SURA'S

Science

IX - Standard

Strictly as per the Reduced (Prioritised) Syllabus released on 13th August, 2021 (G.O.(Ms).No126)

- Sura's Model question paper is given based on the reduced syllabus, with answers.

Salient Features :

- Guide as per the latest Textbook
- Complete Solutions to Textbook Exercises.
- Quarterly Exam - 2019 [QY-2019], Half Yearly Exam - 2019 [HY-2019] are incorporated in appropriate sections.

SURA PUBLICATIONS
Chennai

orders@surabooks.com Ph:9600175757 / 8124201000

2021 - 22 Edition

ISBN : 978-93-5330-464-5
Code No. : RPS_061

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NOTE FROM PUBLISHER

It gives me great pride and pleasure in bringing to you **Sura's Science Guide** for **9th Standard**. It is prepared as per the Reduced Syllabus and New Textbook.

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

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.

Subash Raj, B.E., M.S.
- Publisher
Sura Publications

All the Best

Strictly as per the Reduced (Prioritised) Syllabus released on 13th August, 2021 (G.O.(Ms).No126)

Class: 9th **Subject: Science**

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Class: 9th **Subject: Science**

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UNIT
01

PHYSICS

MEASUREMENT

LEARNING OBJECTIVES

At the end of this lesson, students will be able to

- Understand the fundamental and derived quantities and their units.
- Know the rules to be followed while expressing physical quantities in SI units.
- Get familiar with the usage of scientific notations.
- Know the characteristics of measuring instruments.
- Use vernier caliper and screw gauge for small measurements.
- Find the weight of an object using a spring balance.
- Know the importance of accurate measurements.

TEXT BOOK EXERCISES

I. Choose the correct answer :

1. Choose the correct one. *[QY - 2019]*

(a) mm < cm < m < km (b) mm > cm > m > km
(c) km < m < cm < mm (d) mm > m > cm > km

[Ans : (a) mm < cm < m < km]

2. Rulers, measuring tapes and metre scales are used to measure

(a) mass (b) weight (c) time (d) length

[Ans : (d) length]

3. 1 metric ton is equal to

(a) 100 quintals (b) 10 quintals
(c) 1/10 quintals (d) 1/100 quintals **[Ans : (b) 10 quintals]**

II. Fill in the blanks :

1. Metre is the unit of _____. **[Ans : length]**
2. 1 kg of rice is weighed by _____. **[Ans : beam balance]**
3. Thickness of a cricket ball is measured by _____. **[Ans : vernier caliper]**
4. Radius of a thin wire is measured by _____. **[Ans : screw gauge]**

III. State whether true or false. If false, correct the statement :

1. The SI unit of electric current is kilogram.

Ans. False.

Correct statement : The SI unit of electric current is **ampere**.

2. Kilometre is one of the SI units of measurement.

Ans. True.

3. In everyday life, we use the term weight instead of mass.

Ans. True.

5. One Celsius degree is an interval of 1K and zero degree Celsius is 273.15 K.

Ans. True.

6. With the help of vernier caliper we can have an accuracy of 0.1 mm and with screw gauge we can have an accuracy of 0.01 mm.

Ans. True.

IV. Match the following :

1.

Length	kelvin
Mass	metre
Time	kilogram
Temperature	second

Ans.

Length	metre
Mass	kilogram
Time	second
Temperature	kelvin

2.

Screw gauge	Vegetables
Vernier caliper	Coins
Beam balance	Gold ornaments
Digital balance	Cricket ball

Ans.

Screw gauge	Coins
Vernier caliper	Cricket ball
Beam balance	Vegetables
Digital balance	Gold ornaments

V. Assertion and reason type questions :

Mark the correct answer as :

(a) Both A and R are true but R is not the correct reason.
(b) Both A and R are true and R is the correct reason.
(c) A is true but R is false.
(d) A is false but R is true

1. **Assertion (A) :** The scientifically correct expression is "The mass of the bag is 10 kg"

Reason (R) : In everyday life, we use the term weight instead of mass.

[Ans : (a) Both A and R are true but R is not the correct reason]

2. **Assertion (A) :** 0° C = 273.16 K. For our convenience we take it as 273 K after rounding off the decimal.

Reason (R) : To convert a temperature on the Celsius scale we have to add 273 to the given temperature.

[Ans : (b) Both A and R are true and R is the correct reason]

3. **Assertion (A) :** Distance between two celestial bodies is measured in terms of light year.

Reason (R) : The distance travelled by the light in one year is one light year.

[Ans : (d) A is false but R is true]

Assertion : Distance between two celestial bodies is measured in terms of **astronomical unit.**

VI. Answer very briefly :

1. Define measurement.

Ans. Measurement is the processes of comparison of the given physical quantity with the known standard quantity of the same nature.

2. Define standard unit. [*QY - 2019*]

Ans. Unit is the quantity of a constant magnitude which is used to measure the magnitudes of other quantities of the same nature.

3. What is the full form of SI system?

Ans. International System of Units.

4. Define least count of any device. [*HY - 2019*]

(i) The smallest length which can be measured by metre scale is called least count.

(ii) Least count of the instrument = $\frac{\text{Value of one main scale division}}{\text{Total number of vernier scale division}}$

Least count = [Pitch / No. of head scale divisions]

5. What do you know about pitch of screw gauge?

Ans. Pitch of the screw gauge is the distance between two successive screw threads. It is measured by the ratio of distance travelled on the pitch scale to the number of rotations of the head scale.

Pitch = [Distance travelled on the pitch scale / Number of rotations of the head scale]

6. Can you find the diameter of a thin wire of length 2 m using the ruler from your instrument box?

Ans. No, I can not find the diameter of a thin wire of length 2 m using the ruler.

VII. Answer briefly :

1. Write the rules that are followed in writing the symbols of units in SI system. [*QY - 2019*]

Ans.
(i) Units named after scientists are written in lower case.
Eg. joule, kelvin and newton.
(ii) Symbols for the units are always written in lower case.
Eg. m, kg and s.
(iii) However, the symbols for the units derived from the names of scientists are written in capital letters.
Eg. C (Celsius), N (newton) and J (joule).
(iv) Symbols are not followed by a full stop.
Eg. 75 cm and not 75 cm.
(v) Symbols are never written in plural.
Eg. 100 kg, not as 100 kgs.

2. Write the need of a standard unit.

Ans. A Standard Unit is needed to maintain uniformity in measurements like length, weight, size and distance. Eg: Standard Unit of length is metre.

4. How will you measure the least count of vernier caliper?

Ans. Least Count or L.C. is the minimum reading or value that can be measured with a measuring tool or device.

VIII. Answer in detail :

1. Explain a method to find the thickness of a hollow tea cup.

Ans. Step 1 : The Pitch, Least count and the type of zero error of the screw gauge are determined.

Step 2 : The given cup is placed in between two studs.

Step 3 : The head screw using the ratchat arrangement is freely rotated until the given cup is held firmly, but not tightly.

Step 4 : Pitch scale reading (PSR) by the head scale and head scale coincidence (HSC) with the axis of the pitch scale, are found.

Step 5 : The readings are recorded and the experiment for different positions of the given cup is repeated.

Step 6 : The thickness of the cup is calculated using the formula P.S.R+(HSC×L.C)

Step 7 : Then the average of the last column of the table. is found.

Hence the thickness of a hollow tea cup = _____ mm.

2. How will you find the thickness of a one rupee coin?

Ans. Step 1 : The Pitch, Least count and the type of zero error of the screw gauge are determined.

Step 2 : The given coin is placed in between two studs.

Step 3 : The head screw using the ratchat arrangement is freely rotated until given one rupee coin is held firmly, but not tightly.

Step 4 : Pitch scale reading (PSR) by the head scale and head scale coincidence (HSC) with are axis of the pitch scale are found.

Step 5 : The reading are recorded and the experiment for different positions of the given coin is repeated.

Step 6 : The thickness of the coin is computed using the formula P.S.R+(HSC×L.C)

Step 7 : Then the average of the last column of the table is found.

S. No.	P.S.R. (mm)	HSC (division)	CHSC = HSC ± ZC (Division)	CHSR = CHSC × LC (mm)	Total reading =PSR + CHSR (mm)
1.					
2.					
3.					

mean = _____ mm

Hence the thickness of a one rupee coin = _____ mm

IX. Numerical Problems :

1. Inian and Ezhilan argue about the light year. Inian tells that it is 9.46×10^{15} m and Ezhilan argues that it is 9.46×10^{12} km. Who is right? Justify your answer.

Solution : (Inian is correct)

Light travels 3×10^8 m in one second or 3 Lakhs kilometre in one second.

In one year we have 365 days.

The total number of second in one year is equal to $365 \times 24 \times 60 \times 60$

Distance travelled by light in 1 year $= (3.153 \times 10^{7)} \times (3 \times 10^{8)}$

$= \mathbf{9.46 \times 10^{15}}$ **m.**

2. The main scale reading while measuring the thickness of a rubber ball using Vernier caliper is 7 cm and the Vernier scale coincidence is 6. Find the radius of the ball.

Solution :

MSR = 7 cm
VC = 6 cm
LC = 0.1 mm = 0.01 cm
Diameter = DR = MSR + (VC × LC)
= 7 + 0.06 cm
Diameter D = 7.06 cm
Radius R = $\frac{D}{2} = \frac{7.06}{2} = 3.53$ cm

The radius of the ball = **3.53 cm (or) 0.0353 m**

3. Find the thickness of a five rupee coin with the screw gauge, if the pitch scale reading is 1 mm and its head scale coincidence is 68.

Solution :

PSR = 1 mm = 1×10^{-3} m
HSC = 68
LC = 0.01 mm = 0.01×10^{-3} m
Total reading = PSR + (HSC × LC)
∴ Thickness of the five rupee coin = $1 \times 10^{-3} + (68 \times 0.01 \times 10^{-3})$ m
∴ Thickness of the five rupee coin = 1.68×10^{-3} m = **1.68 mm**

Intext Activities

ACTIVITY - 1

Using Vernier caliper find the outer diameter of your pen cap.

Aim : To find the outer diameter of the pen cap.

Materials required : Vernier caliper, pen cap.

Solution :

S. No.	MSR (cm)	VSR (division)	VSR = (VSC × LC)	Diameter = MSR + VSR
1.	9	34	34 × 0.01 = 0.34	9 + 0.34 = 9.34
2.	9	36	36 × 0.01 = 0.36	9 + 0.36 = 9.36
3.	9	35	35 × 0.01 = 0.35	9 + 0.35 = 9.35
				Mean D = **9.35 cm**

Result : The outer diameter of the pen cap = **9.35 cm** *[End of the activity]*

ACTIVITY - 2

Determine the thickness of a single sheet of your science textbook with the help of a Screw gauge.

S. No.	P.S.R. (mm)	HSC (division)	HSR (mm) HSR = HSC × LC	TR (mm) t = PSR + HSR mm
1.	0	29	0.29	0.29
2.	0	30	0.30	0.30
3.	0	31	0.31	0.31
		Mean thickness 't' of the sheet = **0.30**		

LC = Least Count
PSR = Pitch Scale Reading
HSC = Head Scale Coincidence
HSR = Head Scale Reading
TR = Total Reading

Result : The thickness of the single sheet is = **0.30mm.**

[End of the activity]

Government Exam Questions

2 Mark

1. Match the following.

Column I	Column II
Electric Current	kg
Luminous intensity	ampere
Temperature	candela
Mass	K

Ans.

Column I	Column II
Electric Current	ampere
Luminous intensity	candela
Temperature	K
Mass	kg

7 Mark

1. Explain a method to find the diameter of spherically body. *[QY - 2019]*

Ans. Procedure :

(i) Find the least count of the Vernier caliper.
(ii) Find the zero correction of the Vernier caliper.
(iii) Fix the object firmly in between the two lower jaws of the Vernier.
(iv) Measure the main scale reading and the Vernier scale coincidence.
(v) Repeat the experiment by placing the jaws of the Vernier at different position of the object.
(vi) Use the below formula to find the diameter of the object.

Diameter of object = d = MSR + (VC × LC) ± ZC (cm)

UNIT
02

MOTION

LEARNING OBJECTIVES

Students will be able to

- List the objects which are at rest and which are in motion around them.
- Understand distance and displacement.
- Determine the displacement and distance covered by an object describing a circular path .
- Classify the motion of vehicles as uniform motion and non-uniform motion. distinguish between speed and velocity.
- Relate accelerated and unaccelerated motion.
- Deduce the equations of motion of an object from velocity – time graph.
- Write the equations of motion for a freely falling body.
- Understand the nature of circular motion.
- Identify centripetal force and centrifugal force in day to day life.

TEXT BOOK EXERCISES

I. Choose the correct answer :

1. The area under velocity – time graph represents the

(a) velocity of the moving object. (b) displacement covered by the moving object.
(c) speed of the moving object. (d) acceleration of the moving object.

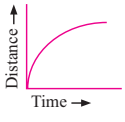
[Ans : (b) displacement covered by the moving object]

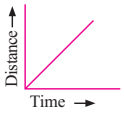
2. Which one of the following is most likely not a case of uniform circular motion?

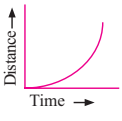
(a) Motion of the Earth around the Sun.
(b) Motion of a toy train on a circular track.
(c) Motion of a racing car on a circular track.
(d) Motion of hours' hand on the dial of the clock.

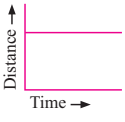
[Ans : (c) Motion of a racing car on a circular track]

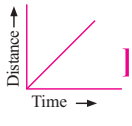
3. Which of the following graph represents uniform motion of a moving particle?

(a) 

(b) 

(c) 

(d) 

[Ans : (b) 

]

II. Fill in the blanks :

1. Speed is a _____ quantity whereas velocity is a _____ quantity. **[*HY - 2019*]**

[Ans : Scalar, Vector]

2. The slope of the distance – time graph at any point gives _____. **[Ans : Speed]**

3. Negative acceleration is called _____. **[Ans : retardation (or) deceleration]**

4. Area under velocity – time graph shows _____. **[Ans : displacement]**

III. State whether true or false. If false, correct the statement :

2. Acceleration can get negative value also.

Ans. True.

3. Distance covered by a particle never becomes zero but displacement becomes zero.

Ans. True.

4. The velocity – time graph of a particle falling freely under gravity would be a straight line parallel to the *x* axis.

Ans. False.

Correct statement : The velocity - time graph of a particle **moving at uniform velocity,** would be straight line parallel to the *x* axis.

5. If the velocity – time graph of a particle is a straight line inclined to X-axis then its displacement – time graph will be a straight line.

Ans. True.

IV. Assertion and reason type questions :

Mark the correct choice as:

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of assertion.

(c) If assertion is true but reason is false.

(d) If assertion is false but reason is true.

1. **Assertion** : The accelerated motion of an object may be due to change in magnitude of velocity or direction or both of them..

Reason : Acceleration can be produced only by change in magnitude of the velocity. It does not depend the direction.

[Ans : (c) If assertion is true but reason is false.]

2. **Assertion** : The Speedometer of a car or a motor-cycle measures its average speed.

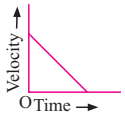
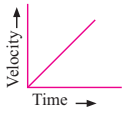
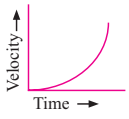
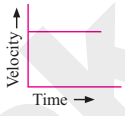
Reason : Average velocity is equal to total displacement divided by total time taken. **[Ans : (d) Assertion is false but reason is true]**

3. **Assertion** : Displacement of a body may be zero when distance travelled by it is not zero.

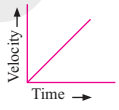
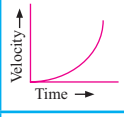
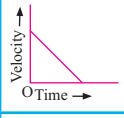
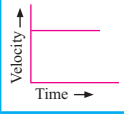
Reason : The displacement is the shortest distance between initial and final position.

[Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion]

V. Match the Following :

	List I		List II
1.	Motion of a body covering equal distances in equal intervals of time	A	
2.	Motion with non uniform acceleration	B	
3.	Constant retardation	C	
4.	Uniform acceleration	D	

Ans.

	List I		List II
1.	Motion of a body covering equal distances in equal intervals of time	A	
2.	Motion with non uniform acceleration	B	
3.	Constant retardation	C	
4.	Uniform acceleration	D	

VI. Answer briefly :

1. Define velocity.

Ans. (i) Velocity is the rate of change of displacement. It is the displacement with unit time. It is a vector quantity. The SI unit of velocity is ms^{-1}.

(ii) Thus, Velocity = Displacement / time taken.

2. Distinguish distance and displacement. *[QY - 2019]*

Ans.

Sl. No.	Distance	Displacement
1	The actual length of the path travelled by a moving body irrespective of the direction	The change in position of a moving body in a particular direction
2	It is a Scalar quantity	It is a Vector quantity

4. Compare speed and velocity.

Ans.

Sl. No.	Speed	Velocity
1.	It is the rate of change of distance with respect to time	It is the rate of change of displacement with respect to time
2.	It is a scalar quantity having magnitude only	It is a vector quantity having both magnitude and direction
3.	Speed is velocity without a particular direction	Velocity is speed in a particular direction
4.	It is measured in ms^{-1} in SI system	It is also measured in ms^{-1} in a particular direction in SI system
5.	Speed in any direction would be a positive quantity, since the distance in any direction is a positive quantity.	Velocity can get both positive and negative values. If velocity in one direction is assumed to be positive then the velocity in the opposite direction would be a negative quantity. Velocity can get zero value also.

5. What do you understand about negative acceleration?

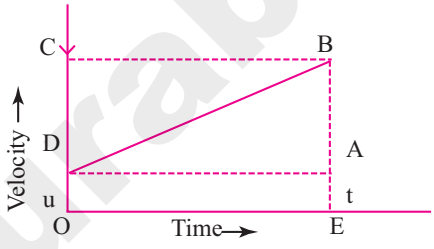
Ans. If velocity decreases with time the value of acceleration is negative.

Note : Negative acceleration is called retardation or deceleration.

VII. Answer in detail :

1. Derive the equations of motion by graphical method. [*QY - 2019*]

Ans. Equations of motion from velocity – time graph:



Graph shows the change in velocity with time of a uniformly accelerated object. The object starts from the point D in the graph with velocity u. Its velocity keeps increasing and after time t it reaches the point B on the graph.

The initial velocity of the object = u = OD = EA

The final velocity of the object = v = OC = EB

Time = t = OE = DA

Also from the graph we know that, AB = DC

1. First equation of motion :

By definition, acceleration = change in velocity / time

= (final velocity – initial velocity)/time

= (OC – OD) / OE

= DC / OE

a = DC / t

DC = AB = at

From the graph EB = EA + AB

$$v = u + at \longrightarrow (1)$$

This is first equation of motion.

2. Second equation of motion :

From the graph the distance covered by the object during time t is given by the area of quadrangle DOEB

s = area of the quadrangle DOEB
= area of the rectangle DOEA + area of the triangle DAB
= (AE × OE) + (1/2 × AB × DA)

$$s = ut + \tfrac{1}{2}(at^2) \longrightarrow (2)$$

This is the second equation of motion.

3. Third equation of motion :

From the graph the distance covered by the object during time, t is given by the area of the quadrangle DOEB. Here DOEB is a trapezium. Then,

s = area of trapezium DOEB
= ½ × sum of length of parallel side × distance between parallel sides
= ½ × (OD + BE) × OE
$s = \tfrac{1}{2} \times (u + v) \times t$

since $a = (v - u) / t$ or $t = (v - u) / a$

Therefore $s = \tfrac{1}{2} \times (v + u) \times (v - u) / a$

$2as = v^2 - u^2$

$$v^2 = u^2 + 2as \longrightarrow (3)$$

This is the third equation of motion.

VIII. Exercise Problems :

1. A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of 10ms^{-2}, with what velocity will it strike the ground? After what time will it strike the ground?

Ans. Here we have

Initial velocity, $u = 0$
Distance, $s = 20$ m
Acceleration, $a = 10 m/s^2$
Final velocity, $v = ?$
Time, $t = ?$

a) Calculation of final velocity, v

We know that, $v^2 = u^2 + 2as$
$v^2 = 0 + 2 \times 10 \times 20$
$v^2 = 400$
v = 20 m/s

b) Calculation of time, t

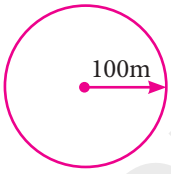
We know that, $v = u + at$
$20 = 0 + 10t$
$20 = 10t$
t = 2s

∴ Ball will strike the ground at a velocity of 20 ms^{-1}

Time taken to reach the ground = **2*s*.**

2. An athlete completes one round of a circular track of diameter 200 m in 40 s. What will be the distance covered and the displacement at the end of 2 m and 20 s?

Ans. Given



Diameter = 200 m
Time of one rotation = 40 s
Diameter of the track = 200m
Radius of track = $\frac{\text{Diameter}}{2} = \frac{200}{2} = 100$ m

Finding Distance:

Now,
Time taken to cover 1 round = 40 s (1 min = 60s)
Total time athletle moves = 2min 20 sec = $2 \times 60 + 20 = 140$ *s*
Distance covered in 1 round = circumference of circle
= $2\pi r = 2 \times \pi \times 100 = 200\pi$ m

Thus,
Distance covered in 40 *s* = $200\,\pi$

Distance covered in 1*s* = $\frac{200\,\pi}{40} = 5\pi$ m

Distance covered in 140 *s* = $140 \times 5\pi = 700\pi = 700 \times \frac{22}{7} = 100 \times 22 =$ **2200 m**

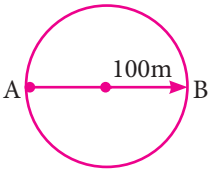
Finding Displacement

Now, it is given that it takes 40s to cover 1 round and he runs for 220 seconds
We find total number of rounds

Total rounds = $\frac{\text{Total Distance covered}}{\text{Distance covered in 1 round}}$

= $\frac{700\,\pi}{200\,\pi} = \frac{7}{2} = 3.5$ rounds

Therfore,
If he started from A, After 140s, he will be at B



Thus,
Displacement = Straight line from A to B
= Diameter of the circle
= **200m**

Intext Activities

ACTIVITY - 1

Look around you. You can see many things: a row of houses, large trees, small plants, flying birds, running cars and many more. List the objects which remain fixed at their position and the objects which keep on changing their position.

Solution :

1. Row of houses, large trees, small plants are the examples, of immovable objects.
2. Flying birds, running cars and buses are the examples of movable objects.

Activity to be done by the students themselves

ACTIVITY - 2

Tabulate the distance covered by a bus in a heavy traffic road in equal intervals of time and do the same for a train which is not in an accelerated motion. From your table what do you understand?

The bus covers unequal distance in equal intervals of time but the train covers equal distances in equal intervals of time.

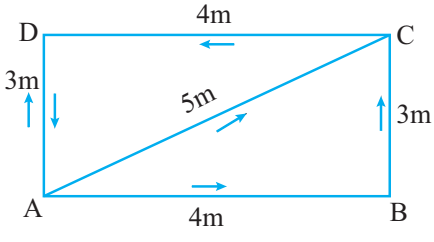
Solution :

Distance covered by a BUS in a heavy traffic	Distance covered by a TRAIN which is NOT in an accelerated motion
In first 10 minutes = 1 km. Next 10 minutes = 2 km. Next 10 minutes = 1.5 km	In first 5 minutes = 2 km. Next 5 minutes = 2 km. Next 5 minutes = 2 km
Covers unequal distance in equal intervals of time.	Covers equal distances in equal intervals of time
Such motion is called Non Uniform Motion.	Such motion is called Uniform Motion.

ACTIVITY - 3

Observe the motion of a car as shown in the figure and answer the following questions:

Compare the distance covered by the car through the path ABC and AC. What do you observe? Which path gives the shortest distance to reach D from A? Is it the path ABCD or the path ACD or the path AD?



Solution :

1. Distance covered by the car through the path ABC = 4m + 3m = 7 m. and AC = 5 m. The distance covered by the car through the path ABC is large compared to AC.
2. The shortest distance to reach D from A is path AD = 3m.
3. The total distance covered by the car ABCDA = 14 m. It finally reaches to A.

ACTIVITY - 4

Take a large stone and a small eraser. Stand on the top of a table and drop them simultaneously from the same height? What do you observe? Now, take a small eraser and a sheet of paper. Drop them simultaneously from the same height. What do you observe? This time, take two sheets of paper having same mass and crumple one of the sheets into a ball. Now, drop the sheet and the ball from the same height. What do you observe?

Solution :

Both the stone and the eraser have reached the surface of the Earth almost at the same time.

The eraser reaches first and the sheet of paper reaches later.

The paper crumpled into a ball reaches ground first and plain sheet of paper reaches later, although they have equal mass. It is because of air resistance. The magnitude of air resistance despends on the area of object exposed to air. So the sheet of paper reaches later.

Government Exam Questions

1 Mark

1. Unit of acceleration is *[QY - 2019]*

(a) ms^{-1} (b) ms^{-2} (c) ms (d) ms^2

[Ans : (b) ms^{-2}]

2. The magnitude of the centripetal force is given by (F = _____)

(a) $\frac{mv^2}{r}$ (b) $\frac{v^2}{r}$ (c) $\frac{2\pi}{T}$ (d) ma

[Ans : (a) $\frac{mv^2}{r}$]

3. In India the voltage of alternating current used for domestic purpose is _____.

(a) 50V (b) 5V (c) 220V (d) 110V

[Ans : (c) 220V]

2 Mark

1. A sound is heard 5 s later than the lightning is seen in the sky on a rainy day. Find the distance of location of lightning? Given the speed of sound = 346 ms^{-1}

Solution :

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

Distance = Speed × Time = 346 × 5 = 1730 m

Thus, the distance of location of lightning is 1730 m.