PHYSICS

BOOKS - ICSE

MOTION IN ONE DIMENSION

Example

1. Select the scalars and vectors from the following: Velocity, distance, acceleration, work, mass, retardation.

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2. Express the speed 36 km h^{-1} in m s^{-1} .

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3. Find the distance travelled by a body in 5 minutes if it travels with a uniform speed of 20 m s^{-1} .

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4. A train moving with uniform speed covers a distance of 120 m in 2 s. Calculate : (i) the speed of the train, (ii) the time it will take to cover 240 m.

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5. A body rises vertically up to a height of 125 m in 5 s and then comes back at the point of projection. Find: (i) the total distance travelled, (ii) the displacement, (iii) the average speed and (iv) the average velocity of the body.

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6. A train first travels for 30 min with a velocity 30 km h^{-1} and then for 40 min with a velocity 40 km h^{-1} in the same direction, Calculate : (i) the total distance travelled, (ii) the average velocity of the train.

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7. A car travels a distance 50 km with a velocity 25 km h^{-1} and then 60 km with a velocity 20 km h^{-1} in the same direction. Calculate : (i) the total time of journey and (ii) the average velocity of the car.

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8. The velocity of an object increases at a constant rate from 20 m s^{-1} to 50 m s^{-1} in 10 s. Find the acceleration.

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9. A pebble thrown vertically upwards with an initial velocity 50 m s^{-1} comes to a stop in 5 s. Find the retardation.

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10. The table below shows the distance in cm, travelled by the objects A, B and C during each second. (i) Which object is moving with constant speed ?

Give a reason for your answer.

(ii) Which object is moving with a constant acceleration? Give a reason.

(iii) Which object is moving with irregular acceleration?

Time	Distance (in cm) covered in each second by *A*, *B* and *C*		
	Object *A*	Object *B*	Object *C*
1st second	20	20	20
2nd second	20	36	60
3rd second	20	24	100
4th second	20	30	140
5th second	20	48	180

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11. The following table represents the distance of a car at different instants in a fixed direction.

Time (s)	0	1	2	3	4	5
Distance (m)	0	10	20	30	40	50

(a) Draw a displacement-time graph and with its help, find whether the motion of the car is uniform or non-uniform?

(b) Use graph to calculate :

(i) the velocity of car (ii) the displacement of car at t = 2.5 s and t = 4.5 s.

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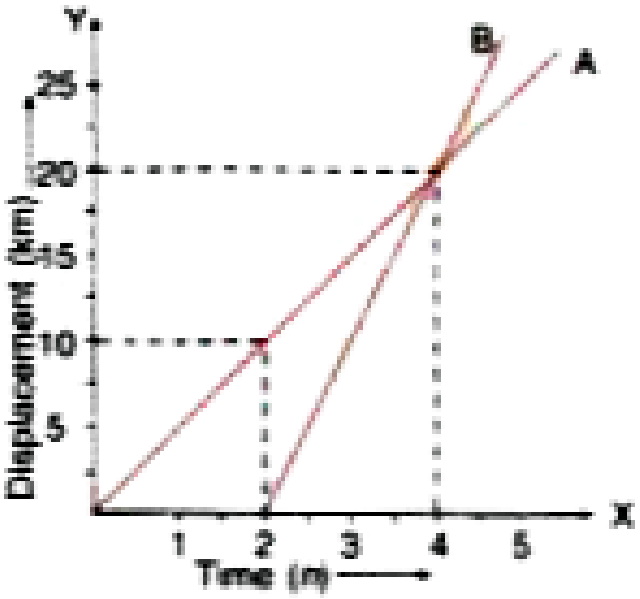
12. Fig 2.26 shows the displacement-time graph for the motion of two boys A and B along a straight road in the same direction. Answer the following:

(i) When did B start after A ?

(ii) How far away was A from B when B started?

(iii) Which of the two has greater velocity ?

(iv) When and where did B overtake A ?



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13. A car travels with a uniform velocity of 20 m s^{-1} for 5 s. The brakes are then applied and the car is uniformly retarded. It comes to rest in further 8 s. Draw a graph of velocity against time. Use this graph to find :

(i) the distance travelled in first 5 s,

(ii) the distance travelled after the brakes are applied,

(iii) total distance travelled, and

(iv) acceleration during the first 5 s and last 8 s.

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14. A train starts from rest and accelerates uniformly at 100 m minute^{-2} for 10 minutes. Find the velocity acquired by the train. It then maintains a constant velocity for 20 minutes. The brakes are then applied and the train is uniformly retarded. It comes to rest in 5 minutes. Draw a velocity-time graph and use it to find :

(i) the retardation in the last 5 minutes,

(ii) total distance travelled, and

(iii) the average velocity of the train.

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15. A stone is thrown vertically upwards with an initial velocity of 40 m s^{-1}. Taking g = 10 m s^{-2}, draw the velocity-time graph of the motion of stone till it comes back on the ground.

(i) Use graph to find the maximum height reached by the stone. (ii) What is the net displacement and total distance covered by the stone ?

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16. A car starting from rest, accelerates at a rate of 2 m s^{-2} for 5 s. For this journey, (a) draw the velocity-time graph (b) draw the displacementtime graph using the velocity-time graph in part (a).

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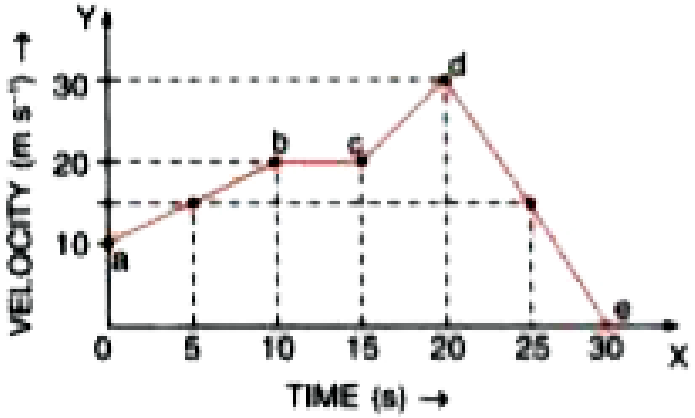
17. The following table represents the velocity of a moving body at different instants of time. Times (s) 0 5 10 15 20 25 30 Velocity (ms −1) 10 15 20 20 30 15 0 The velocity-time graph is as shown in figure.



For which interval of time the body has a uniform motion ? Find the velocity in this time interval ? 204500 Expand-image

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18. A car acquires a velocity of 72 km h^{-1} In 10 s starting from rest. Calculate :

(i) the acceleration,

(ii) the average velocity, and

(iii) the distance travelled in this time.

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19. A ball is initially moving with a velocity $0.5ms^{-1}$ ms. Its velocity decreases at a rate of 0.05 m s^{-2}. (a) How much time will it take to stop ? (b) How much distance will the ball travel before it stops ?

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20. A body initially at rest travels a distance 100 m in 5 s with a constant acceleration. Calculate : (i) the acceleration, and (ii) the final velocity at the end of 5 S.

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21. A car initially at rest starts moving with a constant acceleration of 0.5 m s^{-2} and travels a distance of 25 m. Find : (i) its final velocity and (ii) the time taken.

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22. A body moving with uniform acceleration travels 84 m in the first 6 s and 180 m in the next 5 s. Find : (a) the initial velocity, and (b) the acceleration of the body.

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23. A body with an initial velocity of 18 km h^{-1} accelerates uniformly at the rate of 9 cm s^{-2} over a distance of 200 m. Calculate :

(i) the acceleration in m s^{-2}

(ii) its final velocity in m s^{-1}.

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24. A particle initially at rest, moves with an acceleration 5 m s^{-2} for 5 s. Find the distance travelled in (a) 4 s, (b) 5 s and (c) 5th second.

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25. A particle starts to move in a straight line from a point with velocity 10 m s^{-1} and acceleration - 2.0 ms^{-2}. Find the position and velocity of the particle at (i) t = 5 s, (ii) t' = 10 s.

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Exercise 2 A

1. Differentiate between scalar and vector quantities, giving two examples of each.

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2. State whether the following quantity is a scalar or vector ?

(a) pressure (b) force

(c) momentum (d) energy

(e) weight (f) speed.

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3. When is a body said to be at rest?

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4. When is a body said to be in motion ?

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5. When a body is said to be in motion ? What do you mean by motion in one direction ?

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6. Define displacement. What is its S.I. unit?

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7. Explain the difference between distance and displacement with an example.

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8. Can displacement be zero even if distance is not zero ? Give one example to explain your answer.

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9. When is the magnitude of displacement equal to the distance ?

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10. Define the term velocity ratio. State its unit.

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11. Define speed. What is its S.I. unit?

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12. Distinguish between speed and velocity.

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13. Which quantity, speed or velocity gives the direction of motion of a body?

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14. When is the instantaneous speed same as the average speed ?

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15. Distinguish between uniform velocity and variable velocity.

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16. Distinguish between average speed and average velocity.

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17. Give an example of motion of a body moving with a constant speed, but with a variable velocity. Draw a diagram to represent such a motion.

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18. Give an example of motion in which average speed is not zero, but average velocity is zero.

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19. Define acceleration. State its S.I. unit.

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20. Distinguish between acceleration and retardation.

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21. Differentiate between uniform acceleration and variable acceleration.

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22. What is meant by the term retardation ? Name its S.I. unit.

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23. Which of the quantity, velocity or acceleration determines the direction of motion ?

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24. Give one example of each of the following:

(a) uniform velocity (b) variable velocity

(c) variable acceleration (d) uniform retardation.

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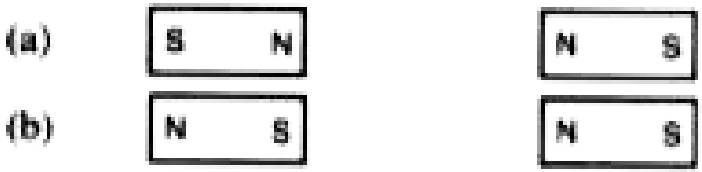
25. The diagram (Fig. 2.6) below shows the pattern of the oil on the road, dripping at a constant rate from a moving car. What informations do you get from it about the motion of the car ?



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26. Define the term acceleration due to gravity. State its average value.

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27. "The value of g remains same at all places on the earth surface'. Is this statement true ? Give reason for your answer.

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28. If a stone and a pencil are dropped simultaneously in vacuum from the top of a tower, which of the two will reach the ground first ? Give reason.

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Exercise 2 A Multiple Choice Type

1. A vector quantity is :

A. work

B. pressure

C. distance

D. velocity

Answer: C

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2. The S.I. unit of velocity is :

A. km h^{-1}

B. m $\min^{-1}$

C. km $\min^{-1}$

D. m s^{-1}

Answer: A

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3. The unit of retardation is :

A. ms^{-1}

B. ms^{-2}

C. m

D. ms^2

Answer: B

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4. A body when projected up with an initial velocity u goes to a maximum height h in time t and then comes back at the point of projection. The correct statement is :

A. the average velocity is 2h/t

B. the acceleration is zero

C. the final velocity on reaching the point of projection is 2u.

D. the displacement is zero.

Answer: A::C::D

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5. 18 k m h^{-1} is equal to :

A. 10 ms^{-1}

B. $5ms^{-1}$

C. $18ms^{-1}$

D. $1.8ms^{-1}$

Answer: A

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Exercise 2 A Numericals

1. The speed of a car is 72 km h^{-1}. Express it in m s^{1}

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2. Express 15 ms^{-1} in km h^{-1}.

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3. Express each of the following in ms^{-1}:

(a) $1kmh^{-1}$ (b) 18 km $\min^{-1}$

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4. Arrange the following speeds in increasing order: 10 m s^{-1}, 1 km $\min^{-1}$

18 km h^{-1}

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5. A train takes 3 h to travel from Agra to Delhi with a uniform speed of 65 km h^{-1}'. Find the distance between the two cities.

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6. A car travels first 30 km with a uniform speed of 60 km h^{-1} and then next 30 km with a uniform speed of 40 km h^{-1}. Calculate : (i) the total time of journey, (ii) the average speed of the car.

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7. A train takes 2 h to reach station B from station A, and then 3 h to return from station B to station A. The distance between the two stations is 200 km. Find : (i) the average speed, (ii) the average velocity of the train.

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8. A car moving on a straight path covers a distance of 1 km due east in 100 s. What is (i) the speed and (ii) the velocity, of car?

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9. A body starts from rest and acquires a velocity 10 m s^{-1} in 2 s. Find the acceleration.

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10. A car starting from rest acquires a velocity 180 m s^{-1} in 0.05 h. Find the acceleration.

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11. A body is moving vertically upwards. Its velocity changes at a constant rate from $50\mathrm{m\ s^{-1}}$ to $20\mathrm{m\ s^{-1}}$ in 3 s. What is its acceleration ?

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12. A toy car initially moving with uniform velocity of $18\mathrm{km\ h^{-1}}$ comes to a stop in 2 s. Find the retardation of the car in S.I. units.

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13. A car accelerates at a rate of $5\mathrm{m\ s^{-2}}$. Find the increase in its velocity in 2 s.

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14. A car is moving with a velocity 20 m s^{-1}. The brakes are applied to retard it at a rate of 2 m s^{-2}. What will be the velocity after 5 s of applying the brakes ?.

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15. A bicycle initially moving with a velocity $5.0\mathrm{m\ s^{-1}}$ accelerates for 5 s at a rate of $2\mathrm{m\ s^{-2}}$. What will be its final velocity ?

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16. A car is moving in a straight line with speed 18 km h^{-1}. It is stopped in 5 s by applying the brakes. Find : (i) the speed of car in m s^{-1}, (ii) the retardation and (iii) the speed of car after 2 s of applying the brakes.

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Exercise 2 B

1. For the motion with uniform velocity, how is the distance travelled related to the time ?

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2. What informations about the motion of a body are obtained from the displacement-time graph ?

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3. What does the slope of a displacement-time graph represent?

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4. Can displacement-time sketch be parallel to the displacement axis ? Give reason to your answer.

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5. Draw a displacement-time graph for a boy going to school with a uniform velocity.

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6. State how the velocity-time graph can be used to find (i) the acceleration of a body, (ii) the distance travelled by the body in a given time, and (iii) the displacement of the body in a given time.

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7. What can you say about the nature of motion of a body if its displacement-time graph is

(a) a straight line parallel to time axis ?

(b) a straight line inclined to the time axis with an acute angle?

(c) a straight line inclined to the time axis with an obtuse angle ?

(d) a curve.

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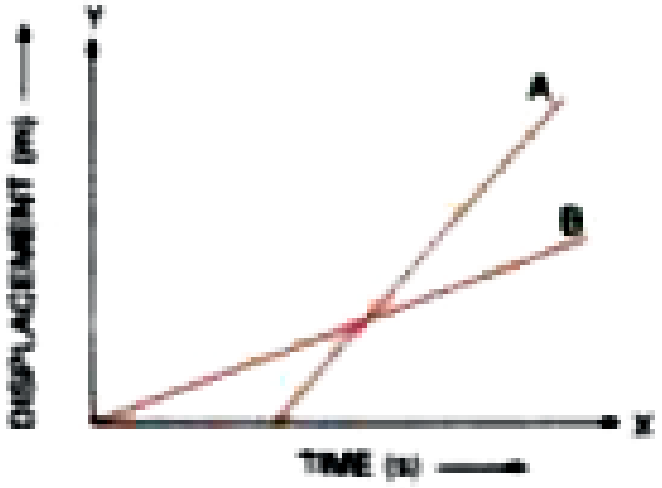
8. Fig. 2.33 shows displacement-time graph of two vehicles A and B moving along a straight road. Which vehicle is moving faster ? Give

reason.



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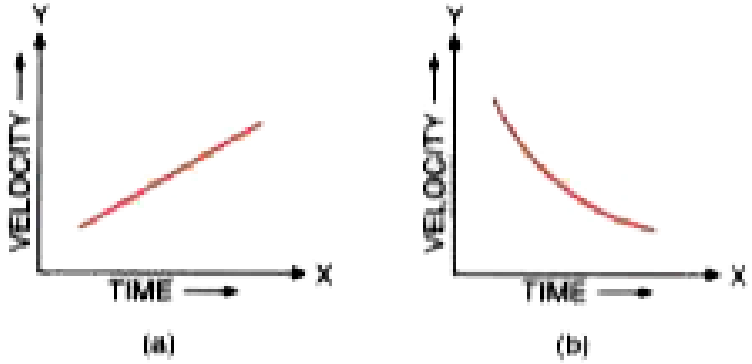
9. State the type of motion represented by the following sketches in Fig. 2.34 (a) and (b).Give example of each type of motion.



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10. Draw a velocity-time graph for a body moving with an initial velocity u and uniform acceleration a. Use this graph to find the distance travelled by the body in time t.

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11. What does the slope of a displacement-time graph represent?

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12. Fig 2.35 shows the velocity-time graph for two cars A and B moving in same direction. Which car has the greater acceleration ? Give reason to your answer.

Reason: Slope of straight line for car B is more than that of line A.

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13. Draw the shape of the velocity-time graph for a body moving with (a) uniform velocity, (b) uniform acceleration.

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14. The velocity-time graph for a uniformly retarded body is a straight line inclined to the time axis with an obtuse angle. How is retardation calculated from the velocitytime graph ?

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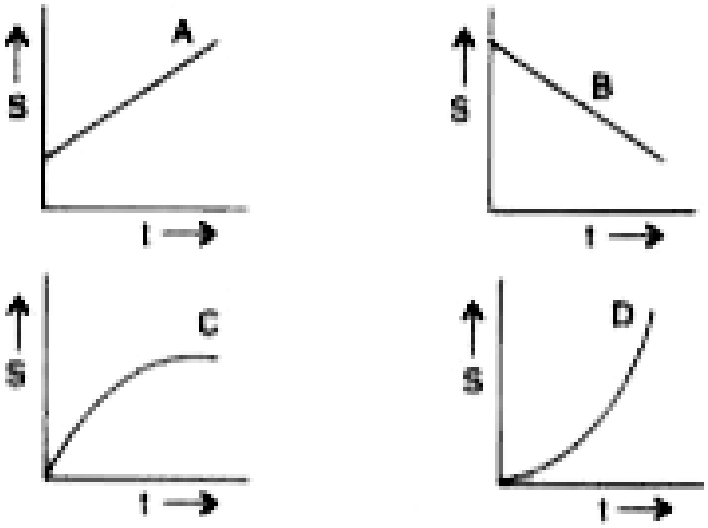
15. Fig. 2.36 shows the displacement-time graph for four bodies A, B, C and D. In each case state what information do you get about the acceleration

(zero, positive or negative).



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16. Draw a graph for acceleration against time for a uniformly accelerated motion. How can it be used to find the change in speed in a certain interval of time?

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17. Draw a velocity-time graph for the free fall of a body under gravity, starting from rest. Take g= 10 m s^{-2}

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18. How is the distance related with time for the motion under uniform acceleration such as the motion of a freely falling body?

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19. A body falls freely from a certain height. Show graphically the relation between the distance fallen and square of time. How will you determine g from this graph ?

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Exercise 2 B Multiple Choice Type

1. The velocity-time graph of a body in motion is a straight line inclined to the time axis. The correct statement is :

A. velocity is uniform

B. acceleration is uniform

C. both velocity and acceleration are uniform

D. neither velocity nor acceleration is uniform.

Answer: A::C

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2. For a uniformly retarded motion, the velocity-time graph is :

A. a curve

B. a straight line parallel to the time axis

C. a straight line perpendicular to the time axis.

D. a straight line inclined to the time axis.

Answer:

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3. For uniform motion :

A. the distance-time graph is a straight line parallel to the time axis.

B. the speed-time graph is a straight line inclined to the time axis.

C. the speed-time graph is a straight line parallel to the time axis.

D. the acceleration-time graph is a straight line parallel to the time axis.

Answer:

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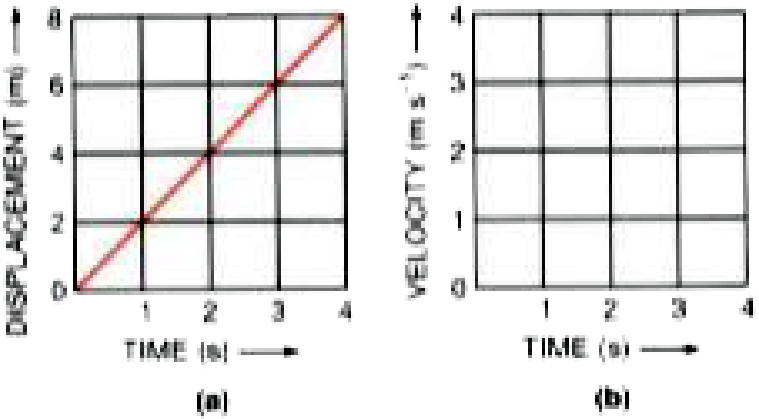
Exercise 2 B Numericals

1. Fig. 2.37 (a) shows the displacement-time graph for the motion of a body. Use it to calculate the velocity of body at t = 1 s, 2 s and 3 s, then draw the velocitytime graph for it in Fig. (b).



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2. Following table gives the displacement of a car at different instants of time. (a) Draw the displacement-time sketch and find the average velocity of car.

(b) What will be the displacement of car at (i) 2.5 s and (ii) 4.5 s?

Time (s)	0	1	2	3	4
Displacement (m)	0	5	10	15	20

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3. A body is moving in a straight line and its displacement at various instants of time is given in the following table :

Time (s)	0	1	2	3	4	5	6	7
Displacement (m)	2	6	12	12	12	18	22	24

Plot displacement-time graph and calculate :

(i) total distance travelled in interval 1 s to 5 s,

(ii) average velocity in time interval 1 s to 5 s.

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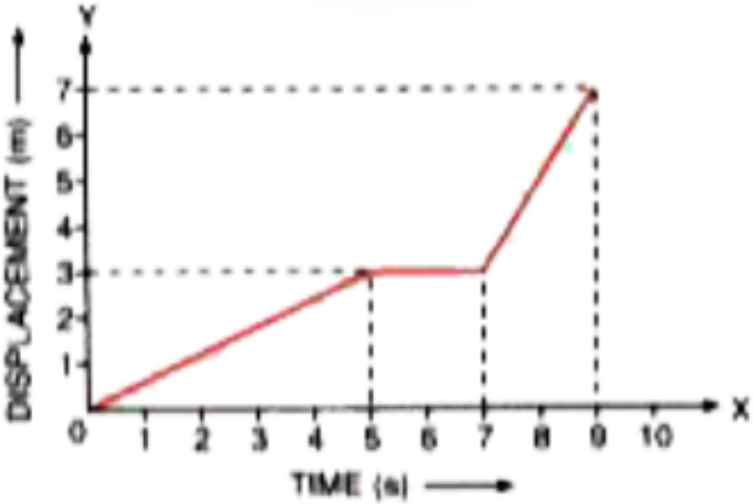
4. Fig. 2.38 shows the displacement of a body at different times.



(a) Calculate the velocity of the body as it moves for time interval (i) 0 to 5 s,

(ii) 5 s to 7 S and

(iii) 7 s to 9 s.

(b) Calculate the average velocity during the time interval 5 s to 9 s. [Hint : From 5 s to 9 s, displacement = 7 m - 3 m = 4 m]

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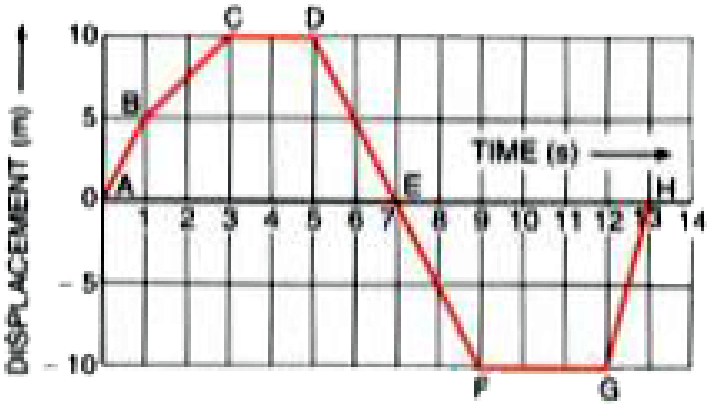
5. From the displacement-time graph of a cyclist, given in Fig. 2.39, find :

(i) the average velocity in the first 4 s,

(ii) the displacement from the initial position at the end of 10 s,

(iii) the time after which he reaches the starting point.



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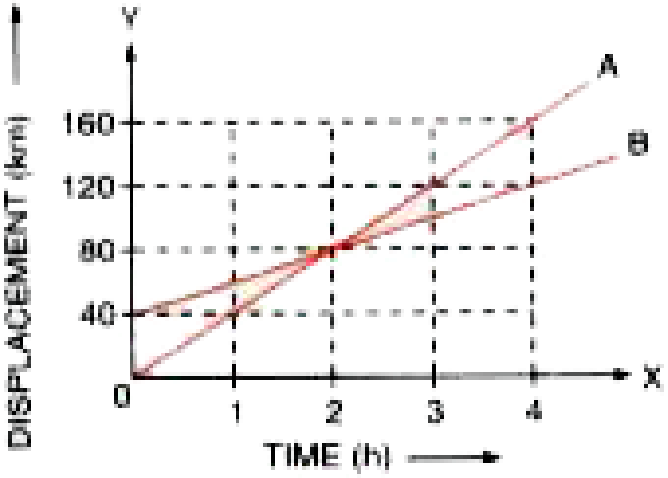
6. Fig. 2.40 ahead represents the displacement-time sketch of motion of two cars A and B. Find :(i) the distance by which the car B was initially ahead of car A.

(ii) the velocities of car A and car B.

(iii) the time in which car A catches car B.

(iv) the distance from start when the car A will catch the car B.



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7. A body at rest is made to fall from the top of a tower. Its displacement at different instants is given in the following table : Draw a displacement-time graph and state whether the motion is uniform or non-uniform?

Time (in s)	0·1	0·2	0·3	0·4	0·5	0·6
Displacement (in m)	0·05	0·20	0·45	0·80	1·25	1·80

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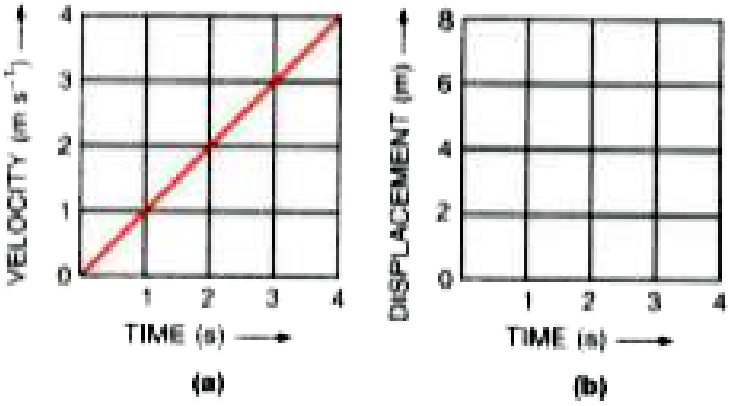
8. Fig. 2.41 (a) shows the velocity-time graph for the motion of a body. Use it to find the displacement of the body at t = 1 s, 2 s, 3 s and 4 s, then draw the displacement-time graph for it on Fig. 2.41 (b).



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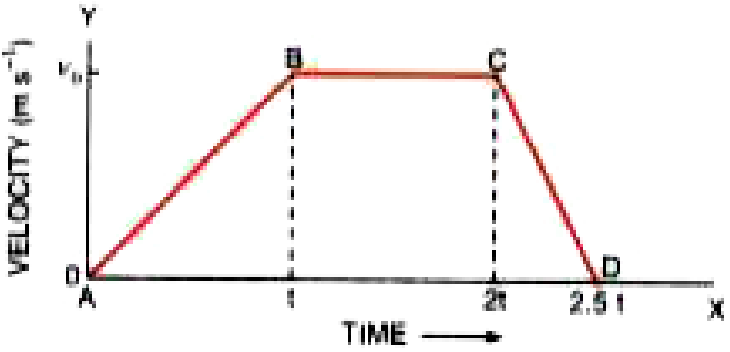
9. Fig. 2.42 given below shows a velocity-time graph for a car starting from rest. The graph has three parts AB, BC and CD.



(i) State how is the distance travelled in any part determined from this graph.

(ii) Compare the distance travelled in part BC with the distance travelled in part AB.

(iii) Which part of graph shows motion with uniform (a) velocity (b) acceleration (c) retardation ?

(iv) (a) Is the magnitude of acceleration higher or lower than that of retardation ? Give a reason. (b) Compare the magnitude of acceleration and retardation.

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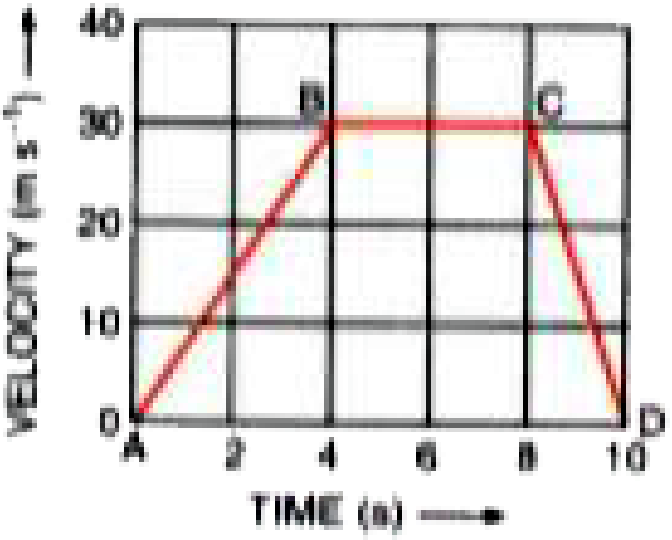
10. The velocity-time graph of a moving body is given below in Fig. 2.43.(i) the acceleration in parts AB, BC and CD. Find :

(ii) displacement in each part AB, BC, CD, and

(iii) total displacement.



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11. A ball moves on a smooth floor in a straight line with a uniform velocity 10 m s^{-1} for 6 s. At t = 6 s, the ball hits a wall and comes back along the same line to the starting point with same speed. Draw the velocity-time graph and use it to find the total distance travelled by the ball and its displacement.

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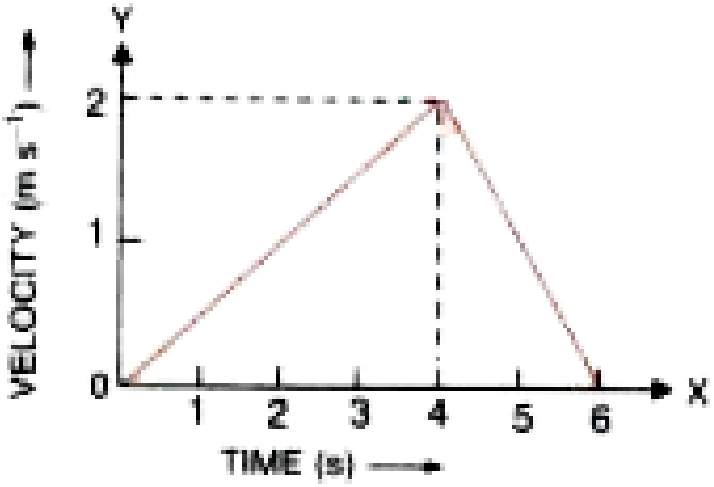
12. Fig. 2.44 shows the velocity-time graph of a particle moving in a straight line.



(i) State the nature of motion of particle.

(ii) Find the displacement of particle at t = 6 s.

(iii) Does the particle change its direction of motion ?

(iv) Compare the distance travelled by the particle from 0 to 4 s and from 4 s to 6 s.

(v) Find the acceleration from 0 to 4 s and retardation from 4 s to 6 s.

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Exercise 2 C

1. Write three equations of uniformly accelerated motion relating the initial velocity (u), final velocity (v), time (t), acceleration (a) and displacement (S).

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2. Derive following equations for a uniformly accelerated motion :

(i) v = u + at

(ii) $S = ut + \frac{1}{2}at^2$

(iii) $v^2 = u^2 + 2aS$

Where the symbols have their usual meanings .

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3. Write an expression for the distance S covered in time t by a body which is initially at rest and starts moving with a constant acceleration a.

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Exercise 2 C Multiple Choice Type

1. The correct equation of motion is :

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2. A car starting from rest accelerates uniformly to acquire a speed 20 km h^{-1} in 30 min. The distance travelled by car in this time interval will be :

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3. A body starts from rest with a uniform acceleration of 2 m s^{-1} . Find the distance covered by the body in 2 s.

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4. A body starts with an initial velocity of 10 ms and acceleration 5 ms. Find the distance covered by it in 5 s.

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5. A vehicle is accelerating on a straight road. Its velocity at any instant is 30 km h^{-1} after 2 s, it is 33.6 km h^{-1} and after further 2 s, it is 37.2 km h^{-1}. Find the acceleration of vehicle in ms^{-1}? Is the acceleration uniform ?

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6. A body, initially at rest, starts moving with a constant acceleration 2 ms^{-2}. Calculate : (i) the velocity acquired and (ii) the distance travelled in 5 s.

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7. A bullet initially moving with a velocity 20 m s^{-1} strikes a target and comes to rest after penetrating a distance 10 cm in the target. Calculate the retardation caused by the target.

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8. A train moving with a velocity of 20 m $s^{-1,}$ is brought to rest by applying brakes in 5 s. Calculate the retardation.

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9. A train travels with a speed of 60 km h^{-1}' from station A to station B and then comes back with a speed 80 km h^{-1}' from station B to station A. Find : (i) the average speed, and (ii) the average velocity of train.

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10. A train is moving with a velocity of 90 km h^{-1}. It is brought to stop by applying the brakes which produce a retardation of 0.5 m s^{-2}? Find : (i) the velocity after 10 s, and (ii) the time taken by the train to come to rest.

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11. A car travels a distance 100 m with a constant acceleration and average velocity of 20 m s^{-1} . The final velocity acquired by the car is 25 m s^{-1}. Find : (i) the initial velocity and (ii) acceleration of car.

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12. When brakes are applied to a bus, the retardation produced is 25 cm s^{-2} and the bus takes 20 s to stop. Calculate : (i) the initial velocity of bus, and (ii) the distance travelled by bus during this time.

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13. A body moves from rest with a uniform acceleration and travels 270 m in 3 s. Find the velocity of the body at 10 s after the start.

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14. A body moving with a constant acceleration travels the distances 3 m and 8 m respectively in 1 s and 2 s. Calculate : (i) the initial velocity, and (ii) the acceleration of body.

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15. A car travels with a uniform velocity of 25 m s^{-1} for 5 s. The brakes are then applied and the car is uniformly retarded and comes to rest in further 10 s. Find : (i) the distance which the car travels before the brakes are applied, (ii) the retardation,and (iii) the distance travelled by the car after applying the brakes.

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16. A space craft flying in a straight course with a velocity of 75 km s^{-1} fires its rocket motors for 6.0 s. At the end of this time, its speed is 120 km s^{-1} in the same direction. Find : (i) the space craft's average acceleration while the motors were firing, (ii) the distance travelled by the space craft in the first 10 s after the rocket motors were started, the motors having been in action for only 6-0 s.

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17. A train starts from rest and accelerates uniformly at a rate of 2 m s^{-2} for 10 s. It then maintains a constant speed for 200 s. The brakes are then applied and the train is uniformly retarded and comes to rest in 50 s. Find : (i) the maximum velocity reached, (ii) the retardation in the last 50 S, (iii) the total distance travelled, and (iv) the average velocity of the train.

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Topic 1 Scalar And Vector Quantities Distance Displacement 2 Marks Questions

1. A train travels for 60 km and men for 60 km in the same direction. Calculate the total distance and displacement travelled.

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2. What do you mean by term "Physical Quantity"? Give examples of 4 physical quantities.

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3. When a body is said to be in motion ? What do you mean by motion in one direction ?

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4. Define displacement. What is its S.I. unit?

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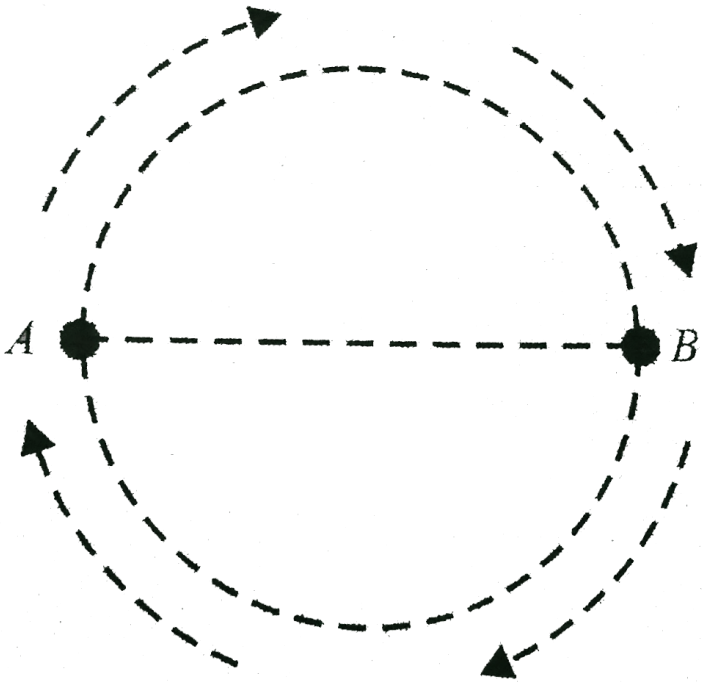
5. A particle is moving in a circle of radius R.

a. What is its displacement when it covers (i) half the circle, (ii) full circle?

b. What is its distance when it comes (i) half the the circle and (ii) full

circle ?.



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6. What will be the numerical ratio of displacement to distance for a moving object?

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7. A girl travels 4 km west and then 4 km north. What is the distance and displacement of the girl ?

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Topic 1 Scalar And Vector Quantities Distance Displacement 3 Marks Questions

1. Can displacement be zero even if distance is not zero ? Give one example to explain your answer.

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2. Explain the difference between distance and displacement with an example.

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3. What are the parameters that are required to express a scalar and vector quantity?

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4. Differentiate between scalar and vector quantities, giving two examples of each.

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5. State which quantities are scalar and which quantities are vector?

Pressure

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6. State which quantities are scalar and which quantities are vector?

Weight

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7. Classify the following physical quantities as scalar or vector quantities.

Pressure, Acceleration, Speed and Force.

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8. Classify the following physical quantities as scalar or vector quantities.

Pressure, Acceleration, Speed and Force.

Watch Video Solution

9. State which quantities are scalar and which quantities are vector?

Energy

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10. State weather Momentum is a scalar quantitiy or a vector quantitiy ?

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Topic 2 Speed Velocity Acceleration Equations Of Motion 2 Marks Questions

1. A train is moving at a velocity of $25\mathrm{ms}^{-1}$. If it is brought to rest by applying the brakes which produces a uniform retardation of $0.5\mathrm{ms}^{-2}$. Calculate velocity of the train after 10s.

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2. A car covers the first-half of the distance between two places at $40km/h$ and other half at $60km/h$. The average speed of the car is

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3. A body starts from rest and accelerates with $4\mathrm{m/s}^2$ for 5 seconds. Find the distance travelled with 5 seconds.

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4. A train takes 3 h to travel from Agra to Delhi with a uniform speed of 65 km h^{-1}'. Find the distance between the two cities.

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5. Define velocity. State its S.I. unit.

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6. Define speed. What is its S.I. unit?

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7. Define acceleration. State its S.I. unit.

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8. Distinguish between uniform velocity and variable velocity.

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9. Give an example of motion in which average speed is not zero, but average velocity is zero.

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10. Distinguish between acceleration and retardation.

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11. Differentiate between Uniform acceleration and Variable acceleration

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12. Define the term acceleration due to gravity. State its average value.

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13. "The value of acceleration due to gravity remains the same at all places on the Earth.s surface". Is this statement true? Give reason for your answer.

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14. If a stone and a pencil are dropped simultaneously in vacuum from the top of a tower, then which of the two will reach the ground first? Give reason.

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15. A car moving on a straight path covers a distance of 1 km due east in 100 s. What is (i) the speed and (ii) the velocity, of car?

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16. A car moving on a straight path covers a distance of 1 km due east in 100 s. What is (i) the speed and (ii) the velocity, of car?

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17. A body starts from rest and acquires a velocity 10 m s^{-1} in 2 s. Find the acceleration.

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18. A toy car initially moving with uniform velocity of $18\mathrm{km\ h^{-1}}$ comes to a stop in 2 s. Find the retardation of the car in S.I. units.

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19. A body is moving vertically upwards. Its velocity changes at a constant rate from $50\mathrm{m\ s^{-1}}$ to $20\mathrm{m\ s^{-1}}$ in 3 s. What is its acceleration ?

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20. A car accelerates at a rate of $5\mathrm{m\ s^{-2}}$. Find the increase in its velocity in 2 s.

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21. A bicycle initially moving with a velocity $5.0\mathrm{m\ s^{-1}}$ accelerates for 5 s at a rate of $2\mathrm{m\ s^{-2}}$. What will be its final velocity ?

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22. A body starts with an initial velocity of 10 ms and acceleration 5 ms. Find the distance covered by it in 5 s.

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23. A bullet initially moving with a velocity 20 m s^{-1} strikes a target and comes to rest after penetrating a distance 10 cm in the target. Calculate the retardation caused by the target.

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Topic 2 Speed Velocity Acceleration Equations Of Motion 3 Marks Questions

1. A train takes 2 h to reach station B from station A, and then 3 h to return from station B to station A. The distance between the two stations is 200 km. Find : (i) the average speed, (ii) the average velocity of the train.

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2. A train takes 2 h to reach station B from station A, and then 3 h to return from station B to station A. The distance between the two stations is 200 km. Find : (i) the average speed, (ii) the average velocity of the train.

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3. A body is thrown vertically upwards with an initial velocity of $9.8\mathrm{ms}^{-1}$. What is its speed and direction after 1 s (g=9.8 $\mathrm{m/s}^2$). Also, find the height to which it will rise.

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4. A body is thrown vertically upwards with an initial velocity of $9.8\mathrm{ms}^{-1}$. What is its speed and direction after 1 s (g=9.8 $\mathrm{m/s}^2$). Also, find the height to which it will rise.

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5. A boy on a lift 490 m high drops a stone. One second later, he throws a second stone after the first. They hit the ground at the same time. With what speed did he thrown the second stone.

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6. Distinguish between speed and velocity.

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7. Distinguish between average speed and average velocity.

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8. A car is moving with a velocity $20\mathrm{m\ s^{-1}}$. The brakes are applied to retard it at a rate of $2\mathrm{m\ s^{2}}$. What will be the velocity after 5 s of applying the brakes?

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9. Give an example of motion of a body moving with a constant speed, but with a variable velocity. Draw a diagram to represent such a motion.

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10. Write three equations of uniformly accelerated motion relating the initial velocity (u), final velocity (v), time (t), acceleration (a) and displacement (S).

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11. A vehicle is accelerating on a straight road. Its velocity at any instant is 30 km h^{-1} after 2 s, it is 33.6 km h^{-1} and after further 2 s, it is 37.2 km h^{-1}. Find the acceleration of vehicle in ms^{-1}? Is the acceleration uniform ?

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Topic 2 Speed Velocity Acceleration Equations Of Motion 4 Marks Questions

1. A car travels first 30 km with a uniform speed of 60 km h^{-1} and then next 30 km with a uniform speed of 40 km h^{-1}. Calculate : (i) the total time of journey, (ii) the average speed of the car.

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2. A car travels first 30 km with a uniform speed of 60 km h^{-1} and then next 30 km with a uniform speed of 40 km h^{-1}. Calculate : (i) the total time of journey, (ii) the average speed of the car.

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3. A car is moving in a straight line with speed 18 km h^{-1} . It is stopped in 5 s by applying the brakes. Find the speed of car in ms^{-1} .

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4. A car is moving in a straight line with speed 18 km h^{-1} . It is stopped in 5 s by applying the brakes. Find the retardation

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5. A car is moving in a straight line with speed 18 km h^{-1} . It is stopped in 5 s by applying the brakes. Find the speed of car after 2 s of applying the brakes.

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6. A body moving with a constant acceleration travels distances 3 m and 8 m, respectively in 1 s and 2 s. Calculate:

(i)the initial velocity.

(ii)The acceleration of body.

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7. A car travels with a uniform velocity of 25 m s^{-1} for 5 s. The brakes are then applied and the car is uniformly retarded and comes to rest in further 10 s. Find : (i) the distance which the car travels before the brakes are applied, (ii) the retardation,and (iii) the distance travelled by the car after applying the brakes.

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8. A car travels with a uniform velocity of 25 m s^{-1} for 5 s. The brakes are then applied and the car is uniformly retarded and comes to rest in further 10 s. Find : (i) the distance which the car travels before the brakes

are applied, (ii) the retardation,and (iii) the distance travelled by the car after applying the brakes.

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9. A car travels with a uniform velocity of 25 m s^{-1} for 5 s. The brakes are then applied and the car is uniformly retarded and comes to rest in further 10 s. Find : (i) the distance which the car travels before the brakes are applied, (ii) the retardation,and (iii) the distance travelled by the car after applying the brakes.

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