



# PHYSICS

## NCERT - NCERT Physics(Telugu)

### MOTION

#### Example

1. A car is moving with the acceleration  $2 \text{ m/s}^2$  from rest. Find the distance traveled by the car in 10th second.



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2. A car is moving with the initial velocity 15 m/s. Car stopped after 5s by application of breaks. Find the retardation (Deceleration).



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3. A bus is moving with the initial velocity of 'u' m/s. After applying the breaks, its retardation is  $0.5 \text{ m/s}^2$  and it stopped after 12s. Find the

initial velocity ( $u$ ) and distance travel by the bus after applying the breaks.



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4. At a distance  $L = 400\text{m}$  away from the signal light, brakes are applied to a locomotive moving with a velocity,  $u = 54 \text{ km/h}$ . Determine the position of rest of the locomotive relative to the signal light after 1 min of the application of the brakes if its acceleration  $a = -0.3 \text{ m/s}^2$



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5. What is the speed of the body moving with uniform acceleration at the midpoint of two points on a straight line, where the speeds are  $u$  and  $v$  respectively ?



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6. A car travels from rest with a constant acceleration " $a$ " for " $t$ " seconds. What is the

average speed of the car for its journey if the car moves along a straight road?



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7. A particle moving with constant acceleration of  $2m / s^2$  due west has an initial velocity of  $9m/s$  due east. Find the distance covered in the fifth second of its motion.



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8. A man standing under a street lamp of height 'H' above the ground starts running with a constant speed 'v' in a constant direction. The light from the lamp falling on the man forms a shadow of him. Find the velocity with which the edge of the shadow of the man's head moves over the ground if his height is "h".



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9. At a distance  $L = 400\text{m}$  away from the signal light,brakes are applied to a locomotive moving at a velocity  $u = 54 \text{ km/h}$ .Determine the position of the locomotive relative to the signal light after 1 min of the application of the brakes if its acceleration  $a = - 0.3 \text{ m/s}^2$



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10. What is the speed of the body moving with uniform accelerated motion at midpoint of

two points on the straight line, where the speeds are  $u$  and  $v$  respectively?



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**11.** A car travels from rest with a constant acceleration “ $a$ ” for “ $t$ ” seconds. What is the average speed of the car for its journey if the car moves along a straight road?



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12. A particle moving with constant acceleration of  $2\text{m/s}^2$  due west has an initial velocity of  $9\text{ m/s}$  due east. Find the distance covered in the fifth second of its motion.



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Let Us Improve Our Learning Reflections On Concepts

1. Distinguish between speed and velocity.



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2. How can you say that a body is in motion? Is it a common property? ( $AS_1$ )



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3. How do you measure instantaneous speed?



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4. Explain acceleration with an example ?

( $AS_1$ )



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5. What do you mean by acceleration ? ( $AS_1$ )



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**Let Us Improve Our Learning Application Of  
Concepts**

1. Draw the distance - time graph when its speed decreases uniformly. ( $AS_5$ )



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2. What is the average speed of a Cheetah that sprints 100m in 4 sec ? What if it sprints 50 m in 2 sec ?



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3. A car travels at a speed of 80 km/h during the first half of its running time and at 40 km/h during the other half. Find the average speed of the car. (60 km/h)



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4. A particle covers 10m in first 5 sec and 10m in next 3 sec. Assuming constant acceleration, find initial speed, acceleration and distance covered in next 2 sec.





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## Let Us Improve Our Learning Higher Order Thinking Questions

1. When the velocity is constant, can the average velocity over any time interval differ from instantaneous velocity at any instant ? If so, give an example, If not, explain why.



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2. You may have heard the story of the race between the rabbit and tortoise. They started from same point simultaneously with constant speeds. During the journey, rabbit took rest somewhere along the way for a while. But tortoise moves steadily with lesser speed and reaches finishing point before rabbit. Rabbit woke up and ran, but rabbit realized that the tortoise had won the race. Draw distance vs time graph for this story.



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3. A man is 48m behind a bus which is at rest. The bus starts accelerating at the rate of  $1\text{m}/\text{s}^2$ , at the same time the man starts running with uniform velocity of 10 m/s. What is the minimum time in which the man catches the bus ?



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Let Us Improve Our Learning Multiple Choice Question



1. The distance travelled by an object in a specified direction is

A. Speed

B. Displacement

C. Velocity

D. Acceleration

**Answer:**



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2. If an object is moving with constant velocity then the motion is

- A. Motion with Non uniform acceleration
- B. Motion with Uniform Acceleration
- C. Uniform Motion
- D. Non uniform Motion

**Answer:**



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3. If there is change in the velocity of the object then the state of object with respect to motion is

- A. State of Constant Speed
- B. State of Constant velocity
- C. State of Uniform Motion
- D. State of Non uniform Motion

**Answer:**



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4. If the acceleration of a moving object is constant then the motion is said to be

A. Motion with Constant Speed

B. Motion with Uniform Acceleration

C. Motion with Uniform Velocity

D. Motion with Non Uniform acceleration

**Answer:**



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## Let Us Improve Our Learning Suggested Experiments

1. Do an experiment to understand the changes in weight of reactants and products in a chemical reaction, write a report.



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**Think And Discuss**

1. What is the displacement of the body if it returns to same point from where it started ?

Given on example from daily life.



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2. When do the distance and magnitude of displacement become equal ?



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3. What is the average speed of the car if covers 200km in 5h ?



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4. When does the average velocity become zero ?



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5. A man used his car. The initial and final odometer readings are 4849 and 5549 respectively. The journey time is 25h. What is his average speed during the journey ?



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6. The speedometer of the car indicates a constant reading. Is the car in uniform motion ? Explain.



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7. Very often you must have seen traffic police catching motorists and scooter drivers who drive fast and fine them. Does fine for speeding depend on average speed or instantaneous speed ? Explain.



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8. One airplane travels due north at  $300\text{km/h}$  and another airplane travels due south at  $300$

km/h. Are their speeds the same ? Are their velocities the same ? Explain.



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**9.** An ant is moving on the surface of a ball. Does its velocity change or not ? Explain.



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**10.** Give an example of motion where there is a change only in speed but no change in

direction of motion.



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**11.** What is the acceleration of the race car that moves at constant velocity of 300 km/h ?



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**12.** Which has the greater acceleration, an airplane, that goes from 1000 km/h to 1005

km/h in 10s or a skateboard that goes from zero to 5km/h in 1 second ?



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**13.** What is the deceleration of a vehicle moving in a straight line that changes its velocity from 100 km/h to a dead stop in 10 sec ?



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14. Correct your friend who says "Acceleration gives an idea of how fast the position changes."



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## Examples

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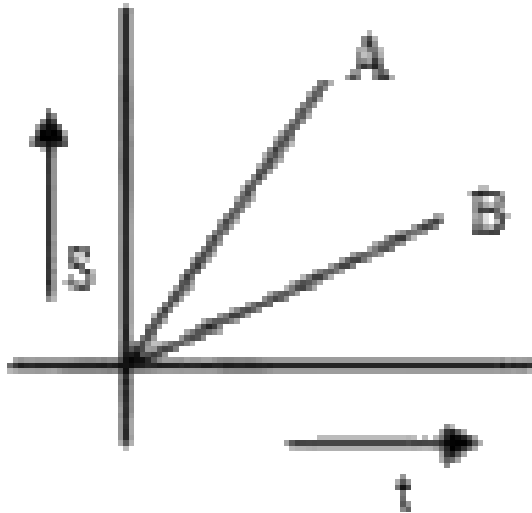


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# Let Us Improve Our Learning Application Of Concepts

1. A body leaving a certain point “ O” moves with a constant acceleration. At the end of the 5<sup>th</sup> second its velocity is 1.5 m/s. At the end of the sixth second the body stops and then begins to move backwards. Find the distance traversed by the body before it stops. Determine the velocity with which the body

returns to point “ O “ ?



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2. A train of length 50m is moving with a constant speed of 10m/s. Calculate the time

taken by the train to cross an electric pole and a bridge of length 250 m.



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3. A particle covers 10m in first 5s and 10m in next 3s. Assuming constant acceleration. Find initial speed, acceleration and distance covered in next 2s.



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## Improve Your Learning

1. A car covers half the distance at a speed of 50 km/h and the other half at 40km/h. Find the average speed of the car.



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2. Derive the equation for uniform accelerated motion for the displacement covered in its nth second of its motion.)



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3. A particle covers 10m in first 5s and 10m in next 3s. Assuming constant acceleration. Find initial speed, acceleration and distance covered in next 2s.



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4. A car starts from rest and travels with uniform acceleration " $\alpha$ " for some time and then with uniform retardation " $\beta$ " and comes

to rest. The time of motion is “  $t$  ” . Find the maximum velocity attained by it.



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5. A body leaving a certain point “ O ” moves with an a constant acceleration. At the end of the 5 th second its velocity is 1.5 m/s. At the end of the sixth second the body stops and then begins to move backwards. Find the distance traversed by the body before it stops.

Determine the velocity with which the body returns to point “O” ?



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6. A point mass starts moving in a straight line with constant acceleration “ $a$ ”. At a time  $t$  after the beginning of motion, the acceleration changes sign, without change in magnitude. Determine the time  $t_0$  from the beginning of the motion in which the point mass returns to the initial position.





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7. A train of length 50m is moving with a constant speed of 10m/s. Calculate the time taken by the train to cross an electric pole and a bridge of length 250 m.



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8. Two trains, each having a speed of 30 km/h, are headed at each other on the same track. A bird flies off one train to another with a

constant speed of 60 km/h when they are 60km apart till before they crash. Find the distance covered by the bird and how many trips the bird can make from one train to other before they crash?



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