



PHYSICS

NCERT - NCERT PHYSICS(TAMIL ENGLISH)

MOTION

Example

1. A car is moving with the acceleration 2 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 (Decelaration).



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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 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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Let Us Improve Our Learning Reflections On Concepts

1. Distinguish between speed and velocity.

(AS_1)



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2. Briefly explain about constant acceleration?



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3. How can you say that a body is in motion? Is it a common property?



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4. Distinguish between average velocity and average speed .



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5. How do you measure instantaneous speed?

(AS_1)



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6. Explain acceleration with an example ?

(AS_1)



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7. What do you mean by acceleration ? (AS_1)



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Let Us Improve Our Learning Application Of Concepts

1. In the above figure distance vs time graphs showing motion of two cars A and B are given.

Which car moves fast ? (AS_1)



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2. A body leaving a certain point “ O ” moves with 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 “ ? (27m, -9 m/s)



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3. 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. (5s , 30s) (AS_1)



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4. Draw the distance vs time graph when the speed of a body increases uniformly. (AS_5)



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5. Draw the distance – time graph when its speed decreases uniformly.



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6. What is the average speed of a Cheetah that sprints 100m in 4sec. ? What if it sprints 50m in 2sec? (25 m/s)(AS₇)



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7. 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) (AS_7)



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8. 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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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. (AS_2)



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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 the tortoise moved steadily with lesser speed and reached the finishing point before rabbit. Rabbit wokeup and ran, but rabbit realized that the tortoise had won the race. Draw distance vs time graph for this story. (AS_5)



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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 m/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? (AS_7)



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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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Think And Discuss

1. What is the displacement of the body if it returns to the same point from where it started? Give one 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 it covers 200 km in 5 h?



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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 stopping motorists or 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 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 a 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 10s?



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



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Problems

1. An object travels 16 m in 4 s and then another 16 m in 2 s. What is the average speed of the object?



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2. 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}



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3. The brakes applied to a car produce an acceleration of 6 ms^{-2} in the opposite direction to the motion. If the car takes 2 s to

stop after the application of brakes, calculate the distance traveled during this time



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4. A 900 kg car moving at 10 ms^{-1} takes a turn around a circle with a radius of 25 m. Determine the acceleration and the net force acting upon the car.



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