

5:01 PM ⓘ



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My Courses

2019-20 GSEB Eng Std-9 A
[GSEB Eng Std-9]



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Study Material



Calendar



Discussions



Suggestions



Test Results



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GSEB Eng Std-9

Mathematics



** Science



Social Studies



Sanskrit



Computer Studies



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GSEB Eng Std-9 >> ** Science >> ** Semester 1 >>

All Chapters

Chapter-1: Motion



Chapter-2: Force and Laws of Motion



Chapter-3: Gravitation



Chapter-4: Properties of Matter



Chapter-5: Structure of Atom



Chapter-6: The Fundamental Unit of Life: The Cell



Chapter-7: Plant Tissues



Chapter-8: Animal Tissues



Chapter-9: Why do we fall ill?



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GSEB Eng Std-9 >> ** Science >> ** Semester 1 >> All Chapters >>

Chapter-1: Motion

Study Material | Textbook content



Study Material | Video Lesson



Practice Test | Ch-1 Test online



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GSEB Eng Std-9 >> ** Science >> ** Semester 1 >> All Chapters >>

Chapter-2: Force and Laws of Motion

Study Material | C2_pdf



Study Material | Video Lesson



Trainer





1

Motion

1.1 Introduction

Dear students, come out of home and walk around. You would find that many things are stationary and many things are moving. People walking on a road, moving vehicles, birds flying in the sky, light rays coming from the sun etc., are in motion. The stationary objects on the earth like roads, bridges, trees, buildings are also in motion due to rotation of the earth. Blood being circulated in a body, air, going into the lungs and coming out of lungs, water flowing in a river, tides of river etc. are examples of motion. The earth around the sun, the sun in the milky way galaxy, and the milky way galaxy with respect to other galaxies, are in motion. Some of the motions are invisible. For example, motion of the molecules of gas, motion of air, motion of sound waves. Such motions are experienced indirectly.

Thus, each object in the universe is in motion. Some of them are moving along a straight line, some are moving along a circular path, or a curved path whereas some have vibrational motion. In this chapter we study, the simplest, motion along a straight line. For description of such a motion we will understand concepts of physical quantities like distance, displacement, velocity and acceleration.

1.2 Concept of Motion

When is a body said to be in motion or stationary? If position of a body changes with time it is said to be in motion. If its position does not change with time it is said to be stationary. Is this answer correct? Let us clarify.

Suppose you are sitting in a school bus along with your school bag. Bus is going towards the school. If you look at your school bag, it is told to be stationary. If you look out through window you

would see the trees, buildings and poles of electricity are found to be in motion. If your friend, standing on the road sees you and your bag, he observes you and your bag are in motion, whereas for him building and trees are stationary.

Now, it should be clear that the body whether it is in motion or stationary, depends on the position of observation also. Thus motion is relative.

Activity 1: Have you experienced your train moving when you have been sitting in a train which is stationary on a platform? Discuss your experience with your friend.

1.3 Position, Distance and Displacement

It is necessary to decide position of the body, if its motion is to be described. The point which is used as a reference to indicate the position of a body is called reference point. Reference point can be selected as per your convenience. If someone asks you, "Where is Gandhinagar?". This question may have many answers. For example, "at 30 km distance from Ahmedabad or at 130 km distance from Vadodara." In the first answer Ahmedabad and in the second answer, Vadodara are the reference places. Thus in the description of position of a body reference point must be mentioned.

Distance: Length of the path of motion of an object during given time period is called distance or path length travelled by the object.

Displacement: In given time interval change in position of a body in given direction is called displacement.

If the body is on x_1 and x_2 positions at times t_1 and t_2 respectively, its displacement in time interval $\Delta t = t_2 - t_1$ can be determined as follows:

$$\text{Displacement} = \text{Final position} - \text{Initial position}$$

$$= x_2 - x_1 \quad 1.3.1$$

Motion

Equation 1.3.1 gives the magnitude of displacement. Direction of the displacement is from the initial position to the final position. Let us understand the difference between distance and displacement clearly using following example.

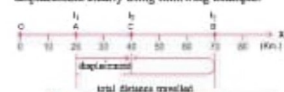


Figure 1.1: Distance and Displacement

Suppose a car is moving in the direction of X-axis. As shown in Figure 1.1, at time t_1 , the car is at A, at time t_2 it is at B, and at time t_3 it is at C. Here C is reference point.

Now, in time period $\Delta t = t_2 - t_1$,
 Path length or distance travelled
 = length of path of motion from A to B
 + length of path of motion from B to C

From the three cases given above it is clear that **path length is always positive whereas displacement can be positive, negative or zero.** Distance travelled by a body gives total length of path of motion, whereas displacement shows final effect of the motion only. Displacement does not give information about the path on which body has travelled.

To describe displacement, magnitude and direction both are required. Such physical quantities are known as vector quantities. To describe total length of path of motion, direction is not needed, only its magnitude is important. Such physical quantities are known as scalar quantities.

Unit of distance and displacement both, are in metre (m). In practice often units like centimetre (cm) and kilometre (km) are also used.

In Physics quantities are mainly divided in



1

Motion

1.1 Introduction

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Motion

1

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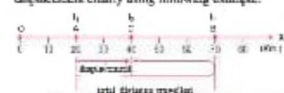


Figure 1.1 Distance and displacement

Suppose a car is moving in the direction of X-axis. As shown in Figure 1.1 at time t_1 the car is at A, at time t_2 car reaches B and comes to C at time t_3 . Here O is reference point.

Now, in time period $\Delta t = t_3 - t_1$

Path length or distance travelled
 $=$ length of path of motion from A to B
 $+ \text{length of path of motion from B to C}$
 $= AB + BC$
 $= (70 - 20) + (70 - 40)$
 $= 80 \text{ km}$

From the three cases given above it is clear that **path length is always positive whereas displacement can be positive, negative or zero.** Distance travelled by a body gives total length of path of motion, whereas displacement shows final effect of the motion only. Displacement does not give information about the path on which body has travelled.

To describe displacement, magnitude and direction both are required. Such physical quantities are known as vector quantities. To describe total length of path of motion, direction is not needed, only its magnitude is important. Such physical quantities are known as scalar quantities.

SI unit of distance and displacement both, are in metre (m). In practice often units like centimetre (cm) and kilometre (km) are also used.

In physics quantities are mainly divided in two parts :

(1) scalar quantity and (2) vector quantity.

Scalar quantity : The quantity, which



1

Motion

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1.3 Position, Distance and Displacement

It is necessary to decide position of the body

time and so, acceleration is positive. The object is said to have accelerated motion. Direction of acceleration is in the direction of velocity.

- (ii) If $v < u$, velocity of the object decreases with time and so, acceleration is negative. In this case the object is said to have retarded motion. Direction of retardation is in the direction opposite to that of velocity.

Acceleration is also vector quantity like velocity. Its SI unit is metre/second² (symbol: m/s^2). Its CGS unit is cm/s^2 .

Illustration 7 : A vehicle starting its motion from rest, travels along a straight path and acquires 36 km/h velocity in 10 s. Now due to application of breaks, its velocity reduces to 18 km/h in 5 s. Find acceleration in both the cases.

Solution : For first case

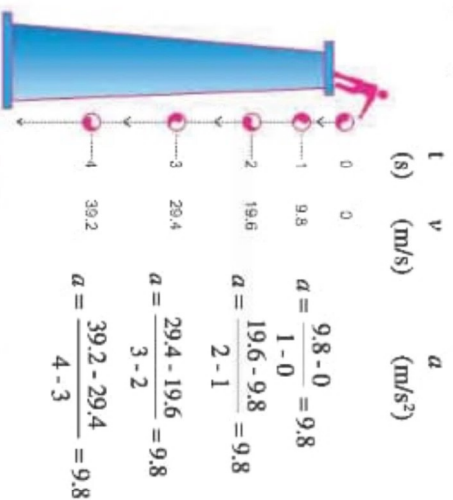
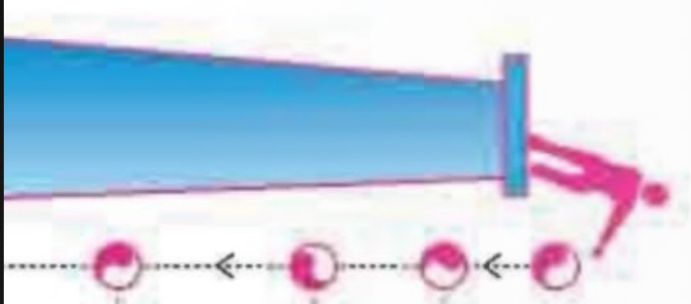


Figure 1.5 Uniform accelerated motion

In figure 1.5 position, velocity and acceleration of the ball are shown at each second, from figure it is clear that in each time interval of 1 second it is clear that in each time interval of 1 second it increases in velocity of the ball is same so it is said

object
 motion
 velocity.
 with
 this
 motion.
 motion



t (s)	v (m/s)	a (m/s ²)
------------	--------------	----------------------------

$$a = \frac{9.8 - 0}{1 - 0} = 9.8$$

$$a = \frac{19.6 - 9.8}{2 - 1} = 9.8$$

$$a = \frac{29.4 - 19.6}{3 - 2} = 9.8$$

Class - 9th

Subject - Science Physics

Chapter - 8

Motion

Numericals

NCERT Solution

NOTES

Part - 1

Part - 2

Equation of Velocity - Time Relation (1st equation of motion)

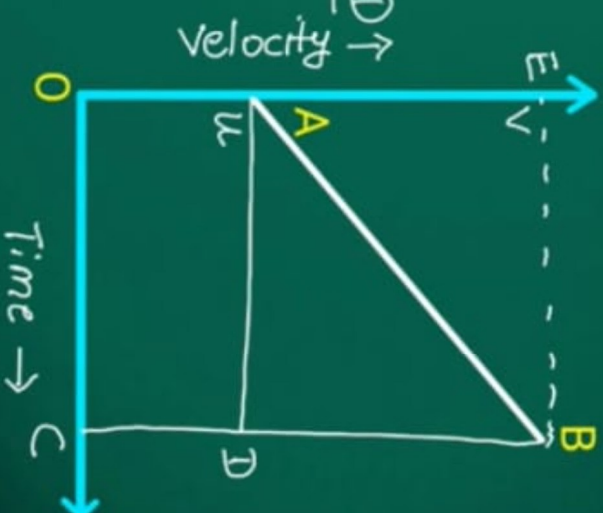
Slope of velocity-Time graph = $AB = \text{Acceleration}$

$$\text{Slope} = \frac{\text{Rise}}{\text{Run}}$$

$$AB = \frac{BD}{AD}$$

$$AB = \frac{BC - CD}{AD}$$

$$\begin{aligned} BC &= BD + CD \\ BC - CD &= BD \end{aligned}$$



5:08 PM



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Calendar

Saturday, Sep 5, 2020



today

month

week

day

SATURDAY 5/9

ALL-DAY

12AM

1AM

2AM

3AM

4AM

5AM

6AM

7AM

7:00 - 8:00

Science Ch-1 study

8AM

8:00 - 9:00

Science Ch-1 Test on

9AM

5:09 PM



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6AM

7AM

7:00 - 8:00

Science Ch-1 study

8AM

8:00 - 9:00

Science Ch-1 Test on

9AM

9:30 - 11:00

10AM

Science Ch-2 revisio

11AM

11:00 - 12:00

Maths ch-4 Live

12PM

1PM

2PM

3PM

4PM

5PM

6PM

7PM

5:09 PM ⓘ



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Calendar [Task] ✕

05-09-2020 09:30 - 05-09-2020 11:00

Science Ch-2 revision

Description



Reference

[Video Lesson \[Study Material\]](#)

Trainer:

Trainer E1

Completion Percentage:

0

Completion Report:



Trainer ▼



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Calendar [Task] ✕

05-09-2020 07:00 - 05-09-2020 08:00

Science Ch-1 study

Description



Reference

[Textbook content \[Study Material\]](#)

Trainer:

Trainer E1

Completion Percentage:

0

Completion Report:



Trainer ▼



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Calendar [Task]

05-09-2020 08:00 - 05-09-2020 09:00

Science Ch-1 Test online

Description



Reference

[Ch-1 Test online \[Practice Test\]](#)

Trainer:

Trainer E1

Completion Percentage:

0

Completion Report:



Trainer



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GSEB Eng Std-9 >> ** Science >> ** Semester 1 >> All
Chapters >> Chapter-1: Motion >> **Ch-1 Test online**



START TEST

View Test Detils

5:10 PM



TEST

Welcome, Student e1 ()

Remaining Time - 00 : 09 : 47

2020-05-21 (1)

2 / 50

2. 'To arrive' means



to go



to come



to see



to arrest

Previous

Next

Finish Test



5:10 PM



TEST

Welcome, Student e1 ()

Remaining Time - 00 : 09: 58

2020-05-21 (1)

1 / 50

1. બેંક દ્વારા કઈ સુવિધા આપવામાં આવતી નથી ?



લોકર



ધિરાણ



મકાન



એ.ટી.એમ.કાર્ડ

Previous

Next

Finish Test



GUJARATI

ENGLISH



5:12 PM ⓘ



TEST

Welcome, Student e1 ()

Remaining Time - 00 : 08 : 26

📄 2020-05-21 (1)

6 / 50

6. You are a nice person everybody likes to be your friend.



such...as



such...that



same....as



so...that

Previous

Next

Finish Test



5:10 PM



TEST

Welcome, Student e1 ()

Remaining Time - 00 : 09 : 39

2020-05-21 (1)

2 / 50

2. 'To arrive' means



to go



to come



to see



to arrest

Previous

Next

Finish Test



5:12 PM ⓘ



TEST

Welcome, Student e1 ()

Remaining Time - 00 : 08 : 21

📅 2020-05-21 (1)

6 / 50

6. You are a nice person everybody likes to be your friend.

such...as

app3.samayiot.com says

Are you sure? Test Results will be locked once you confirm the test finish

Cancel

OK

so...that

Previous

Next

Finish Test

1 2 3 4 5 6 7 8 9

5:12 PM



Welcome, Student e1 ()

**Thanks for giving
exam**



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Test Results

Hindi test Jan 2020
95 / 100 (95%)

Social Studies test Jan 2020
75 / 100 (75%)

English test Jan 2020
85 / 100 (85%)

Science test Jan 2020
78 / 100 (78%)

Maths test Jan 2020
80 / 100 (80%)



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Notice Board

For All Cand
For All Candidate
Pubished on 05-08-2020



For All Cand 2
For All Candidate 2
Pubished on 05-08-2020



Title 1
Title 1 Title 1 Title 1 Title 1 Title 1 Title 1 Title 1
Title 1
Pubished on 03-08-2020

