PHYSICS

BOOKS - MAXIMUM PUBLICATION

MOTION IN ONE DIMENSION

Exercise

1. Which of the following curves does not represent motion in one dimension?

A. 

B. 

C. 

D. 

Answer: B

View Text Solution

2. Free fall of an object(in vaccum) is a case of motion with

A. Uniform velocity

B. Uniform acceleration

C. Variable acceleration

D. Uniform speed

Answer: B

Watch Video Solution

3. The area under velocity-time graph for a particle in a given interval of time represents

A. Velocity

B. Acceleration

C. Work done

D. Displacement

Answer: D

 Watch Video Solution

4. A car travels half the distance with constant velocity of 40kmph and the remaining half

with a constant velocity 60kmph.The average velocity of the car in $kmph$ is

A. 40

B. 45

C. 48

D. 50

Answer: C

Watch Video Solution

5. The acceleration of a moving object is equal to the

A. Gradient of a displacement-time graph

B. Gradient of a velocity-time graph

C. Area below a speed-time graph

D. Area below a displacement-time graph

Answer: B

Watch Video Solution

6. A ball is thrown vertically upwards and comes back.Which of the following graph represents the velocity-time graph of the ball during its flight?

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

7. The magnitude of average velocity is equal to average speed.In which case this condition is staisfied?

Watch Video Solution

8. Can a body be said to be at rest as well as in motion at the same time?

Watch Video Solution

9. What conclusion can you draw if the average velocity is equal to instanteneous velocity?

Watch Video Solution

10. Why the speed of the object can never be negative?

Watch Video Solution

11. Is it possible that the velocity of an object be in a direction other than the direction of acceleration?If yes,give an example.

Watch Video Solution

12. Is it possible to have the rate of change of velocity constant while the velocity itself changes both in magnitude and direction.If yes,give an example.

Watch Video Solution

13. If the acceleration of the particle is constant in magnitude but not in direction,what type of path does the body follow?

 Watch Video Solution

14. Two stones of different sizes are dropped simultaneously from the top of a building.Which stone would reach earlier? Why?

Watch Video Solution

15. A piece of paper and iron piece are dropped simultaneously from the same point in vaccum.Which one will reach at ground earlier?

Watch Video Solution

16. Is it possible that your cycle has a southward velocity but northward

acceleration?If yes,give an example.

Watch Video Solution

17. An ant is moving through a graph paper along x-axis.A boy observes that the ant covers $1mm$ in every second. What type of motion is this?

Watch Video Solution

18. Some examples of motion are given below.State in each case if the motion is one,two,or three dimension

a)A kite flying on a windy day.

b)A speeding car on a long straight highway.

c)A carrom coin rebounding from the side of the board.

d)A planet revolving around its star.

Watch Video Solution

19. Two bodies start moving in the same straight line at the same instant of time from the same origin.The first body moves with a constant velocity of $40\frac{m}{s}$ and the second starts from rest with a constant acceleration of $4\frac{m}{s^2}$.

a)What is uniform speed?

b)Find the time that elapses before the second catches the first body.

Watch Video Solution

20. Displacement is a vector quantity while distance is a scalar quantity.Distinguish between scalar and vector quantities.

 Watch Video Solution

21. "The aerial distance between two towers is $4km$.But speedometer of car shows $5.6km$ when travel from one tower to another." By reading this statement explain the concept of distance and displacement.

 Watch Video Solution

22. A stone is thrown upwards from the ground with a velocity,u.

a)What is the maximum height attained by the stone?

b)Check the correctness of the equation obtained in,(a)using the method of dimensional analysis.

c)Draw the position-time graph of the stone during its return journey

Watch Video Solution

23. Gopal dropped an apple from the top his flat at a height of $10m$.He told his sister Seetha on the ground below that it will reach the ground in $2\sec$ after he drops it. Can she catch it after $2\sec$?

Watch Video Solution

24. A tow rope used to pull the car of mass $700kg$ will break if the tension exceeds $1500N$.

a)Calculate the maximum acceleration with

which the car can be pulled through a level road.

b)Calculate the minimum time required to bring the car to work station $500m$ away from the break point.

Watch Video Solution

25. The relative velocity of a body A with respect to a body B is the time rate at which body A changes its position with respect to body B.

a)If V_A and V_B are the velocities of A and B moving in opposite directions,what is the relative velocity of A with respect to B?

b)Two trains along the same straight rails are moving with constant velocity of $60k\frac{m}{h}$ and $30k\frac{m}{h}$ towards each other.If at time $t = 0$,the distance between them is $90km$,find the time when they collide.

c)The velocity time graph of two bodies A and B make angles of 30° and 60° with the time axis,what is the ratio of their acceleration?

Watch Video Solution

26. A balloon is ascending at the rate of $14ms^{-1}$ and at a height of $98m$ above the ground, a stone is dropped from it.

a)State whether the motion of the balloon is accelerated or retarded?

b)After how much time does the stone reach the ground?

c)Determine the velocity with which the stone strikes the ground.

 Watch Video Solution

27. A particle is moving along x-axis with a uniform positive acceleration.Draw the position time graph for its motion.

Watch Video Solution

28. State the difference between speed and velocity.Can a body move with uniform speed but with variable velocity?Explain with the help of an example.

Watch Video Solution

29. A sprinter starts from rest and pickup a speed of $12\frac{m}{s}$ in $3\,\mathrm{sec}\,onds$.

a)Name the type of motion.

b)Derive a relation to find distance travelled during t second for this type of motion.

c)A car manufacturer advertises that the brakes are so perfect that the car stops instantly.Do you agree?Explain.

Watch Video Solution

30. a)Acceleration due to gravity is $9.8\frac{m}{s^2}$ .What is meant by the value of 9.8?

b)Obtain a relation between velocity-position of a uniformly accelerated body.

c)A particle moving with a certain velocity is subjected to a retardation of $4\frac{m}{s^2}$,if it returns to the starting point in $12s$.Calculate the initial velocity.

Watch Video Solution

31. In which of the following examples of motion, can the body be considered approximately a point object:

A. a railiway cariage moving without jerks between two stations.

B. a monkey siting on top of a man cycling smoothly on a circular track.

C. a spinning cricket ball that tums sharply on hitting the ground.

D. a tumbling beaker that has slipped off the edge of a table.

Answer:

Watch Video Solution

32. A car moving along a straight highway with speed of 126 km h^{-1} is brought to a stop within a distance of 200 m. What is the retardation of the car (assumed uniform), and how long does it take for the car to stop?

Watch Video Solution

33. On a two lane road, car A is travelling with a speed of 36 km h −1 . two cars B and C approach car A in opposite directions with a speed of 54 km h −1 each. At a certain instant, when the distance AB is equal to AC, both being 1 km, B decides to overtake A before C does. What minimum acceleration of car B is required to avoid an accident?

Watch Video Solution

34. Read each statement below carefully and state with reasons and examples, if it is true or false, A particle in one-dimensional motion:

a) with zero speed at an instant may have non-zero acceleration at that instant,

b)with zero speed may have non-zero velocity,

c)with constant speed must have zero acceleration,

d)with positive value of acceleration must be speed-ing up.

Watch Video Solution

35. A man walks on a straight road from his home to a market $2.5km$ away with a speed of $5kmh^{-1}$. Finding the market closed, he instantly turns and walks back home with a speed of $7.5kmh^{-1}$.

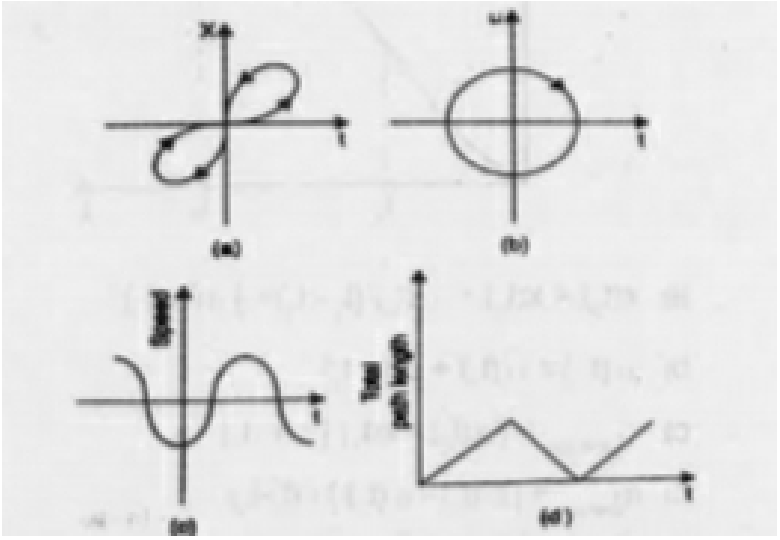
a) What is the magnitude of average velocity, and

b) average speed of the man over the following intervals of time:

i)$0 \rightarrow 30$ min, ii)$0 \rightarrow 50$ min, iii)$0 \rightarrow 40$min ?

Watch Video Solution

36. Look at the graphs (a) to (d) in the following figure carefully and state, with reasons, which of these cannot possibly represent one-dimensional motion of the particle.



Watch Video Solution

37. If 'v' is the velocity and 'a' is the acceleration , give an example of a physical situation for each of the following cases.

(a) $v \neq 0, a = 0$

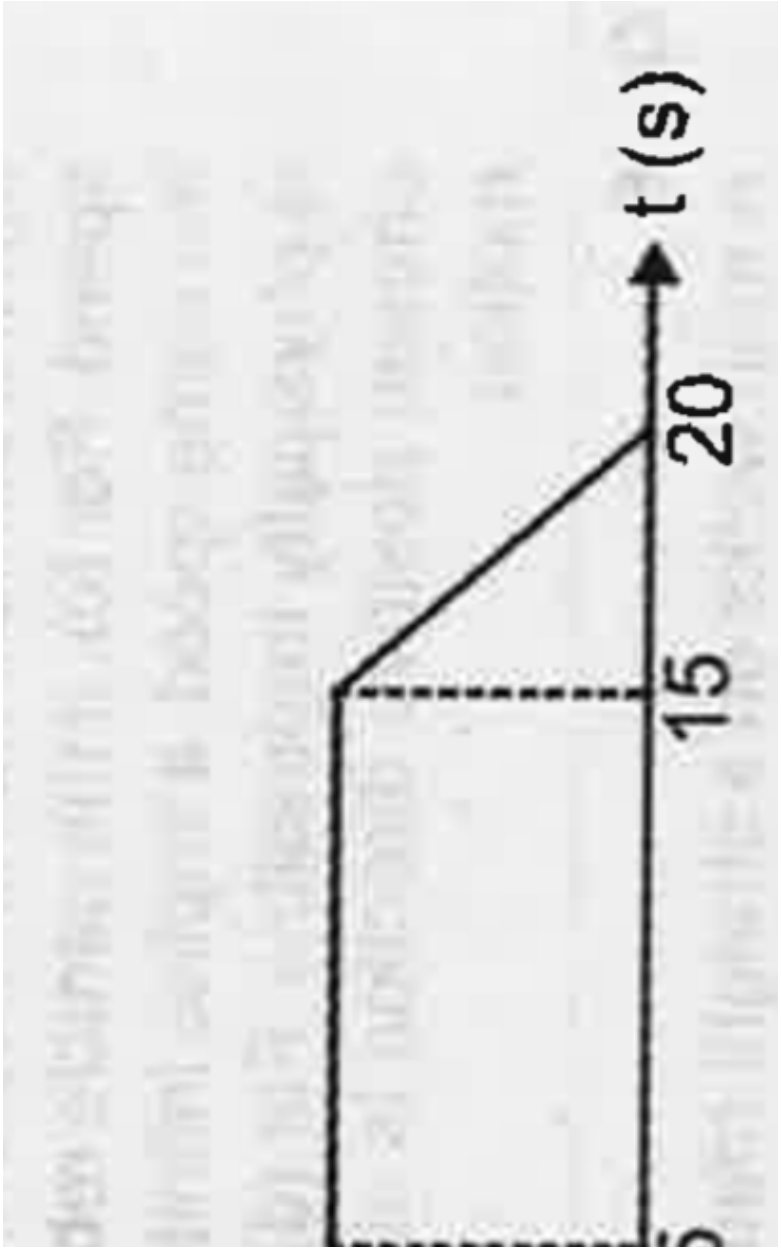
(b) $v = 0, a \neq 0$

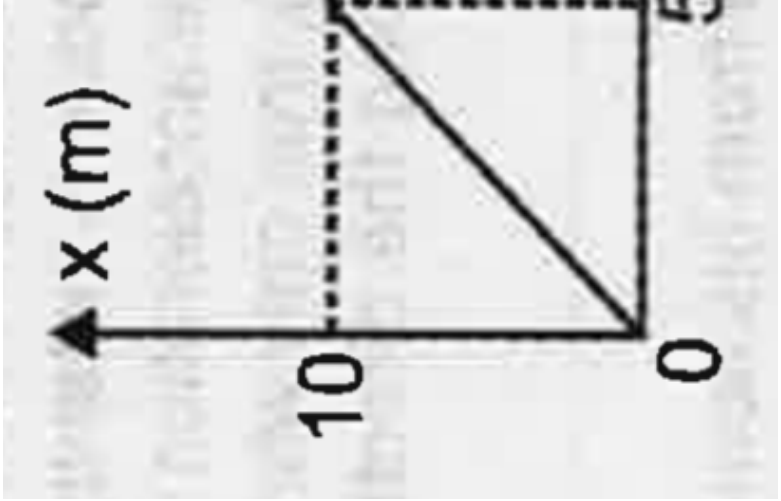
(c) $v > 0, a < 0$

(d) $v < 0, a > 0$

Watch Video Solution

38. (a) The figure shows the position time graph of a body moving along a straight line.

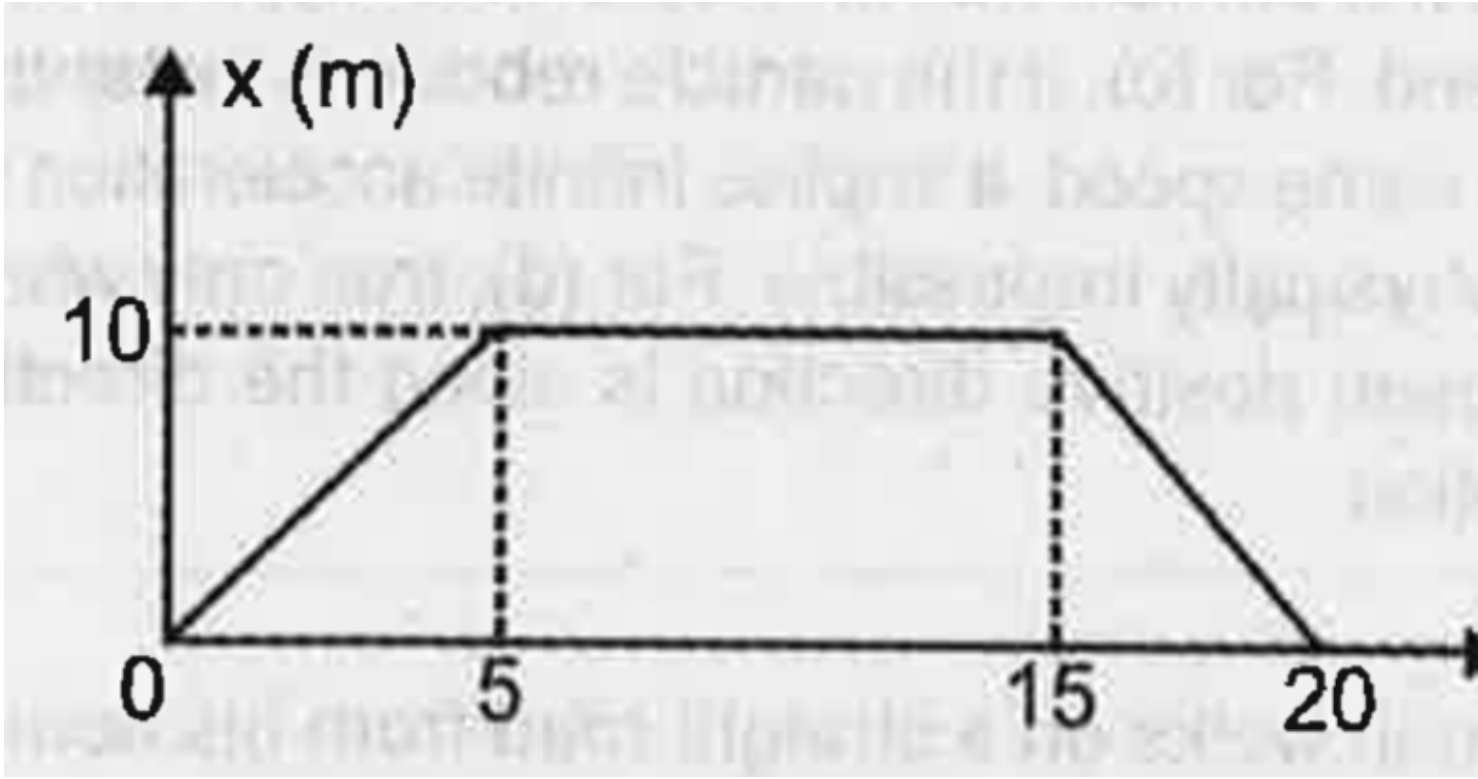




i) Draw the velocity - time graph of the body.

Watch Video Solution

39. The figure shows the position time graph of a body moving along a straight line.


x (m)
10
0
5
15
20

ii) From the graph, find the displacement in 20 seconds.

Watch Video Solution

40. From the velocity-time graph of a body moving with uniform acceleration, deduce the velocity-time relation and the velocity-displacement relation.

Watch Video Solution

41. A physical quantity having both magnitude and direction is a vector and if it has only magnitude it is a scalar. Categorize the following physical quantities into scalars and vectors.

(a) Force

(b) Angular momentum

(c) Time

(d) Work

Watch Video Solution

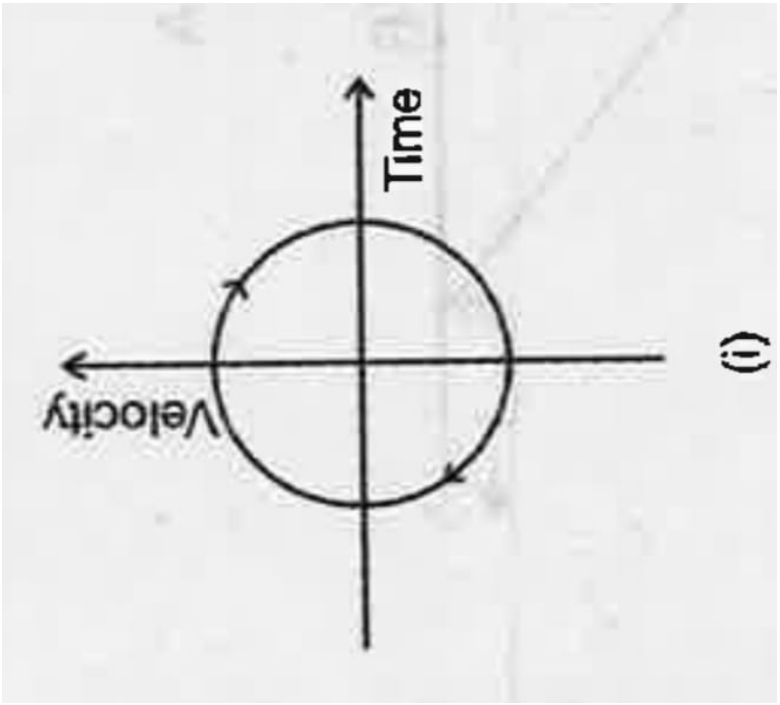
42. Acceleration is the time rate of change of velocity.

Give an example of a body possessing zero velocity and still accelerating.

Watch Video Solution

43. Graph representing the motion of a body is shown below. State with reason whether it can

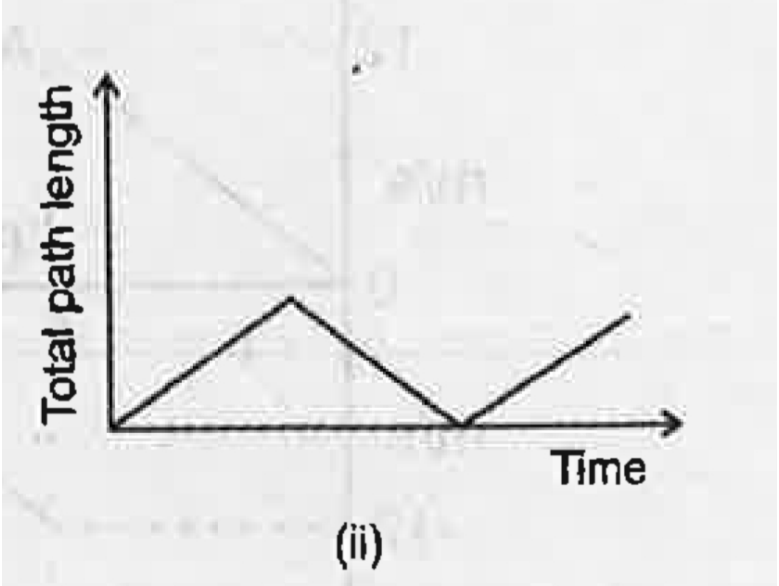
represent one dimensional motion.



Watch Video Solution

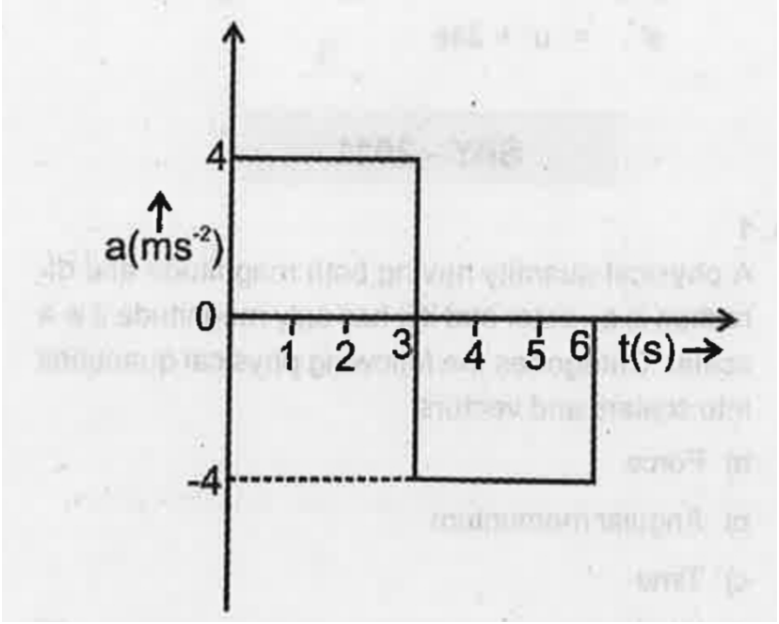
44. Graph representing the motion of a body is shown below. State with reason whether it

can represent one dimensional motion.



Watch Video Solution

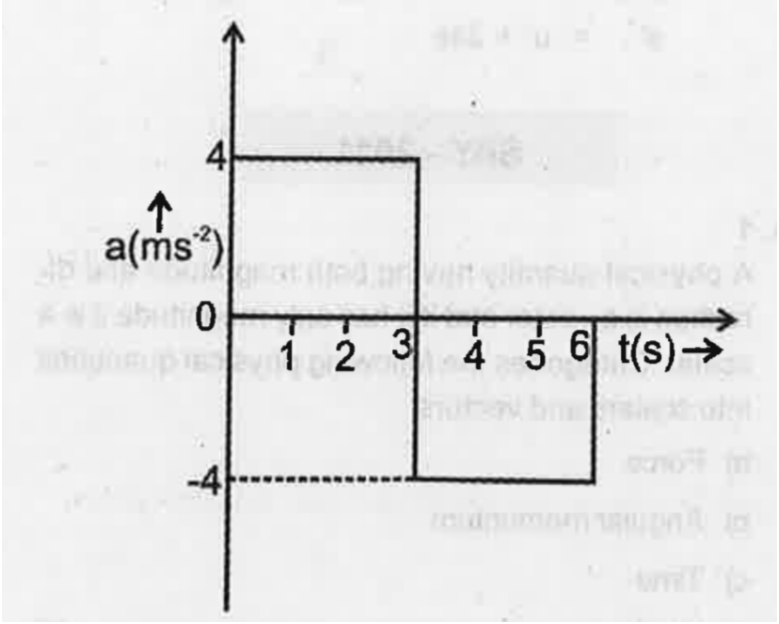
45. Acceleration -time graph of a body starts from rest as shown below :



What is the use of the acceleration - time graph?

Watch Video Solution

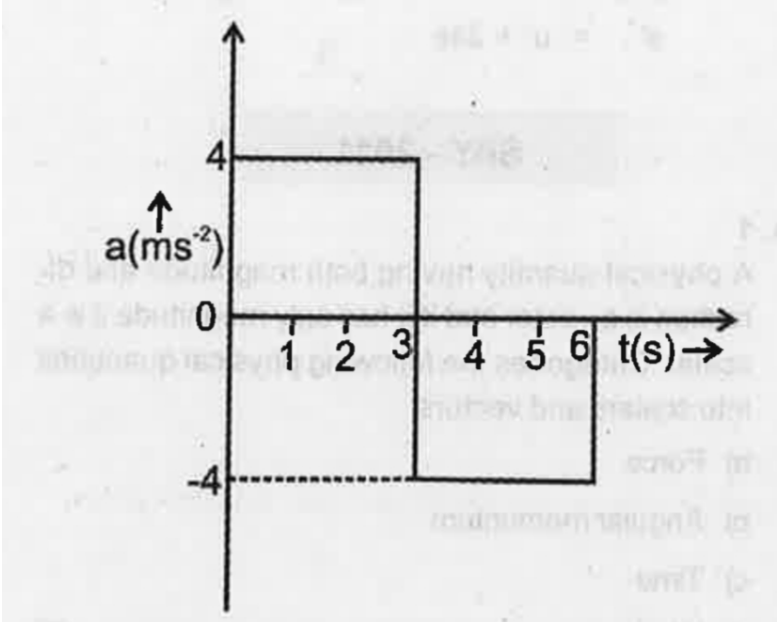
46. Acceleration -time graph of a body starts from rest as shown below :



Draw the velocity-time graph using the above graph

Watch Video Solution

47. Acceleration -time graph of a body starts from rest as shown below :



Find the displacement in the given interval of time form 0 to 3 seconds.

Watch Video Solution

48. State in the following cases whether the motion is one,two or three dimensions.

(i) A butterfly flying around a flower.

(ii) A bus moving along a long and straight road.

Watch Video Solution

49. Derive the equations of motion for non-uniform motion in one dimension.

Watch Video Solution

50. Acceleration is defined as the rate of change of velocity.

Is it possible for a body to have acceleration without velocity?Explain.

Watch Video Solution

51. Acceleration is defined as the rate of change of velocity.

Draw the velocity-time graph of a body moving

with uniform acceleration a and initial velocity v_0.

Watch Video Solution

52. Acceleration is defined as the rate of change of velocity. Obtain the equation for displacement in time t.

Watch Video Solution

53. Velocity is defined as the rate of change of displacement.

Distinguish between average velocity and instantaneous velocity.

Watch Video Solution

54. Velocity is defined as the rate of change of displacement.

When does the average velocity become equal to the instantaneous velocity?

Watch Video Solution

55. Velocity is defined as the rate of change of displacement.

A car travels from A to B at $60k\frac{m}{h}r$ and returns to A at $90k\frac{m}{h}r$.What is its average velocity and average speed?

Watch Video Solution

56. The ratio of velocity,to speed of an object is

_____

(i)one

(ii)greater than one

(iii)less than one

(iv)either less than one or equal to one.

Watch Video Solution

57. A stone is dropped from height h. Arrive at an expression for the time taken to reach the ground.

Watch Video Solution

58. An object released near the surface of the earth is said to be in free fall.(Neglect the air resistance).

Choose the correct alternative from the clues given at the end of the statement.

"Free fall is an example of _____ accelerated motion."(uniformly/nonuniformly).

Watch Video Solution

59. Area under velocity-time graph gives _____.

Watch Video Solution