



Science

6th Standard

Based on the Revised Textbook for 2019

Term - I

Salient Features :

- Term-wise Guide as per the Revised Textbook for the year 2019, for Term - I
- Complete Solutions to Textbook Exercises.
- Exhaustive Additional Questions in all Units.
- Unit-wise Unit Tests with Answers.
- First Term Summative Assessment questions are marked with the symbol ⊗ at the appropriate places in each unit.
- First Term Summative Assessment 2018-19, Question paper with Answer.



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NOTE FROM PUBLISHER

It gives me great pride and pleasure in bringing to you **Sura's Science Guide** for **First Term** for **6th Standard**. It is prepared as per the Revised Textbook for Term-I for the year 2019.

This guide encompasses all the requirements of the students to comprehend the text and the evaluation of the textbook.

- ◆ Additional questions have been provided exhaustively for clear understanding of the units under study.
- ◆ Chapter-wise Unit Tests with Answers.

In order to learn effectively, I advise students to learn the subject section-wise and practice the exercises given. It will be a teaching companion to teachers and a learning companion to students.

Though these salient features are available in this Guide, I cannot negate the indispensable role of the teachers in assisting the student to understand the subject thoroughly.

I sincerely believe this guide satisfies the needs of the students and bolsters the teaching methodologies of the teachers.

I pray the almighty to bless the students for consummate success in their examinations.

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CONTENTS

Unit	Unit Name	Page
1.	Measurements	1 - 12
2.	Force and Motion	13 - 28
3.	Matter Around Us	29 - 46
4.	The Living World of Plants	47 - 58
5.	Living World of Animals	59 - 68
6.	Health and Hygiene	69 - 82
7.	Computer-An Introduction	83 - 86
	First Term Summative Assessment 2018 -19. Question paper with Answer.	87 - 90



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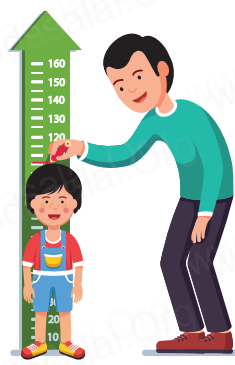

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01

MEASUREMENTS

LEARNING OBJECTIVES

- ❑ To understand the need for measurement in our life.
- ❑ To define length, mass, time and volume.
- ❑ To evaluate the values of some physical quantities in terms of their units and sub units.
- ❑ To identify zero error and parallax error.
- ❑ To measure the volume of solids and liquids.
- ❑ To construct their own measuring tools (models)



Evaluation

I. Choose the correct answer.

1. The girth of a tree can be measured by

(a) metre scale	(b) metre rod
(c) plastic ruler	(d) measuring tape

 [Ans : (d) measuring tape]
2. The conversion of 7 m into cm gives

(a) 70 cm	(b) 7 cm
(c) 700 cm	(d) 7000 cm

 [Ans : (c) 700 cm]
3. Quantity that can be measured is called

(a) Physical quantity	(b) Measurement
(c) unit	(d) motion

 [Ans : (a) Physical quantity]
4. Choose the correct one

(a) $\text{km} > \text{mm} > \text{cm} > \text{m}$	(b) $\text{km} > \text{mm} > \text{m} > \text{cm}$
(c) $\text{km} > \text{m} > \text{cm} > \text{mm}$	(d) $\text{km} > \text{cm} > \text{m} > \text{mm}$

 [Ans : (c) $\text{km} > \text{m} > \text{cm} > \text{mm}$]
5. While measuring length of an object using a ruler, the position of your eye should be

(a) Left side of the point.	(b) Vertically above the point where the measurement is to be taken.
(c) Right side of the point	(d) Any where according to one's convenience.

 [Ans : (b) Vertically above the point where the measurement is to be taken.]

[1]

II. True or False.

1. We can say that mass of an object is 126 kg. [Ans : **True**]
2. Length of one's chest can be measured by using metre scale. [Ans : **False**]
3. Ten millimetres makes one centimetre. [Ans : **True**]
4. A hand span is a reliable measure of length. [Ans : **False**]
5. The SI system of units is accepted everywhere in the world. [Ans : **True**]

III. Fill up the blanks.

1. SI Unit of length is symbolically represented as _____. [Ans : **m**]
2. 500 gm = _____ kilogram [Ans : **0.5**]
3. Distance between Delhi and Chennai can be measured in _____. [Ans : **Kilometre**]
4. 1 m = _____ cm. [Ans : **100**]
5. 5 km = _____ m. [Ans : **5000**]

IV. Analogy:

1. **Sugar : Beam balance; Lime juice?**

Ans : Measuring Jar.

2. **Height of a person : cm; length of your sharpened pencil lead?**

Ans : mm (milli metre)

3. **Milk : volume; vegetables?**

Ans : mass

V. Match the following :

Column A	Column B
1. Length of the fore arm	Metre
2. SI unit of length	Second
3. Nano	10^3
4. SI Unit of time	10^{-9}
5. Kilo	Cubit

Ans :

Column A	Column B
1. Length of the fore arm	Cubit
2. SI unit of length	Metre
3. Nano	10^{-9}
4. SI Unit of time	Second
5. Kilo	10^3

VI. Complete the given table.

Volume	_____
_____	Kg
Length of your little finger	_____
_____	Km

Ans :

Volume	m³
Mass	Kg
Length of your little finger	cm
Distance between two cities	Km

VII. Arrange in increasing order of unit.

1 Metre, 1 centimetre, 1 kilometre, and 1 millimetre.

Ans : 1 millimetre < 1 centimetre < 1 Metre < 1 kilometre.**VIII. Find the answer for the following questions within the grid.**

A		P		L ⁷								R		K	
C		O		E								O		S	
M		K		N								R		I	
P		R ¹		G								R		T ⁹	
R	H	E	S	T	E	D	L	L ¹⁰	I	T	R	E ³	D	A	
L		T		H							D		H	P	
O		E		O					N			K		E	
A ⁶		M ⁵	A	S	S				O			R		V	
V		I		E				C				T		O	
E		L		K		E						S		S	
R		L		I		S ²					T ⁴	K		H	
A		I		T					I			V		P	
G		M		X				M				N		U	
E		Z		D		E		S	K	P	G	I	W	M	F
Z	T	D	K	H				O ⁸	D	O	M	E	T	E	R

- 10^{-3} is one _____. [Ans : **Millimetre**]
- SI Unit of time _____. [Ans : **second**]
- Cross view of reading for a measurement leads to _____. [Ans : **error**]
- _____ is the one what a clock reads. [Ans : **Time**]
- _____ is the amount of substance present in an object [Ans : **Mass**]
- _____ can be taken to get the final reading of the recordings of different of students for a single measurement. [Ans : **Average**]
- _____ is a fundamental quantity. [Ans : **Length**]
- _____ shows the distance covered by an automobile. [Ans : **Odometer**]
- A tailor use _____ to take measurements to stitch a cloth. [Ans : **Tape**]
- Liquids are measured with this physical quantity. [Ans : **Litre**]

IX. Answer in a word or two.

1. What is the full form of SI system? ⊗

Ans : International System of Units.

2. Name any one instrument used for measuring mass.

Ans : Beam balance.

3. Find the odd one out : Kilogram, Millimetre, Centimetre, Nanometre ⊗

Ans : Kilogram.

4. What is the SI Unit of mass?

Ans : Kilogram.

5. What are the two parts present in a measurement?

Ans : A number and the units.

X. Answer in a sentence or two.

1. Define measurement.

Ans : The comparison of an unknown quantity with some known quantity is known as measurement.

2. Define mass. ⊗

Ans : Mass is the measure of the amount of matter in an object.

3. The distance between two places is 43.65 km. Convert it into metre and cm. ⊗

Ans :

(a) Convert km into metre

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

$$\therefore 43.65 \text{ km} = 43.65 \times 1000 = 43650.00 = 43650 \\ = 43650 \text{ m.}$$

(b) Convert km into cm.

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

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

$$1 \text{ km} = 1000 \times 100 \text{ cm}$$

$$1 \text{ km} = 100000 \text{ cm}$$

$$\therefore 43.65 \text{ km} = 43.65 \times 100000 = 4365000.00 \\ = 4365000 \text{ cm.}$$

4. What are the rules to be followed to make accurate measurement with scale?

Ans : (i) Take care to write the correct submultiple.

(ii) Always keep the object in parallel to the scale.

(iii) Start the measurement from '0' of the scale.

XI. Solve the following.

1. The distance between your school and your house is 2250 m. Express this distance in kilometre.

Ans : Distance between school and house is 2250 m.

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

$$\therefore 2250 \text{ m} = 2250 \div 1000 = 2.25 \text{ km.}$$

2. While measuring the length of a sharpened pencil, reading of the scale at one end is 2.0 cm and at the other end is 12.1 cm. What is the length of the pencil?

Ans : Sharpened pencil Reading at one end = 2.0 cm.
 Sharpened pencil Reading at the other end = 12.1 cm.
 Length of the pencil = Difference between two ends.
 = 12.1 cm. – 2.0 cm.
 = 10.1 cm.

XII. Write in detail.

1. Explain two methods those you can use to measure the length of a curved line.

Ans : Measuring the length of a curved line, by two methods.

First method - using a string.

- Draw a curved line AB on the paper.
- Place a string along the curved line.
- Make sure that the string covers every bit of the curved line.
- Mark the points where the curved line begins and ends on the string.
- Now stretch the string along the length of a meter scale.
- Measure the distance between two markings of the string.
- This will give the length of a curved line.

Second method - using a divider.

- Draw a curved line AB on a paper.
- Separate the legs of the divider by 0.5 cm or 1 cm using a ruler.
- Place it on the curved line starting from one end. Mark the position of the other end.
- Move it along the line again and again cutting the line into number of segments of equal lengths.
- The remaining parts of the line can be measured using a scale.
- Count the number of segments.
- Length of the line = (No. of segments × length of each segment) + length of the left over part.

2. Fill in the following chart.

Property	Definition	Basic Unit	Instrument used for measuring
Length			
Mass			
Volume			
Time			

Ans :

Property	Definition	Basic Unit	Instrument used for measuring
Length	The distance between one end and the other desired end.	Metre	Meter scale, Measuring tape.
Mass	Mass is the measure of the amount of matter in an object.	Kilogram	Beam balance
Volume	Volume is the Space occupied by an object.	Solid - Metre Liquid - Litre	Measuring Scale Graduated cylinder
Time	It is period between two events.	Second	Clock

Intext Activities

→ ACTIVITY - 1






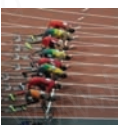
Form a group of 5 members. Select one person and others measure her/his height individually using your hand span and cubit. Compare your answers with others. Do you find any differences? Why? Now you all stand in front of a wall and mark your height on the wall. Measure your height with a scale. What differences do you infer?



Ans : Activity to be done by the students themselves

→ ACTIVITY :

In the given activity, measure the quantities using suitable measuring units and express them with suitable multiple and submultiples.

Picture	Activity	Measuring Unit m/kg/s	Multiple / Submultiple
	Length of tip of pencil.	metre	millimetre (Sub multiple)
	Length of the pen	metre	centimetre
	Distance between two cities	kilo metre	metre
	Mass of dry fruits in table	kilo gram	milligram (Sub multiple)
	Mass of ornaments	kilo gram	milligram (Sub multiple)
	Time taken to finish 100 m race	Seconds	Seconds (Sub multiple)

→ **ACTIVITY - 2**

Aim: To find the length of a curved line using a string.

Materials needed: A meter scale, a measuring tape, a string and a sketch pen.

Method:

- ❖ Draw a curved line AB on a piece of paper.
- ❖ Place a string along the curved line. Make sure that the string covers every bit of the curved line.
- ❖ Mark the points where the curved line begins and ends on the string.
- ❖ Now, stretch the string along the length of a meter scale and measure the distance between the two markings of the string. Note it.
- ❖ This will give you the length of a curved line.



Find the length of a banana.

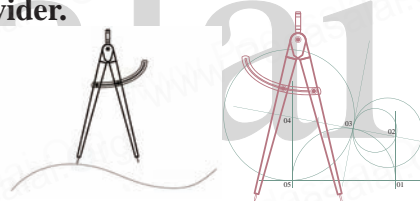


- Ans :** (i) Place a string along the curved surface of the banana.
 (ii) Mark the initial point and the final point on the string.
 (iii) The difference between the two points is the length of the banana.

→ **ACTIVITY - 3**

Measuring the length of a curved line using a divider.

- (i) Draw a curved line AB on a piece of paper.
- (ii) Separate the legs of the divider by 0.5 cm or 1 cm using a ruler.
- (iii) Place it on the curved line starting from one end. Mark the position of the other end. Move it along the line again and again cutting the line into number of segments of equal lengths. The remaining parts of the line can be measured using a scale. Count the number of segments.
- (iv) Therefore, the length of the line = (number of segments × length of each segment) + length of the left over part.

→ **ACTIVITY - 4**

Construct your own beam balance using two scrapped coconut shells, strings or twines thick cardboard as frame and a little sharpened pencil as index needle.

What can you achieve?

1. Find which object is heavier.
2. Find approximate weight of lighter things (leaves, piece of papers, etc)



Ans :

Activity to be done by the students themselves



→ **ACTIVITY - 5**

Ask four or five of your friends to run a race from one end of the school to another. Mark the starting point and the ending point. Using your pulse (or counting by saying 'one little second' etc) count the time taken for each of them to complete the race. Check who is faster?

Ans : Activity to be done by the students themselves

→ **Numerical Problems**

Look at a meter scale carefully and answer the following:

- How many mm are there in a cm?

Ans : There are 10 mm in a 'cm'.

- How many cm are there in a m?

Ans : There are 100 cm in a 'm'.

Complete the following :

- 7875 cm = 78 m 75 cm (100 cm = 1 m)
- 1195 m = 1 km 195 m (1000 m = 1 km)
- 15 cm 10 mm = 160 mm. (10 mm = 1 cm)
- 45 km 33 m = 45033 m. (1000 m = 1 km)

Additional Questions

I. Choose the correct answer:

- In which SI unit, you can measure your height?

(a) Kilogram
(b) Litre

(c) Metre
(d) Second

[Ans : (c) Metre]
- The distance between one end and the other end is called _____.

(a) mass
(b) length

(c) time
(d) None

[Ans : (b) length]
- _____ is used to measure the accurate time of the activity.

(a) Clock
(b) Watch

(c) Stop clock
(d) Sundial

[Ans : (c) Stop clock]
- Five kilometre is equal to _____.

(a) 500 cm
(b) 500 m

(c) 5000 m
(d) 5000 cm

[Ans : (c) 5000 m]
- S.I unit for Volume is _____.

(a) m²
(b) m

(c) m³
(d) none

[Ans : (c) m³]
- Twenty decimetre is equal to _____.

(a) 2 km
(b) 20 cm

(c) 2 metre
(d) 200 mm

[Ans : (c) 2 metre]
- _____ is used to measure mass.

(a) Stop clock
(b) Beam balance

(c) Sundial
(d) Graduated cylinder

[Ans : (b) Beam balance]

8. The metric system of units was created by the _____ in 1790.

- (a) Greek (b) Australians
(c) Russians (d) French

[Ans : (d) French]

9. The moon's gravitational pull is one _____ of the earth's pull.

- (a) seventh (b) sixth
(c) fifth (d) fourth

[Ans : (b) sixth]

II. Find whether the following sentences are true or false. If false Correct the statement.

1. Kerosene is measured with the help of graduated cylinder.

Ans : True.

2. Length is a fundamental quantity.

Ans : True.

3. On moon, the gravitational force is greater than earth.

Ans : False. On moon the gravitational force is **lesser** than earth.

4. An electronic balance is a device used to find accurate mass.

Ans : True.

5. Speedometer is a device used for indicating distance travelled by an automobile.

Ans : False. **Odometer** is a device used for indicating distance travelled by an automobile.

6. A ruler or scale used now a days to measure length was invented by William Bedwell.

Ans : True.

7. Length, mass and time are some of the derived quantities.

Ans : False. Length, mass, and time are some of the **fundamental** quantities.

8. Leaves and piece of paper are heavier things.

Ans : False. Leaves and piece of paper are **lighter** things.

9. National physical laboratory is located in Delhi.

Ans : True.

III. Analogy.

1. Potatoes : Kilogram; Water?

Ans : Litre.

2. Stop clock : accurate time; _____ : accurate weight

Ans : Electronic balance.

3. Mass : Balance; Length?

Ans : measuring tape.

4. Amount of matter : mass; Gravitational Pull?

Ans : Weight.

IV. Answer the following questions in one or two words.

1. What are the materials needed to find the length of a banana?

Ans : A meter scale, a string or thread, sketch pen.

2. What formula is used to measure area of your class room?

Ans : My class room area = Length × Breadth

3. Give an example of a device used to find the accurate measurement of weight.

Ans : Electronic balance.

4. In earlier days, which instruments are used to measure time?

Ans : Sand clock and Sun dial.

5. What are the clocks used to measure a smaller duration of time?

Ans : Electronic clock, Stop watch.

6. Who invented a ruler or scale?

Ans : William Bedwell.

7. Which alloy is used to make the standard metre rod?

Ans : An alloy of Platinum and iridium.

V. Match the following.

Prefix	Symbol
a. Centi	i. k
b. Nano	ii. c
c. milli	iii. n
d. kilo	iv. m

[Ans : a-ii, b-iii, c-iv, d-i]

VI. Answer the following in one or two sentences :

1. What is length?

Ans : The distance between one end and the other desired end is called as length.

2. Give some examples of larger length measures.

Ans : (i) Height of the building,
(ii) Length of a banner,
(iii) Height of lamp post.

3. List the SI units of length, mass and time.

Ans : (i) Length is measured by metre (m)
(ii) Mass is measured by kilogram (kg)
(iii) Time is measured by second (s).

4. What is meant by parallax?

Ans : Parallax is a displacement or difference in the apparent position of an object viewed along two different lines of sight.

5. Differentiate of Mass and Weight.

Ans :

Mass	Weight
Amount of matter in an object	Gravitational pull experienced by the mass
Measuring instrument is Beam balance	Measuring instrument is electronic balance

6. Where are the electronic balances used?

Ans : Electronic balances are used in grocery shops and jeweleries.

7. Hold a sheet paper in one hand and a book in other hand. Which hand feels heaviness? Why?

Ans : The hand, which holds the book, will feel heaviness. The mass of the book is more than that of a single sheet of paper. Therefore, the pull on the book is more than that of the paper. Hence our hand has to give more force to hold a book than a paper.



UNIT TEST

Time : 60 min.

Marks : 25

I. Choose the correct answer.

(4 × 1 = 4)

- The girth of a tree can be measured by _____.
 (a) metre scale (b) metre rod
 (c) plastic ruler (d) measuring tape
- The distance between one end and the other end is called _____.
 (a) mass (b) length
 (c) time (d) 200 mm
- Twenty decimetre is equal to _____.
 (a) 2 km (b) 20 cm
 (c) 2 metre (d) None
- _____ is used to measure mass.
 (a) Stop clock (b) Beam balance
 (c) Sundial (d) Graduated cylinder

II. Fill in the blanks.

(3 × 1 = 3)

- SI Unit of length is symbolically represented as _____.
- 1 m = _____ cm.
- _____ shows the distance covered by an automobile.

III. Find whether the following sentences are true or false. If false Correct the statement.

(3 × 1 = 3)

- We can say that mass of an object is 126 kg.
- The SI system of units is accepted everywhere in the world.
- On moon, the gravitational force is greater than earth.

IV. Answer any five only.

(5 × 2 = 10)

11. Match the following.

1.	Length of the fore arm	(i)	metre
2.	SI unit of length	(ii)	second
3.	Nano	(iii)	cubit
4.	SI unit of time	(iv)	10^{-9}

12. What is meant by parallax?
13. What are the clocks used to measure a smaller duration of time?
14. Define mass.
15. Where are the electronic balances used?
16. The distance between your school and your house is 2250 m. Express this distance in kilometre.
17. What is the full form of SI system?
- V. Write in detail.** (1 × 5 = 5)
18. Explain anyone method to measure the length of a curved line.

(OR)

Fill in the following chart.

Property	Definition	Basic Unit	Instrument used for measuring
Length			
Mass			
Volume			
Time			

★ ★ ★

Answer Key

- I. 1. (d) measuring tape, 2. (b) length, 3. (c) 2 metre, 4. (b) Beam balance
- II. 5. m, 6. 100 7. Odometer
- III. 8. True
9. True
10. False. On moon, the gravitational force is **lesser** than earth.
- IV. 11. 1- (iii), 2-(i), 3- (iv), 4 - (ii)
12. Refer Sura's Guide Page No.10, Q.No. VI - 4.
13. Refer Sura's Guide Page No.10, Q.No. IV - 5.
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★ ★ ★



02

FORCES AND MOTION

LEARNING OUTCOMES

- ❑ To Identify push or pull or both is involved when there is a motion.
- ❑ To understand that some forces act on contact and some are non-contact forces.
- ❑ When a force is applied, it can make things move, change direction or change its shape and size.
- ❑ To distinguish rest and motion and understand that they are relative.
- ❑ To infer motion is caused by application of force.
- ❑ To classify the different types of motion.
- ❑ To deduce the definition of average speed.
- ❑ To use and understand the unit of speed.
- ❑ To distinguish uniform and non-uniform motion.
- ❑ To compute time, distance and speed.



Evaluation

I. Choose the correct answer.

1. Unit of speed is ⊗
 (a) m (b) s (c) kg (d) m/s [Ans : (d) m/s]
2. Oscillatory motion among the following is
 (a) Rotation of the earth about its axis
 (b) Revolution of the moon about the earth
 (c) To and fro movement of a vibrating string
 (d) All of these [Ans : (c) To and fro movement of a vibrating string]
3. The correct relation among the following is
 (a) Speed = distance × time. (b) speed = distance / time
 (c) Speed = time / distance (d) speed = 1 / (distance × time)
 [Ans : (b) speed = distance / time]
4. Gita rides with her father's bike to her uncle's house which is 40 km away from her home. She takes 40 minutes to reach there.
 Statement 1 : She travels with a speed of 1 km / minute.
 Statement 2 : She travels with a speed of 1 km/hour
 (a) Statement 1 alone is correct.
 (b) Statement 2 alone is correct.
 (c) Both Statement 1 and 2 are correct.
 (d) Neither statement 1 nor statement 2 is correct.

[Ans : (a) Statement 1 alone is correct]

II. Find whether the following statements are true or false. - if false give the correct answer.

1. To and fro motion is called oscillatory motion.

Ans : True.

2. Vibratory motion and rotatory motion are periodic motions.

Ans : False. Vibratory motion and **oscillatory** motion are periodic motions.

3. Vehicles moving with varying speeds are said to be in uniform motion.

Ans : False. Vehicles moving with varying speeds are said to be in **non-uniform** motion.

(OR)

Vehicles moving with **uniform speeds** are said to be in **uniform** motion.

4. Robots will replace human in future.

Ans : False. Robots **will not** replace human in future.

III. Fill in the blanks.






1. A bike moving on a straight road is an example of _____ motion. [**Ans : Linear**]

2. Gravitational force is a _____ force. [**Ans : Non Contact Force**]

3. Motion of a potter's wheel is an example of _____ motion. [**Ans : rotatory**]

4. When an object covers equal distances in equal interval of time, it is said to be in _____ motion. [**Ans: uniform**]

IV. Match the following

S. No.	Column A		Column B
1.		a.	Circular motion
2.		b.	Oscillatory motion
3.		c.	linear motion
4.		d.	rotatory motion
5.		e.	linear and rotatory motion

[**Ans : 1-c, 2-d, 3-b, 4-a, 5-e**]

V. Analogy.

1. kicking a ball : contact force :: falling of leaf : _____?

Ans : Non contact force.



2. Distance : metre :: speed : _____?

Ans : metre/second.

3. circulatory motion :: a spinning top :: oscillatory motion : _____?

Ans : Swinging of a pendulum.

VI. Given below is the distance-travelled by an elephant across a forest with uniform speed. Complete the data of the table given below with the idea of uniform speed.

Distance (m)	0	4		12		20
Time (s)	0	2	4		8	10

Ans :

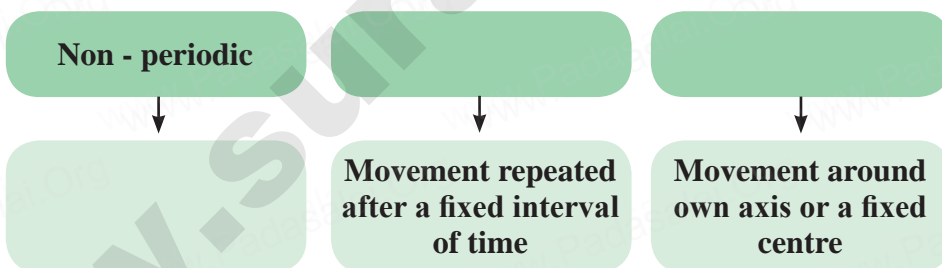
Distance (m)	0	4	8	12	16	20
Time (s)	0	2	4	6	8	10

$$(i) \text{ Distance / Time} = \frac{4}{2} \times 4 = \frac{16}{2} = 8$$

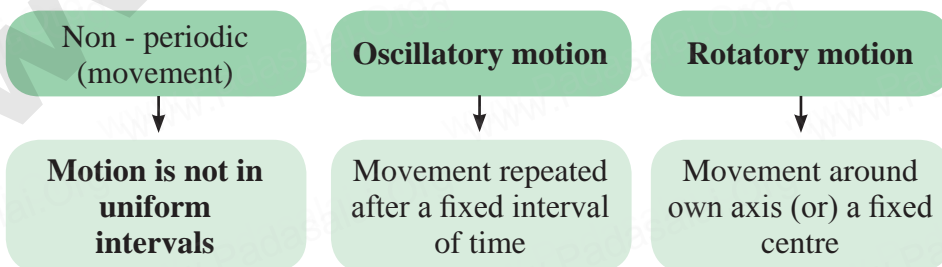
$$(ii) \text{ Distance / Time} = \frac{4}{2} \times 8 = \frac{32}{2} = 16$$

$$(iii) \text{ Time / Distance} = \frac{10}{20} \times 12 = \frac{12}{2} = 6$$

VII. Complete the web chart.



Ans :



VIII. Give one word for the following statements.

1. The force which acts on an object without Physical contact with it .

Ans : Non contact force.

2. A change in the position of an object with time.

Ans : Motion.

3. The motion which repeats itself after a fixed interval of time.

Ans : Oscillatory motion.

4. The motion of an object travels equal distances in equal intervals of time.

Ans : Uniform motion.

5. A machine capable of carrying out a complex series of actions automatically.

Ans : Robots.

IX. Answer the following in a sentence or two.

1. Define force.

Ans : Forces are push or pull by an animate or inanimate agency.

2. Name different types of motion based on the path.

Ans : (i) Linear motion.
(ii) Curvilinear motion.
(iii) Circular motion.
(iv) Rotatory motion.
(v) Oscillatory motion.
(vi) Zigzag (irregular) motion.

3. If you are sitting in a moving car, will you be at rest or motion with respect your friend sitting next to you?

Ans : I am in **rest** with respect to my friend, sitting inside the car.

4. Rotation of the earth is a periodic motion. Justify.

Ans : Motion repeated in equal intervals of time is called as periodic motion. The earth rotates on its axis once in 24 hours. The duration of time is fixed as 24 hours. Therefore the rotation of earth is a periodic motion.

5. Differentiate between rotational and curvilinear motion. ⊗

Ans :

S. No	Rotational motion	Curvilinear motion
1.	A body moves along a circular path.	A body moves along a curved path.
2.	Without changing its position, about its own (fixed) axis.	Changes its position with motion.
3.	Eg. Rotation of a spinning top.	Eg. Throwing paper airplanes or paper darts.

X. Calculate.

1. A vehicle covers a distance of 400 km in 5 hour. Calculate its average speed.

Ans : Distance covered by the vehicle = 400 km
Time taken = 5 hour
Average speed = $\frac{\text{distance covered}}{\text{time taken}} = \frac{400 \text{ km}}{5 \text{ hour}}$
= 80 km/hr.

XI. Answer in detail.

1. What is motion? Classify different types of motion with examples.



Ans : Motion :

Change of position of an object with respect to time is known as motion.

1. Based on Path :

- | | |
|---------------------------------|---------------------------------------|
| (i) Linear motion. | Ex.: Parade of the soldiers. |
| (ii) Curvilinear motion. | Ex.: Paper flight moving. |
| (iii) Circular motion. | Ex.: Swirling stone tied to the rope. |
| (iv) Rotatory motion. | Ex.: Rotating top. |
| (v) Oscillatory motion. | Ex.: Clock pendulum. |
| (vi) Zigzag (irregular) motion. | Ex.: Motion of a bee. |

2. Based on Duration :

- | | |
|---------------------------|--|
| (i) Periodic motion. | Ex.: Motion of a bob of simple Pendulum. |
| (ii) Non periodic motion. | Ex.: Swaying of the branches of a tree. |

3. Based on Speed :

- | | |
|----------------------------|---|
| (i) Uniform motion. | Ex.: Hour hand of a clock. |
| (ii) Non - uniform motion. | Ex.: Motion of a train, as it leaves a station. |

XII. Fill with examples.







Linear motion	
Curvilinear motion	
Self rotatory motion	Motion of wheel in a cart
Circular motion	
Oscillatory motion	
Irregular motion	
Linear motion	Free fall objects
Curvilinear motion	Throwing ball
Self rotatory motion	Motion of wheel in a cart
Circular motion	Athlete running around a track
Oscillatory motion	Flapping of elephants ear
Irregular motion	Playing Foot ball

Ans :

Intext Activities

→ ACTIVITY - 1

Can you identify whether it is push or pull that results in motion in the following cases?

Picture	Result in motion	Picture	Result in motion
	Pull		Push
	Push		Pull
	Push		Push

→ Event 2:

The girl on the swing is moving with respect to the seat of the swing.
She is at rest with respect to the garden.

→ Event 3:

Nisha is going to her grandmother's house by bicycle. The girl on the bicycle is moving with respect to the road.

She is at rest with respect to the bicycle.

→ ACTIVITY - 2

Moon or Cloud?

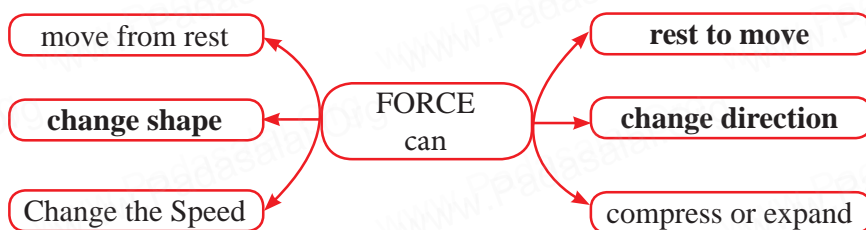
Observe the moon on a windy night with a fair bit of cloud cover in the sky. As a cloud passes in front of the moon you sometimes think it is the moon which is moving behind the cloud. What would you think if you were to observe a tree at the same time?



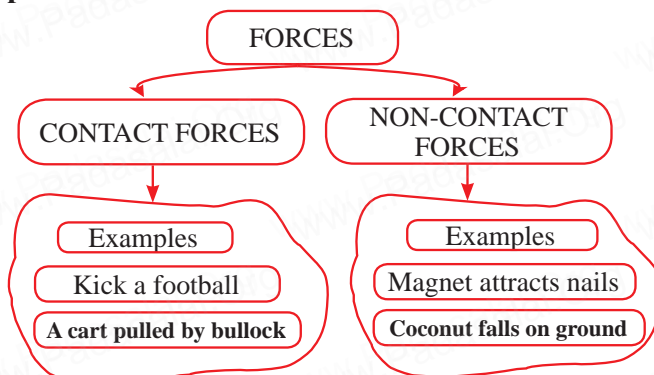
Ans : Activity to be done by the students themselves

→ ACTIVITY - 3

Fill in the empty spaces.



Can you give example for contact and non-contact forces?

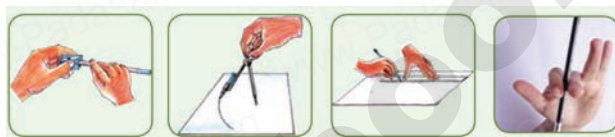


→ ACTIVITY - 4

Play with pencil

Please do what Shanthi did...

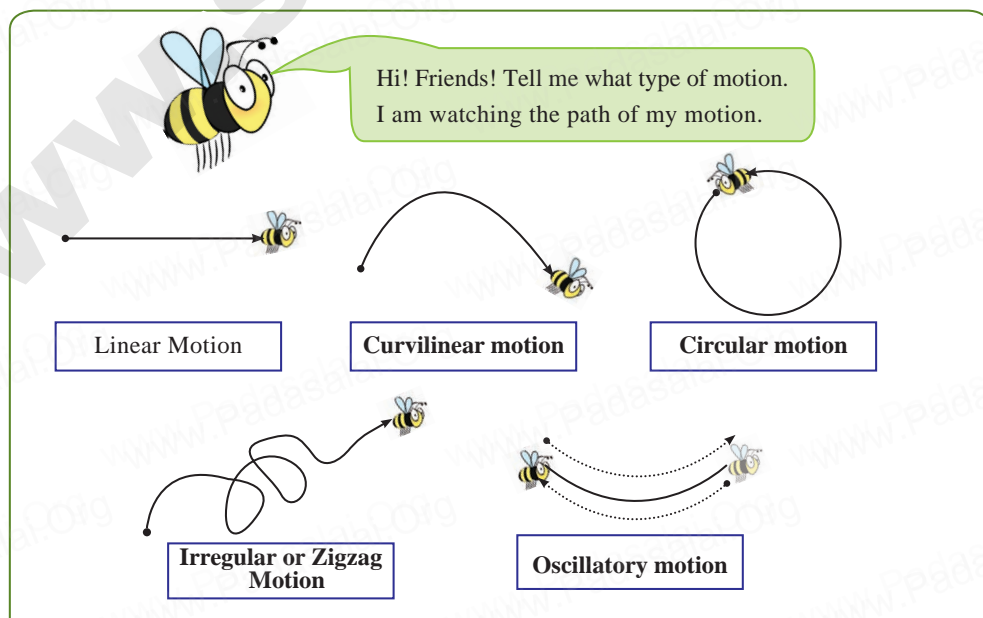
- Shanthi took a pencil and sharpened it with a sharpener.
- Then she drew a circle using the pencil and a compass.
- Later she took her ruler (scale) and drew a straight line in another paper.
- Then she kept the pencil between her finger and moved it back and forth.



Now, look at the motion of the pencil in all these four cases. How was it?

- In the first case, the pencil rotated in its axis.
- In the second case, it went in a circle.
- In the third case, the pencil travelled in a straight line.
- Fourth case, the pencil tip moved back and forth, that is it oscillated like a swing.

→ ACTIVITY - 5



→ **ACTIVITY - 6**

Classify the following according to the path it takes.

Linear, Curvilinear, Circular, Rotatory, Oscillatory, Zigzag (irregular)

• A sprinter running a 100 m race	Linear Motion
• A coconut falling from a tree	Linear Motion
• striking a coin in a carom board game	Zigzag Motion
• Motion of flies and mosquitoes	Zigzag Motion
• Beating of heart	Oscillatory Motion
• Children playing in a swing	Oscillatory Motion
• The tip of hands of a clock	Rotatory Motion
• Flapping of elephant's ears	Oscillatory Motion
• A stone thrown into the air at an angle	Curvilinear Motion
• Movement of people in a bazaar	Zigzag Motion
• Athlete running around a track	Circular Motion
• Revolution of the moon around the earth	Circular Motion
• The movement of a ball kicked in a football match	Curvilinear Motion
• Motion of a spinning top	Rotatory Motion
• Revolution of the earth around the sun	Circular Motion
• Swinging of a pendulum	Oscillatory Motion
• Children skidding on a sliding board	Linear Motion
• Skidding down a playground slide	Zigzag Motion
• Wagging tail of a dog	Oscillatory Motion
• Flapping of a flag in wind	Oscillatory Motion
• A car driving around a curve	Circular Motion
• Woodcutter cutting with a saw	Linear Motion
• Motion of water wave	Oscillatory Motion
• Motion of piston inside a syringe	Linear Motion
• Bouncing ball	Oscillatory Motion
[add five motions you observe to this list]	
Falling fruits from the tree	Linear Motion
Ceiling fan running	Rotatory Motion
Car running on the straight road	Linear Motion
Swirling stone tied to the rope	Circular Motion
Motion of sewing machine needle	Oscillatory Motion

→ **ACTIVITY**

Average Speed.

Taxi Driver: I have travelled 160 km in Two Hours.

Bus Driver: I have travelled 200 km in Four Hours.

Truck Driver: I have travelled 300 km in Five Hours.

Can you say who travelled with highest speed?

Ans : The Taxi driver travelled with highest speed.

How do we say? Let us calculate how long they travelled in One Hour?

Distance travelled by the Car in One Hour = **80 km** ($160 \div 2$)

Distance travelled by the Bus in One Hour = **50 km** ($200 \div 4$)

Distance travelled by the Truck in One Hour = **60 km** ($300 \div 5$)

Have you found out? say now.

Fastest Taxi, Slowest Bus.

→ **Let us Calculate.**

1. A cat travelled 150 metres in 10 seconds, what is its average speed?

Ans : Cat travelled in 10 seconds = 150 m

Average speed = $\frac{\text{distance covered}}{\text{time taken}} = \frac{150 \text{ m}}{10 \text{ s}} = 15 \text{ m / s.}$

2. Priya ride her bicycle 40 km in two hours. What is her average speed?

Ans : Priya ride her bicycle in two hours = 40 km

Average speed = $\frac{\text{distance covered}}{\text{time taken}} = \frac{40 \text{ km}}{2 \text{ hr}} = 20 \text{ km / hour.}$

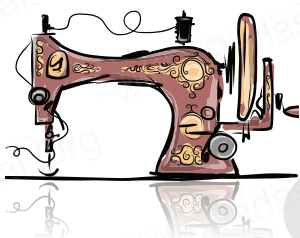
→ **Our speed...**

Let us play a small game. Go to the playground with your friends. Mark 100 metre distance for a race. Conduct a friendly running race and calculate the time they taken to complete the distance by stopwatch. Now fill up the following table.

S. No	Name of the student	distance	Time taken (in seconds)	average speed = distance travelled / time taken	average speed (m/s)
1	Murugesan	100 m	12 sec	100 meter / 12 sec	8.3 m/s
2	T. Vikkas	100 m	14 sec	100 meter / 14 sec	7.1 m/s
3	T. Jeevan rajan	100 m	15 sec	100 meter / 15 sec	6.7 m/s
4	V. Sabari	100 m	13 sec	100 meter / 13 sec	7.7 m/s
5	P. Suresh	100 m	12 sec	100 meter / 12 sec	8.3 m/s

Compute the following Numerical Problems.

1. If you travel 10 kilometres in 2 hours, your speed is 5 km per hour. (10 km / 2 hours)
2. If you travel 15 kilometres in 1/2 hour, you would travel 30 km in one hour, and your speed is 30 km per hour. ($15 \text{ km} \times \frac{2}{1} \text{ hours}$)
3. If you run fast at 20 kilometres per hour for 2 hours, you will cover 40 km. ($20 \text{ km} \times 2 \text{ hours}$)

→ ACTIVITY**Multiple Motion in a Sewing Machine**

- Motion of the needle
- **Periodic (or) Oscillatory motion**
- Motion of the wheel
- **Rotatory motion**
- Motion of footrest
- **Oscillatory motion**

→ Activity - 7**Simple Spinner**

Let us enjoy by making a simple spinner. Make it by the following instruction.

Cut a 2cm long piece from an old ball-pen refill and make a hole in its center with a divider point (Fig 1).

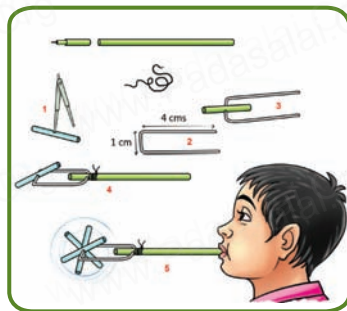
Take a thin wire of length 9cm and fold it into a U-shape (Fig 2).

Weave the refill spinner in the U-shaped wire (Fig 3).

Wrap the two ends of the wire on the plastic refill, leaving enough clearance for the spinner to rotate (Fig 4).

On blowing through the refill, the spinner rotates (Fig 5).

For obtaining maximum speed - adjust the wires so that air is directed towards the ends of the spinner.



Have you enjoyed with simple spinner. Do you observe the motions in the toy. Can you answer the following question?

1. Motion of the air in tube is _____ motion. [Ans : **Linear**]
2. Motion of the refill stick _____ motion. [Ans : **Rotatory**]
3. The toy converts _____ motion into _____ motion. [Ans : **Linear, Rotatory**]

Additional Questions

I. Choose the correct answer:

1. _____ is an ancient Indian astronomer.
(a) C.V. Raman (b) Aryabatta (c) Usain Bolt (d) Edison
[Ans : **(b) Aryabatta**]
2. People walking in a crowded street is example of _____ motion.
(a) linear (b) circular (c) rotatory (d) zigzag
[Ans : **(d) zigzag**]
3. Identify the Periodic motion among the following :
(a) a horse running in a race (b) revolution of the moon around the earth
(c) a coconut falling from a tree (d) paper flight moving
[Ans : **(b) revolution of the moon around the earth**]
4. Usain Bolt crossed 100 metre in _____ seconds and made a world record.
(a) 9.58 (b) 9.83 (c) 9.85 (d) 9.38 [Ans : **(a) 9.58**]
5. _____ are robots scaled down to microscopic size in order to put them into very small spaces to perform a function.
(a) Car robots (b) Home robots (c) Game robots (d) Nanobots
[Ans : **(d) Nanobots**]
6. A _____ is the fastest land animal.
(a) Horse (b) Lion (c) Cheetah (d) Tiger
[Ans : **(c) Cheetah**]
7. A cheetah can run with an average speed of _____.
(a) 112 km/h (b) 121 km/h (c) 211 km/h (d) 122 km/h
[Ans : **(a) 112 km/h**]

II. Find whether the following sentences are true or false. If false Correct the statement.

1. Motion occurs when the object is pulled or pushed by an agency.
Ans : True.
2. Force executed by touching the body is called non - contact force.
Ans : False. Force executed by touching the body is called **contact** force.
3. Gravity pushes the ripen coconut from the tree to the ground.
Ans : False. Gravity **pulls** the ripen coconut from the tree to the ground.

4. Throwing paper aeroplane is the best example of linear motion.

Ans : False. Throwing paper aeroplane is the best example of **curvilinear** motion.

5. The movement of a body about its own axis like a rotating top is liner motion.

Ans : False. The movement of a body about its own axis like a rotating top is **Rotatory** motion.

6. Motion repeated in equal intervals of time is called as periodic motion.

Ans : True.

III. Fill in the blanks.

1. _____ are push or pull by an animate or inanimate agency. [Ans: **Forces**]

2. Application of force in an object results in motion from a state of _____. [Ans: **rest**]

3. Fast oscillations are referred to as _____. [Ans: **vibrations**]

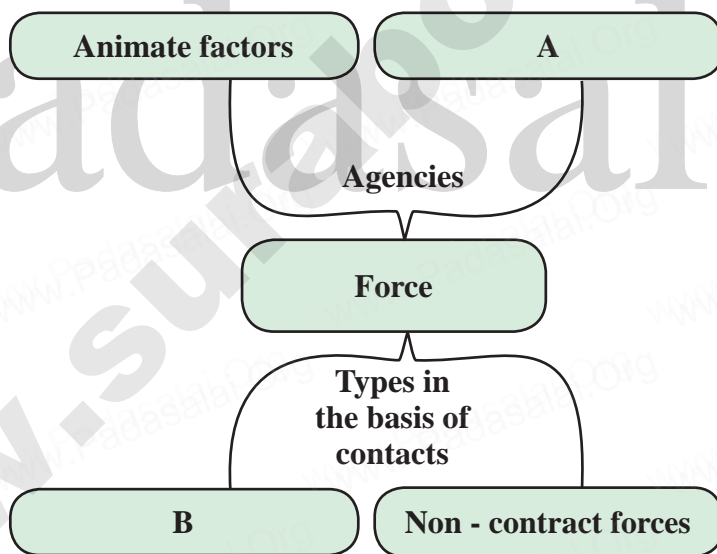
4. Motion repeated in equal intervals of time is called _____. [Ans: **periodic motion**]

5. _____ are automatic machines. [Ans: **Robots**]

6. The term Robots comes from a czech word _____. [Ans: **robota**]

7. _____ is the study of robots in science. [Ans: **Robotics**]

IV. Complete the web chart.



Ans :

- A - In animate factors,
- B - Contact forces.

V. Answer the following in one or two sentences.

1. Define motion.

Ans : When there is a change of position of an object with respect to time, then it is called motion.

2. What is non-contact force?

Ans : The force applied without touching the object is known as non-contact force.

3. List out the types of forces on the basis of contact.

Ans : There are two types.

- i. Contact force,
- ii. Non-contact force.

4. Give the properties of force.

Ans : i. Forces can change the state of a body from rest to motion or motion to rest.
ii. Forces can change the shape of the body.

5. Define non-periodic motion.

Ans : When a motion is not in uniform interval, then such motion is called non-periodic motion.

6. Define Average speed.

Ans : The distance travelled by an object in unit time is called average speed.

$$\text{Average speed} = \frac{\text{distance covered}}{\text{time taken}}.$$

7. List out the types of motion on the basis of speed.

Ans : There are two types.

- i. Uniform motion,
- ii. Non-uniform motion.

8. Define uniform motion.

Ans : If an object covers uniform distances in uniform intervals, then the motion of the object is called uniform motion.

9. Why robots are used in many places?

Ans : Robots can perform mechanical and repetitive jobs faster, more accurately than human beings. It can also handle dangerous materials and explore distant planets.

10. What are the important parts of a robot?

Ans : Electronic sensors are a robot's eyes and ears. These are the important parts.

11. What is nanobots?

Ans : Nanobots are robots scaled down to microscopic size in order to put them into very small places to perform a function.

12. What are the uses of future robots?

Ans : i. It could be placed in the blood stream to perform surgical procedures.
ii. It could target cancer cells and destroy them without touching healthy cells nearby.

VI. Answer in Detail.**1. Classify the following motions according to the path it takes.**

- a) A coconut falling from a tree
- b) Heart beat
- c) A stone thrown into the air at an angle
- d) Movement of people in a bazaar
- e) Motion of a spinning top



- Ans :**
- | | |
|--|----------------------|
| a) A coconut falling from a tree | - Linear Motion |
| b) Heart beat | - Oscillatory Motion |
| c) A stone thrown into the air at an angle | - Curvilinear Motion |
| d) Movement of people in a bazaar | - Zigzag Motion |
| e) Motion of a spinning top | - Rotatory Motion |

2. Classify the following motions based on duration and speed.

- Coconut falls to the ground
- A cart pulled by a bullock
- Train journey
- A bouncing ball
- Revolution of Moon around the earth

- Ans :**
- Non-periodic Motion
 - Non-periodic Motion
 - Non-uniform Motion
 - Periodic Motion
 - Uniform Motion



Padasalai

UNIT TEST

Time : 40 min.

Marks : 25

I. Choose the correct answer.**(3 × 1 = 3)**

1. Unit of speed is _____.
(a) m (b) s (c) kg (d) m/s
2. _____ is an ancient Indian astronomer
(a) C.V. Raman (b) Aryabhatta (c) Ussain Bolt (d) Edison
3. _____ are the robots scaled down to microscopic size in order to put them into very small spaces to perform a function.
(a) Car robots (b) Home robots (c) Game robots (d) Nano robots

II. Fill in the blanks.**(3 × 1 = 3)**

4. Gravitational force is a _____ force.
5. Fast oscillations are referred to as _____.
6. _____ is a study of robots in science.

III. Find whether the following sentences are true or false. If false Correct the statement.**(3 × 1 = 3)**

7. Throwing paper aeroplane is the best example of linear motion.
8. Vibratory motion and rotatory motion are periodic motions.
9. Motion repeated in equal intervals of time is called as periodic motion.

IV. Analogy.**(2 × 1 = 2)**

10. Kicking a ball : Contact force :: Falling of leaf : _____.
11. Distance : metre :: Speed : _____.

V. Match the following.**(3 × 1 = 3)**

12.	A coconut falling from a tree	(i)	Oscillatory motion
13.	Motion of a spinning top	(ii)	Linear motion
14.	Heart beat	(iii)	Rotatory motion

VI. Answer any 3 in a sentences or two.**(3 × 2 = 6)**

15. Rotation of the earth is a periodic motion - Justify.
16. Give the properties of force.
17. Name different types of motion based on the path.
18. What are the uses of future robots?

VII. Answer any one in detail.**(1 × 5 = 5)****19.** What is motion? Classify different types of motion with examples.**20** Classify the following motions based on duration and speed.

- Coconut falls to the ground
- A cart pulled by a bullock
- Train journey
- A bouncing ball
- Revolution of Moon around the earth

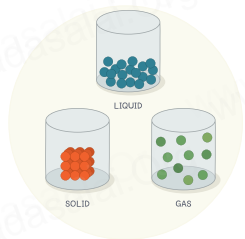
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Answer Key

- I. 1. (d) m/s, 2. (b) Aryabatta 3. (d) Nano robots
- II. 4. Non-contact Force 5. vibrations 6. Robotics
- III. 7. False. Throwing paper aeroplane is the best example of **curvilinear** motion.
8. False. Vibratory motion and **oscillatory** motion are periodic motions.
9. True
- IV. 10. Non-contact force.
11. metre / second
- V. 12. A coconut falling from a tree - Linear motion
13. Motion of a spinning top - Rotatory motion
14. Heart beat - Oscillatory motion
- VI. 15. Refer Sura's Guide Page No. 16, Q.No. IX - 4
16. Refer Sura's Guide Page No.25, Q.No. V - 4
17. Refer Sura's Guide Page No.16, Q.No. IX - 2
18. Refer Sura's Guide Page No.25, Q.No. V - 12
- VII. 19. Refer Sura's Guide Page No.17, Q.No. XI - 1.
20. Refer Sura's Guide Page No.26, Q.No. VI - 2.

★★★

03



MATTER AROUND US

LEARNING OBJECTIVES

- ❑ Define matter and develop an understanding on the particle nature of matter
- ❑ Sort the objects on the basis of certain properties
- ❑ Differentiate solids, liquids and gases based on the arrangement of their particles.
- ❑ Differentiate pure substances from mixtures
- ❑ Identify the need for separation of mixtures
- ❑ Suggest suitable methods for separating given samples of mixture
- ❑ Acquire an awareness on food adulteration and its harmful effects



Evaluation

I. Choose the appropriate answer.

1. _____ is not made of matter.

- (a) gold ring
(c) light ray

- (b) iron nail
(d) oil drop

[Ans : (c) light ray]

2. 200 ml of water is poured into a bowl of 400ml capacity. The volume of water now will be _____.

- (a) 400 ml
(c) 200 ml

- (b) 600 ml
(d) 800 ml

[Ans : (c) 200 ml]

3. Seeds from water-melon can be removed by _____ method.

- (a) hand-picking
(c) magnetic separation

- (b) filtration
(d) decantation

[Ans : (a) hand-picking]

4. Lighter impurities like dust when mixed with rice or pulses can be removed by _____.

- (a) filtration
(c) decantation

- (b) sedimentation
(d) winnowing

[Ans : (d) winnowing]

5. _____ is essential to perform winnowing activity.

- (a) Rain
(c) Water

- (b) Soil
(d) Air

[Ans : (d) Air]

6. Filtration method is effective in separating _____ mixture.

- (a) solid - solid (b) solid - liquid
(c) liquid - liquid (d) liquid - gas

[Ans : (b) solid - liquid]

7. From the following _____ is not a mixture.

- (a) coffee with milk (b) lemon juice
(c) water (d) ice cream embedded with nuts

[Ans : (c) water]

II. True or False. If False, give the correct statement.

1. Air is not compressible.

Ans : False. Air is **highly** compressible.

2. Liquids have no fixed volume but have fixed shape.

Ans : False. Liquids **have fixed volume** but **have no fixed shape**.

3. Particles in solids are free to move.

Ans : False. Particles of solid **can not** move freely (or) Particles of **liquid** are free to move.

4. When pulses are washed with water before cooking, the water is separated from them by the process of filtration.

Ans : False. When pulses are washed with water before cooking the water is separated from them by the process of **decantation**.

5. Strainer is a kind of sieve which is used to separate a liquid from solid.

Ans : True.

6. Grain and husk can be separated by winnowing.

Ans : True.

7. Air is a pure substance.

Ans : False. Air is a **mixture of gases**.

8. Butter from curds is separated by sedimentation.

Ans : False. Butter from curd is separated by **Churning**.

III. Match the following.

(a)

S. No.	Property	Example
1.	Breaks easily (brittle)	Metal pan
2.	Bends readily	Rubber band
3.	Can be stretched easily	Cotton wool
4.	Gets compressed easily	Mud pot
5.	Gets heated readily	Plastic wire

Ans :

S.No.	Property	Example
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