



PHYSICS

BOOKS - S CHAND PHYSICS (HINGLISH)

MOTION

Solved Examples

1. A man travels a distance of 1.5 m towards East, then 2.0 m towards South and finally 4.5 m towards East.

(i) What is the total distance travelled ?

(ii) What is his resultant displacement ?

A. 8 m, 6.3 m

B. 4 m, 6.3 m

C. 12 m, 6.3 m

D. 8m, 12.6 m

Answer: A



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2. A scooterist covers a distance of 3 kilometres in 5 minutes. Calculate his speed in:

(a) centimetres per second (cm/s)

(b) metres per second (m/s)

(c) kilometres per hour (km/h)



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3. The train 'A' travelled a distance of 120 km in 3 hours whereas another train 'B' travelled a distance of 180 km in 4 hours. Which train travelled faster ?

A. A

B. B

C. both runs with equal speed

D. none of these

Answer: B



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4. A car travels 30 km at a uniform speed of 40 km/h and the next 30 km at a uniform speed of 20 km/h . Find its average speed.

- A. $80/3\text{ kmph}$
- B. 30 kmph
- C. 135 kmph
- D. none of these

Answer: A



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5. On a 120 km track, a train travels the first 30 km at a uniform speed of 30 km/h . How fast must the train travel the next 90 km so as to average 60 km/h for the entire trip?



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6. A train travels at a speed of 60 km/h for 0.52 h , at 30 km/h for the next 0.24 h and then at 70 km/h for

the next 0.71 h. What is the average speed of the train ?



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7. A car travels a distance of 200 km from Delhi to Ambala towards North in 5 hours.

Calculate (i) speed, and (ii) velocity, of the car for this journey.



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8. A bus covers a distance of 250 km from Delhi to Jaipur towards West in 5 hours in the morning and

returns to Delhi in the evening covering the same distance of 250 km in the same time of 5 hours. Find (a) average speed, and (b) average velocity, of the bus for the whole journey.



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9. A driver decreases the speed of a car from 25 m/s to 10 m/s in 5 seconds. Find the acceleration of the car.



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10. A scooter acquires a velocity of $36\text{km}/\text{h}$ in 10 seconds just after the start . Calculate the acceleration of the scooter.

A. $1\text{ m}/\text{s}^2$.

B. $2\text{ m}/\text{s}^2$.

C. $5\text{ m}/\text{s}^2$.

D. $9\text{ m}/\text{s}^2$.

Answer: A



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11. A moving train is brought to rest within 20 seconds by applying brakes. Find the initial velocity , if the retardation due to brakes is $2m / s^2$.



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12. A body starts to slide over a horizontal surface with an initial velocity of $0.5kmh^{-1}$.due to friction, it velocity decreases at a rate of $0.05ms^{-2}$.how much time will it take for body to stop ?\



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13. A racing car has a uniform acceleration of 4 m/s^2 .

What distance will it cover in 10 s after start ?

A. 400 m

B. 200 m

C. 100 m

D. 20 m

Answer: B



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14. A scooter moving at a speed of 10 m/s is stopped by applying brakes which produce a uniform acceleration of, -0.5 m/s^2 . How much distance will be covered by the scooter before it stops ?

A. 50 m

B. 75 m

C. 100 m

D. None of these

Answer: C



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15. A car travelling at 20 km/h speeds up to 6 km/h in 6 seconds. What is its acceleration ?

A. $a = 1.85 \text{ m/s}^2$

B. $a = 2 \text{ m/s}^2$

C. $a = 9.8 \text{ m/s}^2$

D. $a = 4.85 \text{ m/s}^2$

Answer: A



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16. A car increases its speed from 20 km/h to 50 km/h in 10 seconds. What is its acceleration?

A. 1 m/s^2

B. 1.5 m/s^2

C. 2 m/s^2

D. 0.83 m/s^2

Answer: d



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17. Study the speed time graph of a body shown in Figure. and answer the following questions:

(a) What type of motion is represented by OA ?

(b) What type of motion is represented by AB ?

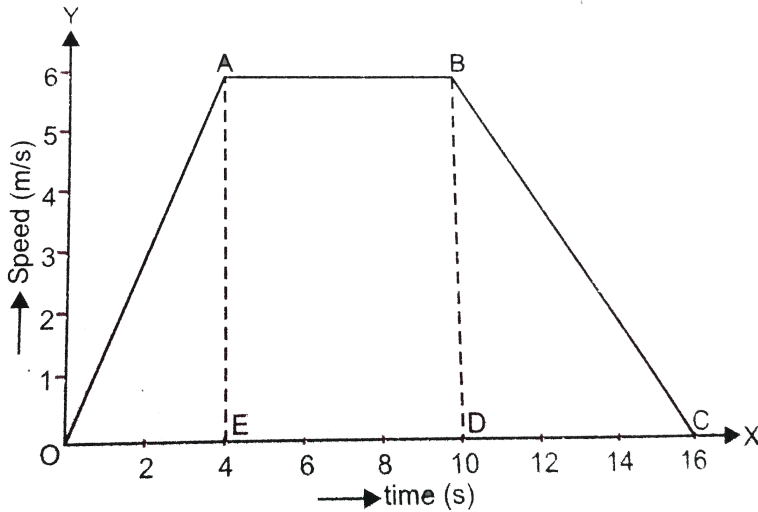
(c) What type of motion is represented by BC ?

(d) Find out acceleration of the body.

(e) Find out retardation of the body .

(f) Find out the distance travelled by the body from A

to B



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18. A cyclist goes around a circular track once every 2 minutes. If the radius of the circular track is 105 metre, calculate his speed. (Given $\pi = \frac{22}{7}$)

A. 5.5 m/s

B. 5.5 cm/s

C. 11 m/s

D. None

Answer: A



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19. Is displacement a scalar quantity ?



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20. Is distance a vector quantity ?

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21. Change the speed of 6 m/s into km/h.

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22. What name is given to the speed in a specified direction ?

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23. Give two examples of bodies having non-uniform motion.



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24. Name the physical quantity obtained by dividing 'Distance travelled' by 'Time taken' to travel that distance.



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25. What do the following measure in a car ?

(a) Speedometer

(b) Odometer



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26. Name the physical quantity which gives us an idea of how slow or fast a body is moving.



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27. Under what conditions can a body travel a certain distance and yet its resultant displacement be zero ?



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28. In addition to speed, what else should be known to predict the position of a moving body from a given starting point ?



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29. When is a body said to have uniform velocity ?



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30. Under what conditions (s) is the magnitude of average velocity of an object equal to its average speed ?



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31. Which of the two can be zero under certain conditions : average speed of a moving body or average velocity of a moving body ?



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32. Give one example of a situation in which a body has a certain average speed but its average velocity is zero.



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33. What is the acceleration of a body moving with uniform velocity ?



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34. What is the other name of negative acceleration ?



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35. Name the physical quantity whose SI unit is :

(a) m/s m/s^2



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36. What type of motion is exhibited by a freely falling body ?



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37. What is the SI unit of retardation ?



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38. What type of motion , uniform or non-uniform , is exhibited by a freely falling body ? Give reason for your answer .



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39. State whether speed is a scalar or a vector quantity . Give reason for your choice.



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40. Bus X travels a distance of 360 km in 5 hours whereas bus Y travels is distance of 476 km in 7 hours. Which bus travels faster ?



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41. Arrange the following speeds in increasing order (keeping the least speed first) :

- (i) An athlete running with a speed of 10 m/s .
- (ii) A bicycle moving with a speed of 200 m/min .
- (iii) A scooter moving with a speed of 30 km/h .



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42. (a) Write the formula for acceleration. Give the meaning of each symbol which occurs in it.

(b) A train starting from Railway Station attains a speed of 21 m/s in one minute. Find its acceleration.



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43. (a) What term is used to denote the change of velocity with time ?

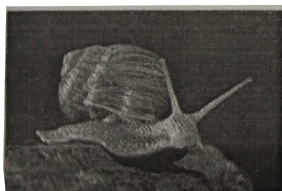
(b) Give one word which means the same as 'moving with a negative acceleration'.

(c) The displacement of a moving object in a given interval of time is zero. Would the distance travelled by the object also be zero ? Give reason for your answer.

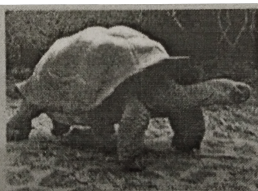


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44. A snail covers a distance of 100 metres in 50 hours. Calculate the average speed of snail in km/h.



The snail covers a distance of 100 metres in 50 hours.



The tortoise covers the same distance of 100 metres in 15 minutes.



And this sprinter (in red vest) covers a distance of 100 metres in just 9.83 seconds.



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45. A tortoise moves a distance of 100 metres in 15 minutes. What is the average speed of tortoise in km/h ?



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46. If a sprinter runs a distance of 100 metres in 9.83 seconds, calculate his average speed in km/h.



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47. A motorcyclist drives from A to B with a uniform speed of 30kmh^{-1} and returns back with a speed of 20kmh^{-1} . Find its average speed.



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48. A motorcyclist starts from rest and reaches a speed of 6 m/s after travelling with uniform

acceleration for 3 s. What is his acceleration ?



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49. If a bus travelling at 20 m/s is subjected to a steady deceleration of 5 m/s^2 , how long will it take to come to rest ?



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50. (a) What is the difference between 'distance travelled' by a body and its 'displacement' ? Explain with the help of a diagram.

(b) An ant travels a distance of 8 cm from P to Q and

then moves a distance of 6 cm at right angles to PQ.

Find its resultant displacement.



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51. Define motion, What do you understand by the terms 'uniform motion' and 'non-uniform motion' ? Explain with examples.



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52. (a) Define speed. What is the SI unit of speed ?

(b) What is meant by (i) average speed, and (ii) uniform speed ?



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53. (a) Define velocity. What is the SI unit of velocity ?

(b) What is the difference between speed and velocity ?

(c) Convert a speed of 54 km/h into m/s.



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54. The distance between two stations is 200 km. A train travels the first 100 km at a speed of 10 km/hr. How fast should the train travel the next

100 km so as to average 70 km/hr for the whole journey.



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55. A train travels the first 15 km at a uniform speed of 30 km/h, the next 75 km at a uniform speed of 50 km/h, and the last 10 km at a uniform speed of 20 km/h. Calculate the average speed for the entire train journey.



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56. A car is moving along a straight road at a steady speed. It travels 150 m in 5 seconds :

- (a) What is its average speed ?
- (b) How far does it travel in 1 second ?
- (c) How far does it travel in 6 seconds ?
- (d) How long does it take to travel 240 m ?



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57. A particle is moving in a circular path of radius r .

The displacement after half a circle would be

A. 0

B. πr

C. $2r$

D. $2\pi r$

Answer: C



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58. The numerical ratio of displacement to the distance covered is always

A. always less than 1

B. equal to 1 or more than 1

C. always more than 1

D. equal to 1 or less than 1

Answer: D



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59. Suppose a boy is enjoying a ride on a merry-go-round which is moving with a constant speed of $10ms^{-1}$. It implies that the boy is

A. at rest

B. moving with no acceleration

C. in accelerated motion

D. moving with uniform velocity

Answer: C



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60. In which of the following cases of motions, the distance moved and the magnitude of displacement are equal ?

A. if the car is moving on straight road

B. if the car is moving on circular road

C. if the pendulum is moving to and fro

D. if a planet is moving around the sun

Answer: A



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61. The speed of a moving object is determined to be 0.06 m/s . This speed is equal to :

A. 2.16 km/h

B. 1.08 km/h

C. 0.216 km/h

D. 0.0216 km/h

Answer: C



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62. A freely falling object travels 4.9 m in 1st second, 14.7 m in 2nd second, 24.5 m in 3rd second, and so on. This data shows that the motion of a freely falling object is a case of :

- A. uniform motion
- B. uniform acceleration
- C. no acceleration
- D. uniform velocity

Answer: B

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63. When a car runs on a circular track with a uniform speed, its velocity is said to be changing. This is because :

- A. the car has a uniform acceleration
- B. the direction of car varies continuously
- C. the car travels unequal distance in equal time intervals
- D. the car travels equal distances in unequal time intervals

Answer: B



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64. Which of the following statement is correct regarding velocity and speed of a moving body ?

- A. velocity of a moving body is always higher than its speed
- B. speed of a moving body is always higher than its velocity
- C. speed of a moving body is its velocity in a given direction

D. velocity of a moving body is its speed in a given direction

Answer: D



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65. Which of the following can sometimes be 'zero' for a moving body ?

- (i) average velocity
- (ii) distance travelled
- (iii) average speed
- (iv) displacement

A. only (i)

B. (i) and (ii)

C. (i) and (iv)

D. only (iv)

Answer: C



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66. When a car driver travelling at a speed of 10 m/s applies brakes and brings the car to rest in 20 s, then retardation will be :

A. $+2m / s^2$

B. $-2m / s^2$

C. $-0.5m / s^2$

D. $+0.5m / s^2$

Answer: D



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67. Which of the following could not be a unit of speed ?

A. km/h

B. s/m

C. m/s

D. mm s^{-1}

Answer: B



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68. One of the following is not a vector quantity. This one is :

A. displacement

B. speed

C. acceleration

D. velocity

Answer: B



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69. Which of the following could not be a unit of acceleration ?

A. km/s^2

B. cm s^{-2}

C. km/s

D. m/s^2

Answer: C



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70. A body is moving along a circular path of radius R . What will be the distance travelled and displacement of the body when it completes half a revolution ?



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71. If on a round trip you travel 6 km and then arrive back home :

(a) What distance have you travelled ?

(b) What is your final displacement ?



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72. A body travel a distance of 3 km towards East, then 4 km towards North and finally 9 km towards East.

(i) What is the total distance travelled ?

(ii) What is the resultant displacement ?



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73. A boy walks from his classroom to the bookshop along a straight corridor towards North. He covers a distance of 20 m in 25 seconds to reach the bookshop. After buying a book, he travels the same distance in the same time to reach back in the classroom. Find (a) average speed, and (b) average velocity, of the boy.

A. Average speed = 5.8 m/s , Average velocity = 20 m/s

B. Average speed = 9.8 m/s , Average velocity = 0 m/s

C. Average speed = 0.8 m/s , Average velocity = 0 m/s

D. None of these

Answer: C



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74. A car travels 100 km at a speed of 60 km/h and returns with a speed of 40 km/h . Calculate the average speed for the whole journey.



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75. A ball hits a wall horizontally at 6.0 m s^{-1} . It rebounds horizontally at 4.4 m s^{-1} . The ball is in contact with the wall for 0.040 s . What is the acceleration of the ball ?

- A. 260 units
- B. 264 units
- C. - 40 units
- D. None of these

Answer: A



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76. (a) What remains constant in uniform circular motion ?

(b) What changes continuously in uniform circular motion ?



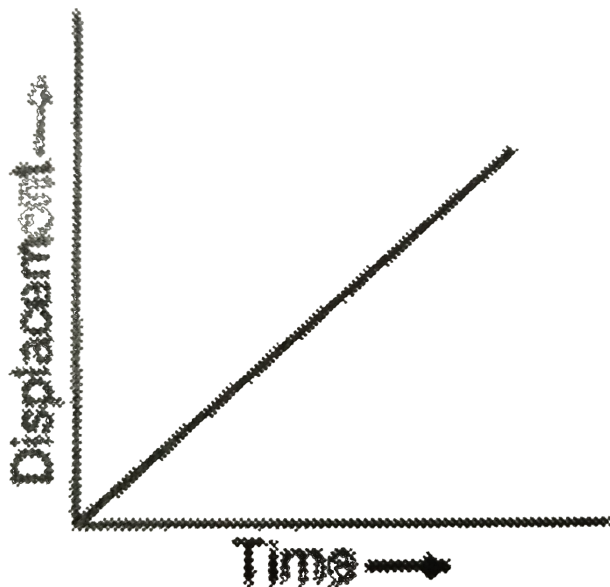
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77. A body goes round the sun with constant speed in a circular orbit. Is the motion uniform or accelerated ?



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78. What conclusion can you draw about the velocity of a body from the displacement-time graph shown below :



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79. What is the quantity which is measured by the area occupied below the velocity-time graph ?



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80. What does the slope of a speed-time graph indicate ?



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81. What does the slope of a speed-time graph indicate ?



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82. Give one example of a motion in where an object does not changes its speed but its direction of motion changes continuously.



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83. Name the type of motion in which a body has a constant speed but not constant velocity.



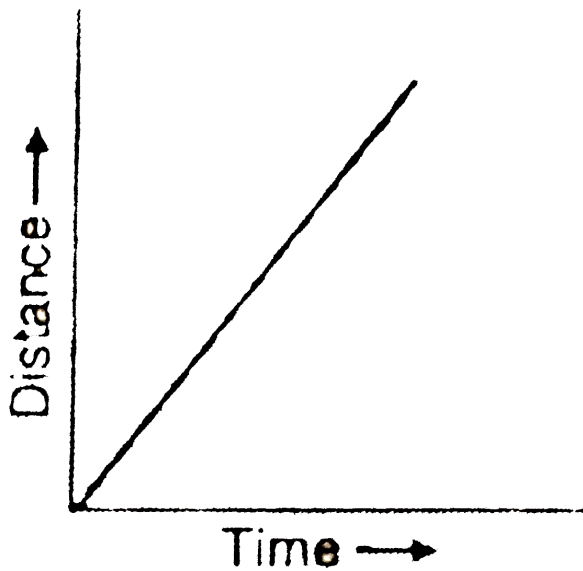
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84. What can you say about the motion of a body if its speed-time graph is a straight line parallel to the time axis ?



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85. What conclusion can you draw about the speed of a body from the following distance-time graph ?



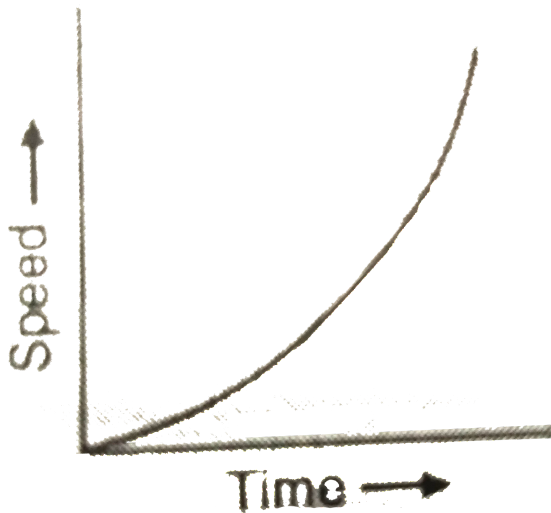
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86. What can you say about the motion of an object whose distance-time graph is a straight line parallel to the time axis ?



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87. What conclusion can you draw about the acceleration of a body from the speed-time graph shown below ?



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88. What type of motion is the motion of tip of second's hand of a watch ? Is it uniform or accelerated ?



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89. Is the uniform circular motion accelerated ? Give reasons for your answer.



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90. Write the formula to calculate the speed of a body moving along a circular path. Give the meaning

of each symbol which occurs in it.



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91. Explain why, the motion of a body which is moving with constant speed in a circular path is said to be accelerated.



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92. State an important characteristic of uniform circular motion. Name the force which brings about uniform circular motion.



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93. Find the initial velocity of a car which is stopped in 10 seconds by applying brakes. The retardation due to brakes is 2.5 m/s^2 .



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94. A body is accelerating at a constant rate of 10 m/s^2 . If the body starts from rest, how much distance will it cover in 2 seconds?



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95. A motorcycle moving with a speed of 5 m/s is subjected to an acceleration of 10 m s^{-2} . If the body starts from rest, how much distance will it cover in 2 s ?



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96. A bus running at a speed of 18 km/h is stopped in 2.5 seconds by applying brakes. Calculate the retardation produced.



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97. A train starting from rest moves with a uniform acceleration of $0.2m/s^2$ for 5 minutes . Calculate the speed acquired and the distance travelled in this time.

A. 60 m/s, 8 km

B. 50 m/s, 9 km

C. 60 m/s, 9 km

D. None of these

Answer: C



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98. Name the two quantities, the slope of whose graphs gives (i) Speed (ii) Acceleration.



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99. A cheetah starts from rest, and accelerates at 2 m/s^2 for 10 seconds. Calculate :

(a) the final velocity

(b) the distance travelled.



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100. A train travelling at 20 m s^{-1} accelerates at 0.5 m s^{-2} for 30 s. How far will it travel in this time ?



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101. A cyclist is travelling at 15 m s^{-1} . She applies brakes so that she does not collide with a wall 18 m away. What deceleration must she have ?



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102. Draw a velocity-time graph to show the following motion :

A car accelerates uniformly from rest for 5 s , then it travels at a steady velocity for 5 s.



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103. The velocity-time graph for part of a train journey is a horizontal straight line. What does this tell you about

(a) the train's velocity, and (b) about its acceleration ?



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104. (a) Explain the meaning of the following equation of motion :

$$v = u + at$$

where symbols have their usual meanings.

(b) A body starting from rest travels with uniform acceleration. If it travels 100 m in 5 s, what is the value of acceleration.



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105. (a) Derive the formula : $v = u + at$, where the symbols have usual meanings.

(b) A bus was moving with a speed of 54 km/h. On applying brakes it stopped in 8 seconds. Calculate the acceleration.



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106. (a) Derive the formula : $s = ut + \frac{1}{2}at^2$, where the symbols have usual meanings.

(b) A train starting from stationary position and moving with uniform acceleration attains a speed of 36 km per hour in 10 minutes. Find its acceleration.



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107. (a) Write the three equations of uniformly accelerated motion. Give the meaning of each symbol which occurs in them

(b) A car acquires a velocity of 72 km per hour in 10

seconds starting from rest. Find (i) the acceleration, (ii) the average velocity, and (iii) the distance travelled in the time.



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108. (a) What is meant by uniform circular motion ?

Give two examples of uniform circular motion.

(b) The tip of seconds' hand of a clock takes 60 seconds to move once on the circular dial of the clock. If the radius of the dial of the clock be 10.5 cm, calculate the speed of the seconds' hand of the clock.

(Given $\pi = \frac{22}{7}$).



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109. A bus increases its speed from 36 km/h to 72 km/h in 10 seconds. Its acceleration is :

A. $5m / s^2$

B. $2m / s^2$

C. $3.6m / s^2$

D. $1m / s^2$

Answer: D



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110. A bus moving along a straight line at 20 m/s undergoes an acceleration of 4 m/s^2 . After 2 seconds, its speed will be :

- A. 8 m/s
- B. 12 m/s
- C. 16 m/s
- D. 28 m/s

Answer: D



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111. What does the slope of a speed-time graph indicate ?

A. distance travelled

B. velocity

C. acceleration

D. displacement

Answer: C



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112. Area under $a = (v - t)$ graph represents a physical quantity which has the unit

A. m

B. m^2

C. $m\ s^{-1}$

D. $m\ s^{-2}$

Answer: A



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113. If the displacement of an object is proportional to square of time, then the object moves with

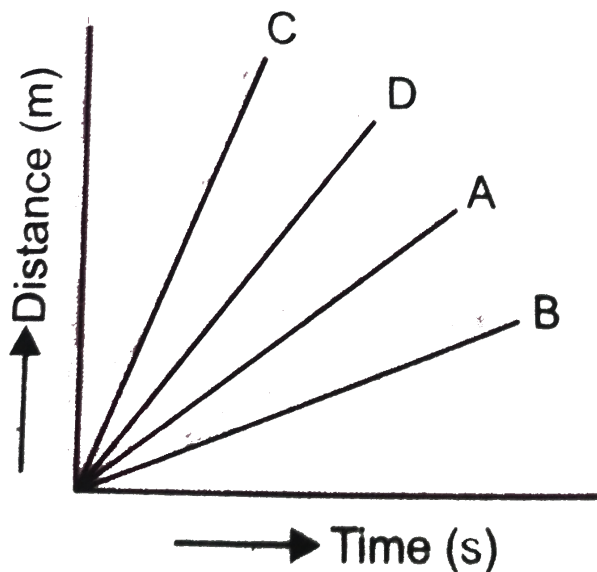
- A. uniform velocity
- B. uniform acceleration
- C. increasing acceleration
- D. decreasing acceleration

Answer: B



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114. Four cars A , B and C are moving on a levelled road. Their distance versus time graphs are shown in Fig. Choose the correct statement



- A. car A is faster than car D.
- B. car B is the slowest.
- C. car D is faster than the car C

D. car C is the slowest

Answer: B



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115. A car of mass 1000 kg is moving with a velocity of 10 m s^{-1} . If the velocity-time graph for this car is a horizontal line parallel to the time axis, then the velocity of car at the end of 25 s will be :

A. 25 m s^{-1}

B. 40 m s^{-1}

C. 10 m s^{-1}

D. 250 m s^{-1}

Answer: C



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116. A motorcycle is being driven at a speed of 20 m/s when brakes are applied to bring it to rest in five seconds. The deacceleration produced in this case will be :

A. $+4\text{m} / \text{s}^2$

B. $-4\text{m} / \text{s}^2$

C. $+0.25\text{m} / \text{s}^2$

D. $-0.25m/s^2$

Answer: A



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117. A sprinter is running along the circumference of a big sports stadium with constant speed. Which of the following do you think is changing in this case ?

- A. magnitude of acceleration being produced
- B. distance covered by the sprinter per second
- C. direction in which the sprinter is running
- D. centripetal force acting on the sprinter

Answer: C



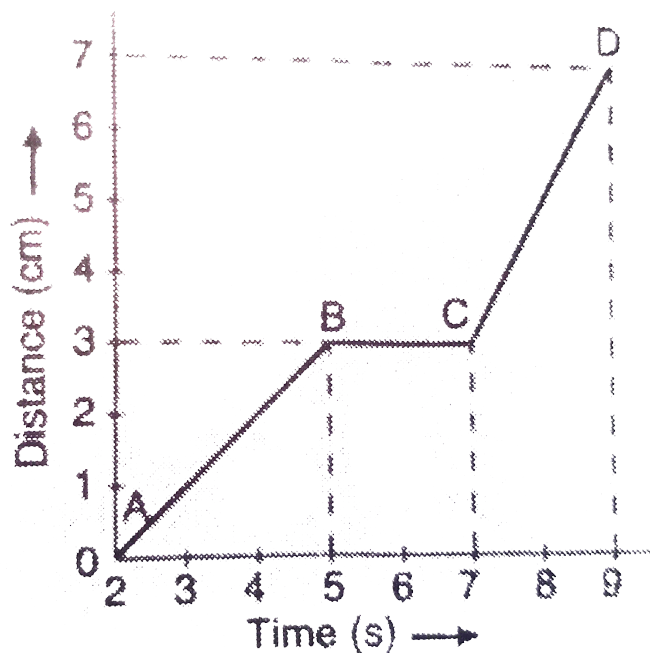
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118. The graph given alongside shows the positions of a body at different times. Calculate the speed of the body as it moves from :

(i) A to B,

(ii) B to C, and

(iii) C to D.



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119. What can you say about the motion of a body if :

(a) its displacement-time graph is a straight line ?

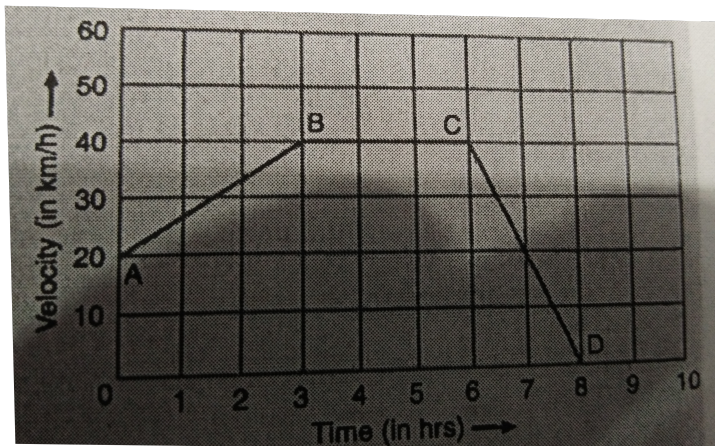
(b) its velocity-time graph is a straight line ?

120. Give alongside is the velocity-time graph for a moving body:

Find : (i) Velocity of the body at point C.

(ii) Acceleration acting on the body between A and B.

(iii) Acceleration acting on the body between B and C.





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121. A body is moving uniformly with a velocity of $5m/s$. Find graphically the distance travelled by it in $5s$.



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122. The graph given alongside shows how the speed of a car changes with time :

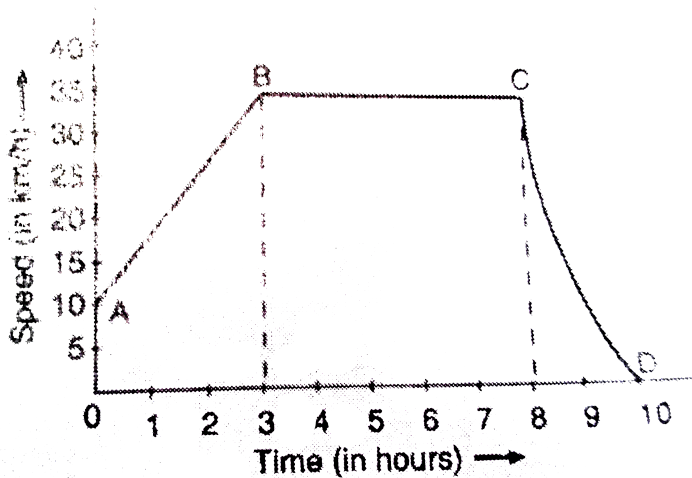
(i) What is the initial speed of the car ? ItBrgt (ii)

What is the maximum speed attained by the car ?

ItBrgt (iii) Which part of the graph shows zero

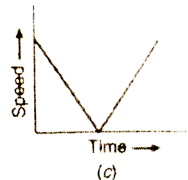
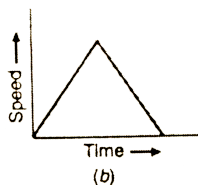
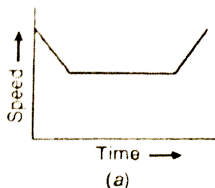
acceleration ? ItBrgt (iv) Which part of the graph shows varying retardation ?

(v) Find the distance travelled in first 8 hours.



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123. Three speed-time graphs are given below :



Which graph represents the case of :

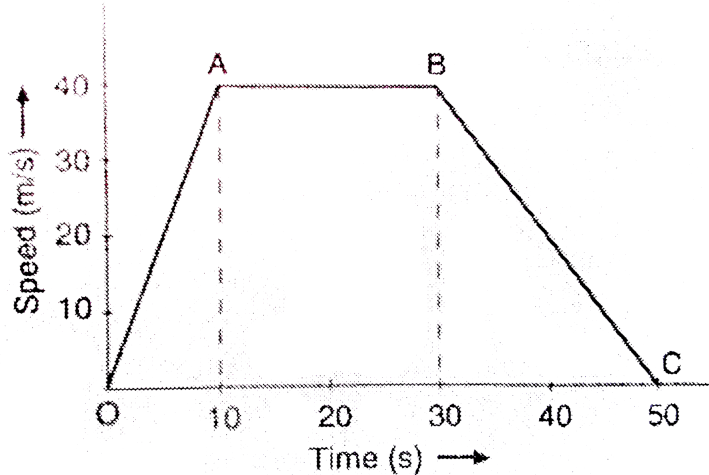
(i) A cricket ball thrown vertically upwards and returning to the hands of the thrower ?

(ii) A trolley decelerating to a constant speed and then accelerating uniformly ?



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124. Study the speed-time graph of a car given alongside and answer the following questions :

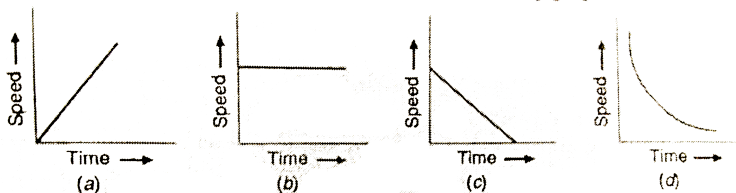


- (i) What type of motion is represented by OA ?
- (ii) What type of motion is represented by AB ?
- (iii) What type of motion is represented by BC ?
- (iv) What is the acceleration of car from O to A ?
- (v) What is the acceleration of car from A to B ?
- (vi) What is the retardation of car from B to C ?



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125. What type of motion is represented by each one of the following graphs ?



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126. A car is travelling along the road at 8 m s^{-1} . It accelerates at 1 m s^{-2} for a distance of 18 m. How fast is it then travelling ?

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127. A car is travelling at 20 m/s along a road. A child runs out into the road 50 m ahead and the car driver steps on the brake pedal. What must the car's deceleration be if the car is to stop just before it reaches the child ?



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128. An object has moved through a distance. Can it have zero displacement ? If yes, support your answer with an example.



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129. A farmer moves along the boundary of a square field of side $10m$ in $40s$. What will be the magnitude of displacement of the farmer at the end of 2 minutes 20 seconds ?



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130. Which of the following is true for displacement ?

- (a) It cannot be zero.
- (b) Its magnitude is greater than the distance travelled by the object.



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131. Distinguish between speed and velocity.



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132. Under what conditions (s) is the magnitude of average velocity of an object equal to its average speed ?



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133. What does the path of an object look like when it is in uniform motion ?



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134. During an experiment, a signal from a spaceship reached the ground station in five minutes. What was the distance of the spaceship from the ground station ? The signal travels at the speed of light, that is, $3 \times 10^8 m / s$.



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135. When will you say a body is in :

(i) uniform acceleration ?

(ii) non-uniform acceleration ?



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136. A bus decreases its speed from $80\text{km}/h$ to $60\text{km}/h$ in $5s$. Find the acceleration of the bus.



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137. A train starting from a railway station and moving with uniform acceleration attains a speed $40\text{km}/h$ in 10 minutes. Find its acceleration.



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138. What is the nature of the distance-time graphs for uniform and non-uniform motion of an object ?



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139. What can you say about the motion of an object whose distance-time graph is a straight line parallel to the time axis ?



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140. What can you say about the motion of an object whose distance-time graph is a straight line parallel

to the time axis ?



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141. What is the quantity which is measured by the area occupied below the velocity-time graph ?



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142. A bus starting from rest moves with a uniform acceleration of 0.1 m/s^2 for 2 minutes. Find
(a) the speed acquired, (b) the distance travelled.

A. 12 m/s and 720 m

B. 6 m/s and 360 m

C. 5 m/s and 670 m

D. None of these

Answer: A



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143. A train is travelling at a speed of 90 km/h . Brakes are applied so as to produce a uniform acceleration of -0.5 m/s^2 . Find how far the train will go before it is brought to rest.



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144. A trolley, while going down an inclined plane, has an acceleration of $2\text{ cm} / \text{s}^2$ starting from rest. What will be its velocity 3 s after the start ?



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145. A racing car has a uniform acceleration of $4\text{ m} / \text{s}^2$. What distance will it cover in 10 s after start ?

A. 100 m

B. 200 m

C. 400 m

D. None of these

Answer: B



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146. A stone is thrown in a vertically upward direction with a velocity of $5m/s$. If the acceleration of the stone during its motion is $10m/s^2$ in the downward direction, what will be the height attained by the stone and how much time will take to reach there ?

A. 1 m and 1 second

B. 1.25 m and 0.5 sec

C. 12.5 m and 1 sec

D. None of these

Answer: B



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



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148. Joseph jogs from one end A to other end B of a straight $300m$ road in 2 minutes 30 seconds and then turns around and jogs $100m$ back to point C in another 1 minute. What are Joseph's average speeds and velocities in jogging (a) from A to B and (b) from A to C ?



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149. Abdul, while driving to school, computes the average speed for his trip to be $20kmh^{-1}$. On his return trip along the same route, there is less traffic and the average speed is $30kmh^{-1}$. What is the average speed for Abdul's trip ?



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150. A motorboat starting from rest on a lake acceleration line at a constant rate of $3.0m/s^2$ for $8.0s$. How far does the boat travel during this time ?

A. 48 m

B. 92 m

C. 96 m

D. None of these

Answer: C



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151. A driver of a car A travelling at $54\text{km}/\text{h}$ applies the brakes and stops the car in 4 seconds. Another driver of car B travelling at $36\text{km}/\text{h}$ applies the brakes and stops the car in 6 seconds. Plot speed versus time graphs for the two car. which of the cars travelled farther before stopping ?



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152. A ball is gently dropped from a height of 20m . If its velocity increases uniformly at the rate of $10\text{m}/\text{s}^2$

, with what velocity will it strike the ground ? After what time will it strike the ground ?



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153. State which of the following situations are possible and give an example for each of these :

(a) A body with a constant acceleration but with zero velocity.

(b) An object moving in a certain direction with an acceleration in the perpendicular direction.



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154. An artificial satellite is moving in a circular orbit of radius 42250km . Calculate its speed if it takes 24hours to revolve around the Earth.



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Sample Problem

1. A car is moving on a straight road with uniform acceleration. The following table gives the speed of the car at various instants of time :

Speed(m / s)	:	5	10	15	20	25	30
Time(s)	:	0	10	20	30	40	50

Draw the speed-time graph by choosing a convenient

scale. Determine from it :

(i) the acceleration of the car.

(ii) the distance travelled by the car in 50 seconds.



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Very Short Answer Type Questions

1. Fill in the following blanks with suitable words:

(a) Displacement is a quantity whereas distance is a Quantity.

(b) The physical quantity which gives both the speed and direction of motion of a body is called its

(c) A motorcycle has a steady of $3m/s^2$. This

means that every itsincrease by

(d) Velocity is the rate of change ofIt is measured in

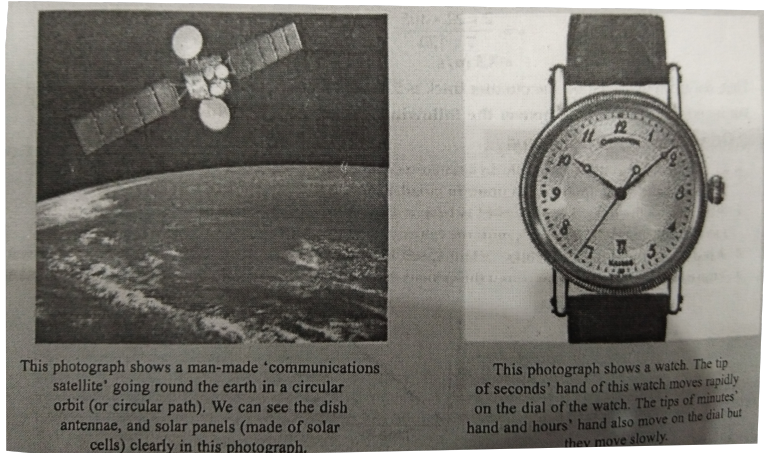
(e) Acceleration is the rate of change of It is measured in



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2. A setellite goes round the earth in a circular orbit with constant speed. Is the motion uniform or

accelerated ?



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3. Fill in the following blanks with suitable words :

(a) If a body moves with uniform velocity, its acceleration is

(b) The slope of a distance-time graph indicates of a moving body.

(c) The slope of a speed-time graph of a moving body gives its

(d) In a speed-time graph, the area enclosed by the speed-time curve and the time axis gives the by the body.

(e) It is possible for something to accelerate but not change its speed if it moves in a



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Short Answer Type Questions

1. What is the difference between uniform linear motion and uniform circular motion ? Explain with

examples.



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Long Answer Type Questions

1. Show by means of graphical method that :

$$v = u + at$$

where the symbols have their usual meanings.



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2. Using graphical method, derive the equations

$$v = u + at \text{ and } s = ut + \frac{1}{2}at^2$$

where symbols have their usual meanings.



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3. Use graphical method to derive the relation

$v^2 - u^2 = 2as$, where the symbols have their usual meanings.



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Multiple Choice Questions

1. In the speed-time graph for a moving object shown here, the part which indicates uniform deceleration of the object is :

A. AB

B. BC

C. CD

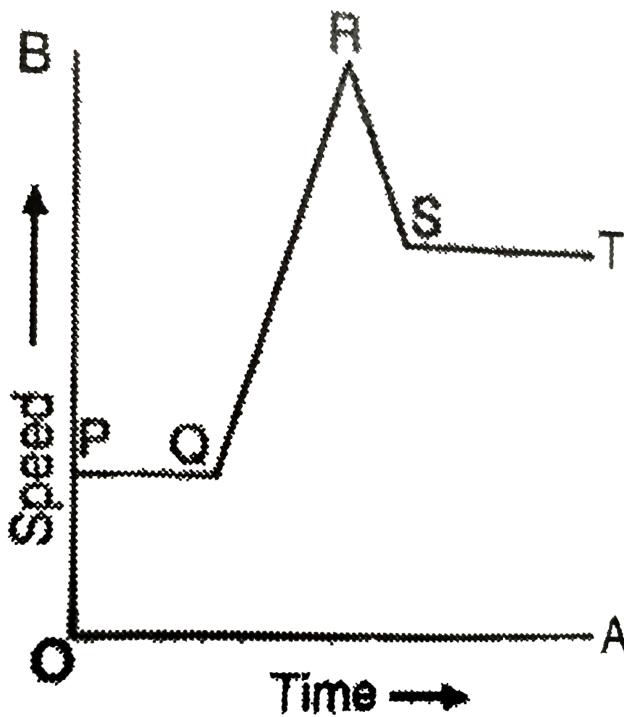
D. DE

Answer: C



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2. A student draws a distance-time graph for a moving scooter and finds that a section of the graph is a horizontal line parallel to the time axis. Which of the following conclusion is correct about this section of the graph ?



- A. the scooter has uniform speed in this section
- B. the distance travelled by scooter is the maximum in this section
- C. the distance travelled by the scooter is the minimum in this section
- D. the distance travelled by the scooter is zero in this section

Answer: D



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3. 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 hour' hand on the dial of a clock

Answer: C

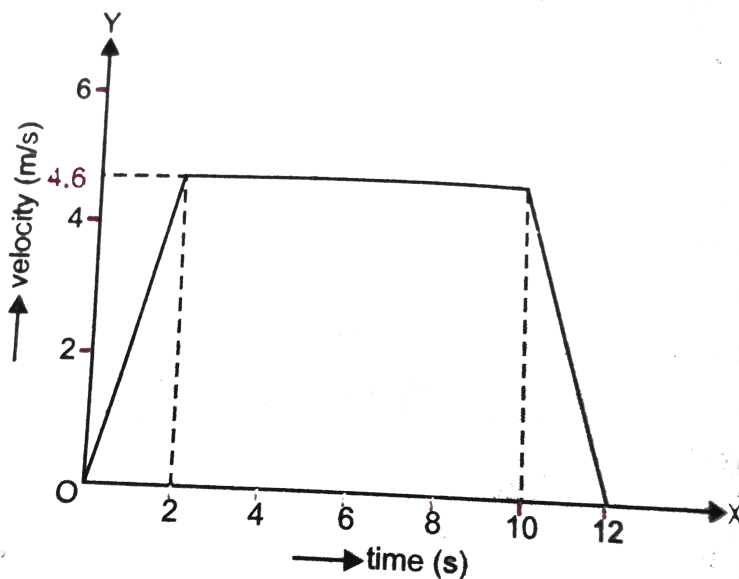


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Questions Based On High Order Thinking Skills Hots

1. The velocity - time graph of an ascending passenger order lift is given in figure. What is the acceleration of the lift:

- (i) during the first two seconds ,
- (ii) between 2nd and 10th second,
- (iii) during the last two seconds. .



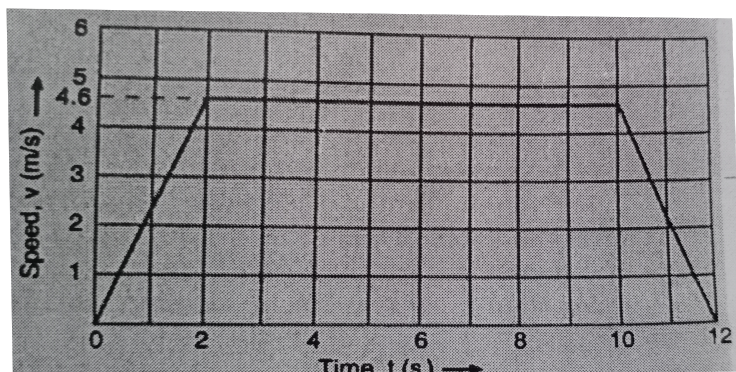
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2. A car is moving on a straight road with uniform acceleration. The speed of the car varies with time as follows :

Time(s)	:	0	2	4	6	8	10
Speed(m/s)	:	4	8	12	16	20	24

Draw the speed-time graph by choosing a convenient scale. From this graph :

- (i) Calculate the acceleration of the car.
- (ii) Calculate the distance travelled by the car in 10 seconds.





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Ncert Book Questions And Exercises

1. What does the odometer of an automobile measure ?



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2. Figure shows the distance-time graph of three object A , B and C . Study the graph and answer the following questions :

(a) Which of the three is travelling the fastest ?

(b) Are all three ever at the same point on the road ?

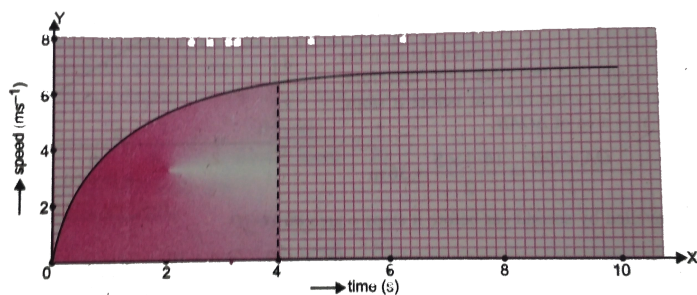
(c) How far has C travelled by when B passes A ?

(d) How far has B travelled by the time it passes C ?



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3. The speed-time graph for a car is shown in Figure



(a) Find how far does the car travel in the first 4 seconds. Shade the area on the graph that represents the distance travelled by the car during this period.

(b) Which part of the graph represents uniform motion of the car ?



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