unit that could be used everywhere as a basic unit of measurement is called a standard unit.

4. How can a measured length be expressed?

Each measurement has:

i. A number describing the numerical value.

ii. The unit in which that quantity is measured.

5. Give one example each of the following types of motion.

a. Linear b. Translatory c. Circular d. Periodic

Types of motion	Example
a. Linear	falling of a stone

b. Translatory	propagation of sound
c. Circular	ceiling fan
d. Periodic	Pendulum of clock

6. Before the 19th century which power was used in transportation?

Till the beginning of the 19th century, people depended on animal power to transport them from one place to another.

7. Name the 20th century invention in the field of transportation.

The 20th century inventions in the field of transportation are electric train, monorail, supersonic, aeroplanes, spacecraft, etc.

8. When was the metric system created? Why was it felt necessary to have standard units of measurement?

The metric system was created by the French in 1790. It was necessary to have standard units of measurement for the sake of uniformity.

I. Long Answer Type Questions.

1. How can we find the length of a curved line? Explain.

Draw a curved line CD. Take a thread and make a knot at one of its ends. Keep the knot made in the thread on point C of the line. Place a small portion of the thread along the line, keeping it tight using your fingers and thumb. Keep on stretching the thread on the curved line till you take the thread to the point D of the line. Make a mark on the thread where it touches the other end of the line at point D. Now, stretch the thread along a metre scale and the length between the knot in the beginning and mark on the thread is measured through scale. This measured length on scale will give you the length of the curved line CD.

2. While travelling in a train, it appears that the trees near the track are moving whereas co-passengers appear to be stationary. Explain the reason. [NCERT Exemplar]

While travelling in a train, the tree near the track look moving in opposite direction to the direction of motion of train because there is a relative motion between moving train and trees near the track. In case of co-passengers, the relative motion between we and co-passengers is zero, so co-passengers appear to be stationary.

3. How are the motion of a wheel of a moving bicycle and a mark on the blade of a moving electric fan different? Explain. [NCERT Exemplar]

S.No	Motion of wheel of a moving bicycle	S.No	Motion of blade of a moving electric fan
1	Rotational and circular motion both.	1	Only circular motion
2	It changes position during circular motion.	2	It can not change its position.
3	It shows rectilinear motion.	3	It can not show rectilinear motion.
4	It can cover some distance in a given time interval.	4	It can not cover any distance.

4. Three students measured the length the length of a corridor and reported their measurements. The values of their measurements were different. What could be the reason for difference in their measurements? (Mention any three) [NCERT Exemplar]

The reasons for difference in their measurements may be as follows.

i. Their scales of measurements may not be standard.

ii. The length of the scale used may not be proper.

iii. Their observations may be wrong or there may have been some error in scale.

5. Boojho was ridding in his bicycle along a straight road. He classified the motions of various parts of the bicycle as (i) rectilinear motion. (ii) circular motion and (iii) both rectilinear as well as circular motion. Can you just one part of the bicycle for each type of motion? Support your answer with reasons. [NCERT Exemplar]

Type of motion	Part of the bicycle that exhibits the motion
i. Rectilinear motion	Handle of bicycle
ii. Circular motion	Paddles of bicycle
iii. Both rectilinear and circular motion	Wheels of bicycle

Reasons:

i. The handle of a bicycle will always move with rectilinear motion because it cannot do circular motion.

ii. The paddles of a bicycle will always move with circular motion around its chain fixing system.

iii. The wheels of bicycle will exhibit both rectilinear as well as circular motion because the wheel will move forward and its points around the rim will execute circular motion.

II. Long Answer Type Questions.

1. Why do we need standard unit for measurement?

We need standard unit for measurement to make our judgement more reliable and accurate. For proper dealing, measurement should be same for everybody. Thus there should be uniformity in measurement. For the sake of uniformity we need a common set of units of measurement, which are called standard units. Nowadays SI units are used in science and technology almost universally.

2. What type of motion do the following objects have?

a. the galloping of a horse.

b. the needle of a sewing machine.

c. the movements of a mosquito

d. the blades of an electric fan

e. the smoke from a lighted dhoopbatti

f. Wheels of moving car.

a. The galloping of a horse: Linear motion.

b. The needle of a sewing machine. Periodic motion.

c. Movement of a mosquito: Random motion.

d. Blade of an electric fan: Cirucular motion.

e. The smoke from a lighted dhoopbatti: Random motion.

f. Wheels of moving car: Linear motion and Rotational motion.

3. Give two examples for each of the following motions.

i. Linear motion **ii. Spinning motion** **iii. Oscillatory motion**

iv. Periodic motion **v. Vibrational motion** **vi. Circular motion**

vii. Random motion

i. Linear motion:

a. March-past of soldiers in a parade,

b. Moving of bicycle on a straight road.

ii. Spinning motion:

a. Rotating fan,

b. Wheel of sewing machine.

iii. Oscillatory motion:

a. Pendulum of clock

b. Motion of a child on a swing.

iv. Periodic motion:

a. Pendulum of clock

b. Motion of a swing, heartbeat.

v. Vibrational motion:

a. String of a guitar

b. Surface

vi. Circular motion:

a. Rotation of fan

b. Bicycle wheel

vii. Random motion:

a. Motion of football players

b. Movement of mosquito

III. Long Answer Type Questions.

1. Distinguish between the following.

a. Rectilinear motion and circular motion

b. Rotational motion and periodic motion

c. Rest and Motion

a.

S.No	Rectilinear motion	Circular motion
1	Movement along a straight line from one position to another.	Movement in a circular manner in relation to its own axis or around a fixed centre.
2.	For example, a bus moving on a straight highway.	For example, a spinning top.

b.

S.No	Rotational motion	Periodic motion
1	Movement in a circular path in relation to its own fixed axis.	Oscillatory movement along the same path again and again with same speed.
2.	For example, blades of a moving fan	For example, pendulum of a clock.

c.

S.No	Rest	Motion
1	The state in which an object does not change its position with time and with respect to its surroundings.	The state in which an object keeps on changing with time and with respect to its surroundings.
2.	For example, book placed on table.	For example, butterfly flying in garden.

I. High Order Thinking Skills (HOTS) Questions

1. A carpenter is fixing a curtain road on the wall by tightening a screw. How many different kinds of motions is the screw undergoing?

The screw undergoes two kinds of motions, i.e., circular and periodic motions.

2. Mira's mother is stitching a frock with the help of a sewing machine for her. Mira observes that the sewing machine remains at the same location while its wheel rotates and needle moves up and down.

i. What type of motion does the needle undergo?

ii. Wheel moves with a particular motion. Name it.

i. Periodic motion

ii. Circular motion

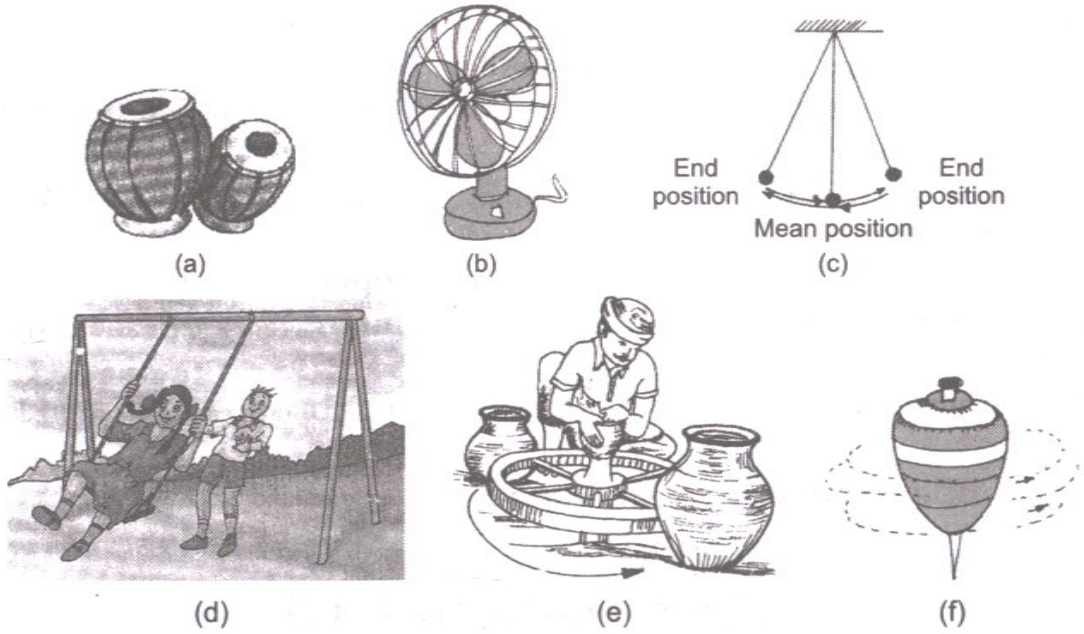
II. High Order Thinking Skills (HOTS) Questions

1. What kind of motions does a screw that is turned undergo?

A screw undergoes circular (rotation) and periodic motions.

Skill Based Questions

1. Observe the pictures given below. Write the type of motion these objects exhibit while in action / or being played.



a. Periodic motion, vibratory

b. Circular motion

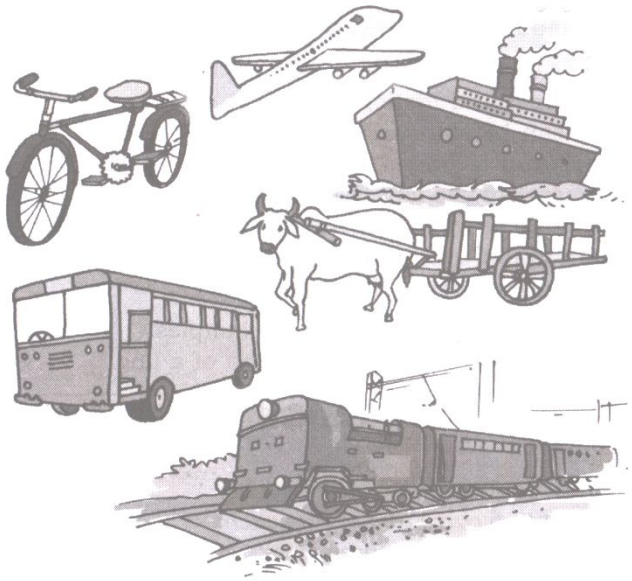
c. Oscillatory (periodic) motion

d. Periodic motion, oscillatory

e. Circular motion

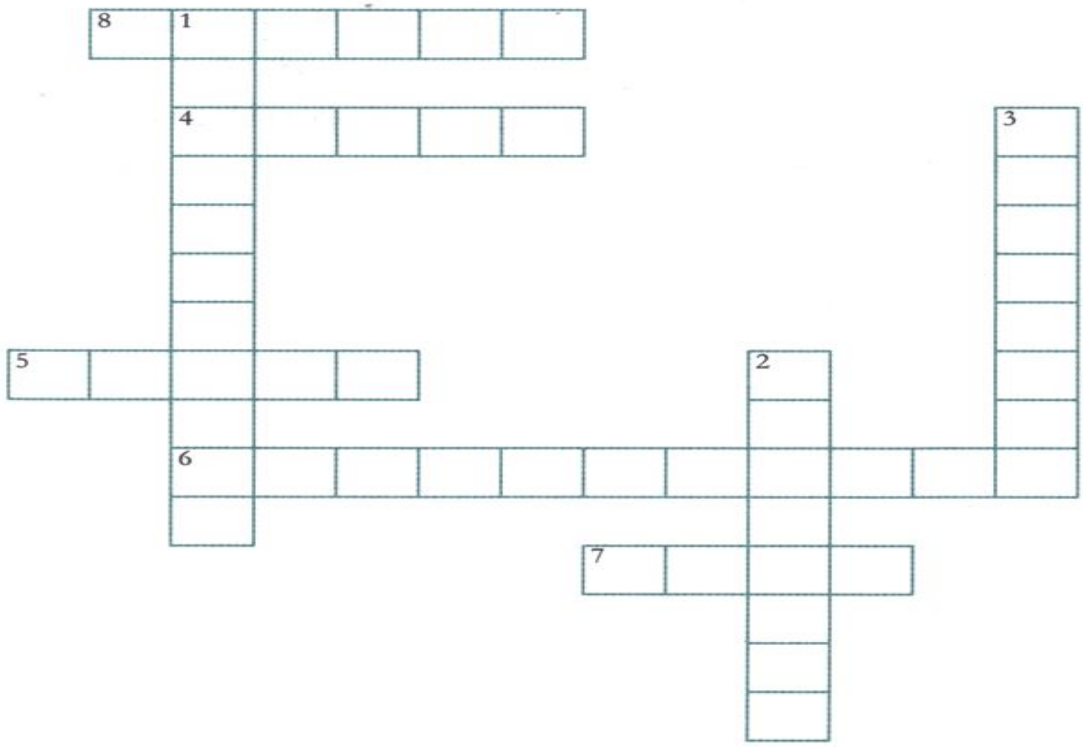
f. Spinning (circular) motion

2. Draw the pictures of different means of transportation.



Cross word puzzle

1. Solve the crossword puzzle with the help of the clues provided.



Across

4. The length between the tip of the elbow and the middle finger.

5. The standard unit of length.

6. Motion of a body along a straight line.

7. The state in which a given object does not change its position with time and with respect to its surroundings.

8. The state in which a given object keeps on changing its position with time and with respect to its surroundings.

Down

1. The to and fro motion of a swing

2. The length between the tip of the thumb and the little finger.

3. The motion of the earth around the Sun.

Across

4. cubit

5. metre

6. rectilinear

8. motion

Down

1. oscillatory

2. handspan

3. circular

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