# EXERCISE-01

Multiple choice questions

1. Which of the following is the best estimate of the height of a mountain?
   (1) 1 m   (2) 100 m
   (3) 1000 m   (4) 1 mm

2. Ten metres is equal to
   (1) 100 cm   (2) 100000 mm
   (3) 1000 cm   (4) 1000 dm

3. One-thousandth is expressed by which prefix?
   (1) Centi   (2) Milli
   (3) Kilo   (4) deci

4. The fixed quantity of measurement is called
   (1) Foot   (2) Unit
   (3) Pound   (4) Meter

5. While measuring length using a metre scale, the position of the eye
   (1) Should be vertically above the zero mark of the scale.
   (2) Should be vertically above the point where the measurement is to be taken.
   (3) Should be a little away from the point where the measurement is to be taken.
   (4) Soes not matter as long as the scale is accurate.

6. What does your P.T. teacher uses to measure the length of a playground?
   (1) Elastic tape   (2) Ruler
   (3) Tape scale   (4) Body parts

7. Which type of unit of length will be used to find thickness of a coin?
   (1) km   (2) metre
   (3) millimetre   (4) centimetre

8. Which device can be used to measure length of curved line.
   (1) Metre scale   (2) Elastic tape
   (3) Thread and ruler (4) None of these

9. One of the early measure of distance was
   (1) litre   (2) kilogram
   (3) hand span   (4) gram

10. Which of the following statements is not valid for both rotational and circular motion?
    (1) Rotation about an axis passing through the body.
    (2) Body moves and changes position with respect to time.
    (3) Body stays in the same place with respect to time.
    (4) To and fro motion of a body about its mean position.

11. Which of these is dissimilar or different from the others?
    (1) A car taking turn on a curved road
    (2) Motion of a swing
    (3) Motion of needle end of a sewing machine
    (4) Motion of an engine piston

12. An example of rotational motion is
    (1) the Moon revolving around the Earth.
    (2) the Earth rotating about its own axis.
    (3) the Earth revolving around the Sun.
    (4) the bob of a swinging pendulum.

13. In which of the following motion, there is no change in the direction of movement of the body?
(1) Rotational motion
(2) Rectilinear motion
(3) Periodic motion
(4) All of the above

14. Which part of the moving cycle undergoes rotational motion?
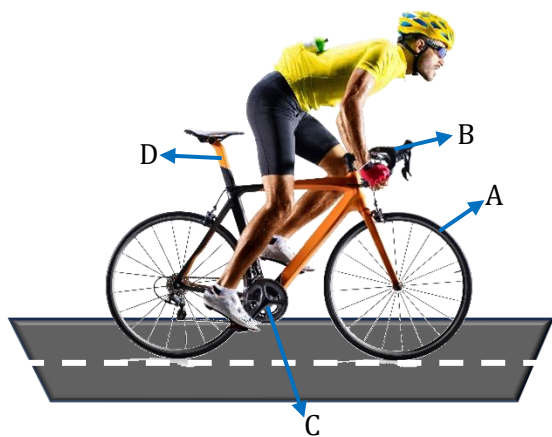
(1) Only A
(2) A and B
(3) A and C
(4) B and D

15. What kind of motion does a pendulum have?
(1) Periodic motion
(2) Rectilinear motion
(3) Rotational motion
(4) Non-periodic motion

16. Motion of which of the following is not periodic?
(1) Beating of a drum by a drummer
(2) Rotation of the Earth on its axis
(3) Revolution of Moon around the Earth
(4) Movement of a pendulum

17. The motion of the arms of soldiers taking part in march past is
(1) Circular motion
(2) Periodic motion
(3) Rotational motion
(4) Rectilinear motion

18. An example of rectilinear motion is
(1) Apple falling from a tree
(2) Motion of a car on road
(3) A spinning top
(4) Both (1) and (2)

19. Motion of the Earth is
(1) Circular motion
(2) Periodic motion
(3) Rotational motion
(4) All the three types

20. Motion of a screw while going into the wood is an example of
(1) Rectilinear and circular motion
(2) Rotation and revolution
(3) Rotation and spin motion
(4) Rotational and rectilinear motion

21. The motion exhibited by the ball rolling down an inclined plane is :
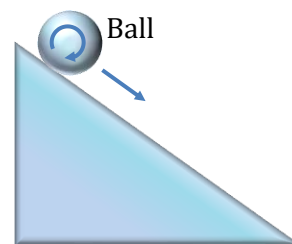
(1) Rotational and circular
(2) Rotational and periodic
(3) Linear and rotational
(4) Uniform motion

22. What kind of motion is executed by a pendulum of a wall clock?
(1) Rectilinear motion
(2) Periodic motion
(3) Circular motion
(4) (1) and (2) Both

23. Windmill shows _____ motion.
(1) Rotational
(2) Circular
(3) Linear
(4) None of these

[2]

24. Which of the following does not involve combination of motion?

(1) A car   (2) A bicycle

(3) Spinning top   (4) Rolling ball

25. Earliest mode of transport an water was

(1) Aeroplane

(2) Yacht

(3) Logs tied together

(4) Bullock cart

True or false

1. We can understand a measurement even without a unit.

2. The standard unit of length is centimetre in metric system.

3. A standard unit is always a fixed measure of a physical quantity.

4. The choice of a length-measuring device depends upon the type of measurement to be made.

5. Kilometre is used for measuring small distances.

6. We can trust on the measurements taken by use our senses and body parts.

7. A body is said to be in motion only if its position changes with time.

8. The motion of the seconds hand of a clock is rotational.

9. The motion of the ball in a game of football is linear.

10. The motion of the Moon around the Earth can be considered as a circular motion.

1. Match the column

Column-I		Column-II	
(1)	10^{-1}	(a)	Milli
(2)	10^{-2}	(b)	Deci
(3)	10^{-3}	(c)	Centi
(4)	10^{1}	(d)	Deca

2. Match the column

| Column-I		Column-II	
(1)	A motion that repeats itself in regular intervals of time.	(a)	Circular motion
(2)	A motion in which an object moves in a fixed direction	(b)	Rotational motion
(3)	An athlete moving on circular track.	(c)	Rectilinear motion
(4)	Motion of ceiling fan.	(d)	Periodic motion

3. Match the column

Column-I		Column-II	
(1)	Height of mountain	(a)	Millimetre
(2)	Distance between two cities	(b)	Metre
(3)	Thickness of biscuit	(c)	Kilometre
(4)	Size of rice grain	(d)	Centimetre

Fill in the blanks

1. The determination of the size or magnitude of something is called _____.

2. Five kilometre is _____ m.

3. An object is said to be in motion if its _____ changes with time.

4. In rectilinear motion objects move along _____ path.

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

6. An object in _____ motion moves about an axis.

7. Motion of wheel of a bicycle is _____.

8. Any type of motion that repeat itself after equal intervals of time is called _____.

9. To measure the diameter of a tree, you can use _____.

10. Rotation of the Earth about its axis is a _____ motion but it is _____ an oscillatory motion.

Crossword puzzle
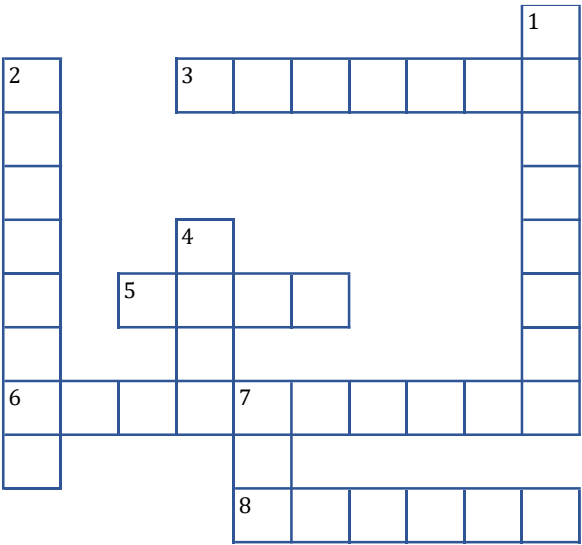
Across

3. _____ System consist of measurement of length consists of units yard, feet, inch, mile etc.

5. An object is said to be at _____ if its position does not change with time.

6. A spinning top exhibit _____ motion

8. Measurement consists of _____ and unit.

Down

1. _____ quantity is the building blocks of physics.

2. _____ units are Internationally accepted.

4. 10^6 = _____

7. One centimetre is equal to _____ millimetre.

ANSWER KEY

Multiple choice questions

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	3	3	2	2	2	3	3	3	3	4	1	2	2	3	2
Que.	16	17	18	19	20	21	22	23	24	25					
Ans.	1	2	4	4	4	3	2	1	3	3					

True or false

1. False   **2.** False   **3.** True   **4.** True   **5.** False

6. False   **7.** True   **8.** True   **9.** False   **10.** True
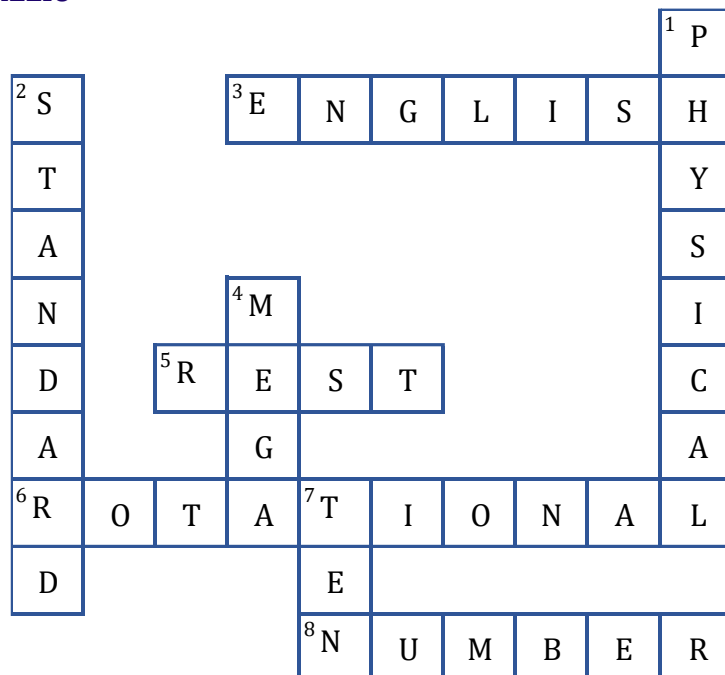
Match the column

1. (1) → (b), (2) → (c), (3) → (a), (4) → (d)

2. (1) → (d), (2) → (c), (3) → (a), (4) → (b)

3. (1) → (b), (2) → (c), (3) → (a), (4) → (d)

Fill in the blanks

1. Measurement   **2.** 5000   **3.** Position   **4.** Straight

5. Oscillatory motion   **6.** Rotational   **7.** Rotational motion

8. Periodic motion   **9.** Measuring tape   **10.** Periodic; not

Crossword puzzle

1. PHYSICS
2. STANDARDA
3. ENGLISH
4. MEG
5. REST
6. ROTA TIONAL
7. TE
8. NUMBER

EXERCISE-02

Very short answers type questions

1. Define measurement.

2. Define units.

3. What is the SI unit of length?

4. Give three example where length can be measured in metre.

5. Which type of metre scale is used by the tailor to measure length?

6. Name the measuring device you can use to measure the girth of a tree.

7. Arrange following in increasing order :
   1 km, 5 cm, 10 mm, 4 m

8. Give two examples of periodic motion.

9. What kind of movement does the Earth have about its axis?

10. Define circular motion of an object with suitable example.

11. Define rotatory motion with a suitable example?

12. Define the term rectilinear motion.

13. What do you understand by term periodic motion?

14. Classify the following as circular, periodic or rectilinear motion :
   Swing, Speed boat racing, 100 m race, Rocking chair, The Moon revolving around the Earth.

15. Give one example of modes of transport used on land, water and air.

Short answer type questions

1. What is the need for standard units of measurement?

2. 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?

3. Why a cubit can't be used as standard unit of length?

4. How can one measure the length of a curved line?

5. What precautions should be taken while measuring length with a ruler?

6. How did people measure length in early times?

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

8. Can an object have more than one type of motion? If yes, give two examples.

9. What is periodic motion? Give any two examples.

10. What is the difference between motion of a falling stone and motion of a stone tied to a thread and whirled with hand?

Long answer type questions

1. Explain, how will you measure the length of a book using a perfect scale. What should you do if the scale is broken at its zero end? Make figure and give an example.

2. Explain in brief the types of motion and give one example of each.

Numerical Problems

1. Arrange the following lengths in their increasing magnitude :
    1 metre, 1 centimetre, 1 kilometre, 1 millimetre.

2. Convert :
    (a) 250 m to cm   (b) 120 m to km
    (c) 521 mm to cm   (d) 178 km to m
    (e) 812 cm to m.

3. Give the metric prefix for each value :
    (a) 1000   (b) 0.01

4. The height of a person is 2.25 m. Express it into cm and mm.

5. The distance between Radha's home and her friend's home is 4862 m. Express this distance into km.

ANSWER KEY

Numerical problems

1. 1 mm, 1 cm, 1 m, 1 km

2. (a) 25000 cm   (b) 0.12 km   (c) 52.1 cm   (d) 178000 m   (e) 8.12 m

3. (a) Kilo   (b) Centi

4. 225 cm ; 2250 mm

5. 4.862 km

EXERCISE-01 SOLUTIONS

Multiple choice questions

1. **Option (3)**

    Metre and mm are used to measure small lengths and 1000 m = 1km is used to measure long distances.

2. **Option (3)**

    As we know that 1 m = 100 cm,

    10 m = 10 × 100 cm = 1000 cm

3. **Option (2)**

    This is $\dfrac{1}{1000}$ that is expressed by prefix milli.

4. **Option (2)**

    Fixed quantity of measurement is called a unit.

5. **Option (2)**

    While measuring length using a meter scale, the position of the eye should be vertically above the point where the measurement is to be taken.

6. **Option (3)**

    Tape scale is used to measure the long lengths like of playground, park, racing track etc.

7. **Option (3)**

    Thickness of coins are measured in mm because thickness of coins are under cm.

8. **Option (3)**

    Thread and ruler can be used to measure length of curved line.

9. **Option (3)**

    Body parts like the hand span, the cubit and the foot were used by people to measure the length.

10. **Option (4)**

    Rotational and circular motion are not to and fro motion.

11. **Option (1)**

    Option 2, 3, 4 are oscillatory motion and option 1 is a part of circular motion.

12. **Option (2)**

    Rotational motion is a motion in which body moves about a fixed axis passing through the body.

13. **Option (2)**

    Rectilinear motion takes place on straight path so there is no change in the direction of movement of body.

14. **Option (3)**

    Only A & C are moving about their axis so this type of motion is rotational motion.

15. **Option (2)**

    Pendulum repeats its path over fixed interval of time i.e. to and fro motion so it is a periodic motion.

16. **Option (1)**

    In option 2, 3, 4 body repeats its path over fixed interval of time but in option 1 the beating of drum is not repeated in fixed interval of time.

17. **Option (2)**

    The motion of the arms of soldiers in a march past is periodic motion.

18. **Option (4)**

    Example of rectilinear motion :

    (i) Apple falling from a tree

    (ii) Motion of a car on road.

19. **Option (4)**

Earth moves on a circular path around the Sun, Earth rotates on its axis in 24 hours in a day and around the Sun in 365 days every year, so Earth has all these three types of motion.

20. **Option (4)**

Screw going into the wood shows rotatory as well as rectilinear motion.

21. **Option (3)**

The ball rolling down straight inclined plane rotating on its axis is exhibiting linear and rotational motion.

22. **Option (2)**

Motion of a pendulum of a wall clock is periodic as it repeats itself after a fixed interval of time.

23. **Option (1)**

Motion of wind mill is rotational as its fan rotates about a fixed axis.

24. **Option (3)**

Motion of a spinning top rotational only.

25. **Option (3)**

Earliest mode of Transport on water was done by making a floating platform by tying logs together.

True or false

1. **False**

Without a unit we would not be able to understand that which physical quantity is being measured.

2. **False**

In metric system the standard unit of length is metre (m).

3. **True**

Standard units are those quantities in terms of which other quantities can be expressed so, they are always fixed in nature.

4. **True**

If we want to measure the length of a line drawn on a paper, we can use general scale of 15 cm but if we want to measure 1 m or more than 1 m, like a piece of cloth we use meter stick.

5. **False**

Kilometre is used to measure long distances, for example the distance between Delhi and Kota is measured in kilometres.

6. **False**

We cannot trust on measurements taken by using our senses and body parts because it does not give accurate and precise measurement as it varies from person to person.

7. **True**

A body is said to be in motion only if its position changes with time.

8. **True**

The second hand of a clock moves about a fixed axis so it exhibits rotational motion.

9. **False**

When a football player kicks a football it can follow straight path and it can follow curved path in air.

10. **True**

Moon moves in a circular path around the Earth.

EXERCISE-02 SOLUTIONS

Very short answer type questions

1. A measurement is a comparison of the unknown quantity with some standard quantity of the same kind.

2. A unit is a standard quantity in terms of which other quantities can be measured.

3. The SI unit of length is metre(m).

4. Table, cricket bat, room size, window frames etc can be measured in meters.

5. Inch-tape or measuring tape is used by the tailor to measure the length.

6. Measuring tape can be used to measure the girth of a tree.

7. 100 mm < 5 cm < 4 m < 1 km.

8. Two example of periodic motion are :
   (i) Earth rotates around the Sun.
   (ii) Motion of hands of a clock.

9. The earth have rotational motion about its axis.

10. Circular motion :- when an object moves along a circular path, this type of curvilinear motion is called circular motion.
    Example : motion of an athlete along a circular track.

11. Motion of a body turning about an axis is called rotational motion. In other words, 'a motion in which an object spins about a fixed axis is called rotational motion'. It is a motion in which the orientation of an object continuously changes throughout the motion.
    Example : motion of a spinning top.

12. If an object moves in a straight line, its motion is called rectilinear motion or one-dimensional motion.

13. A motion that occurs when an object moves in a repeated pattern (a cycle) over equal periods of time is called a periodic motion.

14. Periodic motion → Rocking chair, swing
    Rectilinear motion → 100 m race.
    Circular motion → Moon revolving around the earth.

15. Modes of transportation used on land is truck, on water is ship and on air is aeroplane.

Short answer type questions

1. Need for standard units of measurement:
   (i) We know that, a measurement consists of two parts, a number and a unit. For example, if you say your height is 4, it could mean 4 inches, 4 feet or 4 yards, 4 miles etc. Thus we require a standard unit to make a sense to measurement. In order words, units are necessary to sensibly describe a physical quantity.
   (ii) Its also important that the unit must be accurate and it must not change with respect to person or time.
   (iii) It is also important that standard units are internationally accepted.

2. Elastic tape is stretchable and if every time we take the measurement it will be different from the previous one, so we cannot get the exact measurement.

3. A cubit cannot be used as a standard unit of length as it is not fixed in length and varies from person to person.

4. You can measure the length of a curved line or surface using a measuring tape. You have observed this while you visit a tailor shop to get your clothes stitched. The length of a curved line or surface is measured by using a measuring tape. In tailor shop, the tailor measures the periphery or circumference of your neck or waist using the measuring tape. But it can also be measured by using string or thread and a ruler to measure the length of a curved line or surface indirectly.

5. Care to be taken while measuring a length with a ruler
   (i) Place the scale in contact with the object along its length.
   (ii) In some scales, zero mark is broken. We may not be able to see the zero mark clearly. In such cases, we should avoid taking measurements from the zero mark of the scale. We can use any other full mark of the scale, say,1.0 cm. Then we must subtract the reading of this mark from the reading at the other end.
   (iii) Correct position of the eye is also important for taking measurement. Our eye must be exactly in front of the point where the measurement is to be taken.

6. In early times people actually used different parts of their body to measure length as cubit, fathom, foot, pace etc. But these measurements depend on the size of the person, they may vary from person to person.

7. **Similarity :** motion of a bicycle and a ceiling fan both exhibits rotatory motion about a fixed point.
   Difference : motion of fan is only rotatory but the motion of bicycle is rotatory as well as linear.

8. Yes, an object can has more than one type of motion. For example : A ball rolling down on an inclined plane has rotatory as well as linear motion, the pendulum has both oscillatory as well as periodic motion.

9. A motion that occurs when an object moves in a repeated pattern (or cycle) over equal periods of time is called periodic motion. e.g. motion of a pendulum, rotational motion of the Earth.

10. Motion of a falling stone is rectilinear while motion of a stone tied to a thread and whirled with hand is circular.

Long answer type questions

1. When the scale is perfect, place the scale along the length of the book. One end of the book is kept on the 0-mark (zero mark) of the scale. The reading of the scale at the other end of the book is the length of the book. If the scale is broken at zero mark then we should avoid taking measurement from zero mark of the scale. We can use any other full mark of the scale, say 1.0 cm. Then you must subtract the reading of this mark from the reading at the other end. For example, the reading at the one end is 1.0 cm and at the other end it is 4.1 cm. Therefore, the length of the object is (4.1-1) cm =3.1 cm.
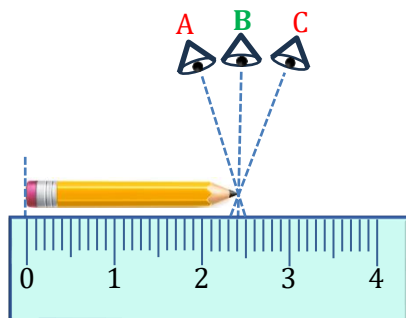
* Hear B is the correct position to take the reading.

2.   Types of motion :

(i) **Rectilinear motion :** If an object moves in a straight line, its motion is called rectilinear motion or one dimensional motion. For example, motion of a car along a straight path.

(ii) **Circular motion :** When an object moves along a circular path this type of motion is called circular motion. For example, motion of an athlete along a circular track is a circular motion.

(iii) **Rotational motion :** A motion in which an object spins about a fixed axis is called rotational motion. For example, the motion of a fan or motor.

(iv) **Periodic motion :** A motion that occurs when an object moves in a repeated pattern over equal periods of time is called a periodic motion. For example, revolution of Earth around the Sun.

(v) **Oscillatory motion :** A motion that occurs when an object moves to and fro about its mean position over equal periods of time is called an oscillatory motion or vibratory motion. For example, motion of simple pendulum.

Numerical problems

1.   1 millimetre, 1 centimetre, 1 meter, 1 kilometre.

2.   (a) As we know, 1 m = 100 cm,

So, 250 m = 250×100 cm = 25000 cm.

(b) As we know, 1 km = 1000 m or

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

So, 120 m = 120× $\dfrac{1}{1000}$ km = 0.12 km.

(c) As we know, 1 cm = 10 mm or 1 mm

$= \dfrac{1}{10} \text{ cm}$,

So, 521 mm = 521 × $\dfrac{1}{10}$ cm = 52.1 cm.

(d) As we know, 1 km = 1000 m,

So, 178 km = 178 × 1000 m = 178000 m.

(e) As we know, 1 m = 100 cm

$1 \text{ cm} = \dfrac{1}{1000} \text{ m}$,

812 cm = 812 × $\dfrac{1}{1000}$ m = 8.12 m.

3.   Metric prefixes :

(a) 1000 = kilo

(b) 0.01 = $\dfrac{1}{100}$ = centi

4.   As we know, 1 m = 100 cm

so 2.25 m = 2.25 × 100 cm = 225 cm;

We also know that 1 cm = 10 mm

So, 225 cm = 225 × 10 mm = 2250 mm

5.   As we know, 1 km = 1000 m

or 1 m = $\dfrac{1}{1000}$ km

So, 4862 m = 4862 × $\dfrac{1}{1000}$ km = 4.862 km