



PHYSICS

BOOKS - VGS PUBLICATION-BRILLIANT

MOTION

Conceptual Understanding

1. "She moves at a constant speed in a constant direction." Rephrase the same

sentence in fewer words using concepts related to motion.



[Watch Video Solution](#)

2. What do you mean by constant acceleration ?



[Watch Video Solution](#)

3. An object moving with 6m per second execute an acceleration $2m/s^2$ in next 3

seconds. How much distance it covered ? ($s = ut + \frac{1}{2} at^2$)



[Watch Video Solution](#)

4. A car stopped after travelling distance 8m due to applying brakes at the speed of 40 m/s. Find acceleration and retardation of car in that period. ($v^2 - u^2 = 2as$)



[Watch Video Solution](#)

Asking Questions And Making Hypothesis

1. Correct your friend who says "The car rounded the curve at a constant velocity of 70 km/h".



[Watch Video Solution](#)

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



[Watch Video Solution](#)

3. Can the direction of velocity of an object reverse when its acceleration is constant ?

If so give an example, if not, explain why.



[Watch Video Solution](#)

Application To Daily Life Concern To Biodiversity

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



[Watch Video Solution](#)

Try These

1. Derive the equation for uniform accelerated motion for the displacement covered in its n^{th}

second of its motion.

$$\left(s_n = u + a \left(n - \frac{1}{2} \right) \right)$$



[Watch Video Solution](#)

2. A point mass starts moving in a straight line with constant acceleration "a". At a time t after the beginning of motion, the acceleration changes sign, without change in magnitude. Determine the time t_0 from the beginning of the motion in which the point mass returns to the initial position. $((2 + \sqrt{2})t)$



[Watch Video Solution](#)

3. Consider a train which can accelerate with an acceleration of $20\text{cm}/\text{s}^2$ and slow down with deceleration of $100\text{cm}/\text{s}^2$. Find the minimum time for the train to travel between the stations 2.7 km apart. (180 s)



[Watch Video Solution](#)

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

taken by the train to cross an electric pole and a bridge of length 250 m. (5s, 30s).



Watch Video Solution

5. Draw the distance vs time graph when the speed of the body increases uniformly.



Watch Video Solution

Activities

1. Describe uniform motion.



[Watch Video Solution](#)

2. Explain with an example where "speed remains constant, but its velocity changes".



[Watch Video Solution](#)

Think Discuss

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

Given on example from daily life.



Watch Video Solution

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



Watch Video Solution

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



[Watch Video Solution](#)

4. When does the average velocity become zero ?



[Watch Video Solution](#)

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



[Watch Video Solution](#)

6. Very often you must have seen traffic police catching motorists and scooter drivers who drive fast and fine them. Does fine for

speeding depend on average speed or instantaneous speed ? Explain.



[Watch Video Solution](#)

7. One airplane travels due north at 300km/h and another airplane travels due south at 300 km/h. Are their speeds the same ? Are their velocities the same ? Explain.



[Watch Video Solution](#)

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



Watch Video Solution

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



Watch Video Solution

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



Watch Video Solution

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



Watch Video Solution

Questions Given In The Lesson

1. Can you find the speed of the car at a particular instant of time ?



[Watch Video Solution](#)

2. What is the shape of the graph ?



[Watch Video Solution](#)

3. Explain with an example where "speed remains constant, but its velocity changes".



[Watch Video Solution](#)

4. What is acceleration ? How can we know that a body is accelerating ?



[Watch Video Solution](#)

[Worked Out Examples](#)

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



[Watch Video Solution](#)

Previous Summative Assessments Questions

1. Frame any one question to understand Newton's third law of motion.



[Watch Video Solution](#)

2. A motor cyclist drive from A to B with uniform speed of 30km/hour and returns back with a speed of 20 km/hour. Find the average speed.



[Watch Video Solution](#)

3. A train of length 100 m. Is moving with a constant speed of 10m/s. Calculate the time taken by the train to cross the electric pole ?



[Watch Video Solution](#)

4. Calculate the average speed of "Ussain Bolt" who sprints 100m in 9.81 sec. during 2016 Rio Olympics to win Gold medal.



[Watch Video Solution](#)

5. Explain the terms in the formula $v = u + at$.



[Watch Video Solution](#)

Essential Material For Examination Purpose

1. Write an equation of motion to find the distance travelled when initial velocity, time, and acceleration are given.



[Watch Video Solution](#)

2. Define acceleration.



[Watch Video Solution](#)

3. What is the key difference between distance and displacement ?



Watch Video Solution

4. The distance travelled by a particle in time 't' is given by $S = (2.5m/s^2)t^2$. Find the average speed of the particle during the time '0' to '5' sec.



Watch Video Solution

5. A ball is thrown up with an initial speed of 4m/sec . Find the maximum height reached by the body.



[Watch Video Solution](#)

6. A man used his car. The initial and final odometer readings are 4849 and 5549 respectively. The journey time is 70h. What is his average speed during the journey ?



[Watch Video Solution](#)

7. An object is moving in a circular path of radius 7 m. What is the distance and displacement of an object after one revolution ?



[Watch Video Solution](#)

8. A person moves 3 km towards east and turned toward north and travelled a distance of 4 km. Find total distance and total displacement.



[Watch Video Solution](#)

9. What happens to the direction of velocity and acceleration when the

i) speed of an object increases ?

ii) speed of an object decreases ?



[Watch Video Solution](#)

10. Find the acceleration of a bus if its speed increases from 0 m/s to 600 m/s in 1 minute ?



[Watch Video Solution](#)

11. What is the key difference between distance and displacement ?



[Watch Video Solution](#)

12. Explain the terms uniform and non-uniform motions.



[Watch Video Solution](#)

13. Derive equation of uniform accelerated motion.



[Watch Video Solution](#)

14. Derives $s = ut + \frac{1}{2}at^2$

Derive one equation for displacement of a body which is in the uniform acceleration.



[Watch Video Solution](#)

15. Give an example to each situation in daily life.

i) Speed changes when direction remains constant.

ii) Direction of motion changes when speed remains constant.

iii) Speed and direction simultaneously change.



Watch Video Solution

1. A car covers half the distance at a speed of 60kmh^{-1} and the other half at a speed of 40kmh^{-1} . The average speed of the car is

A. 44.44kmh^{-1}

B. 50kmh^{-1}

C. 48kmh^{-1}

D. 0

Answer: B



Watch Video Solution

2. Mithilesh wanted to find instantaneous speed of the car in which he was travelling. He should see which one of the following meters ?

A. Anaemometer

B. Odometer

C. Speedometer

D. Thermometer

Answer: C



Watch Video Solution

3. An example for a motion where the speed and direction of motion both changes continuously is

A. Ball moving down the inclined plane

B. Throwing stone into the air, making some angle with the horizontal

C. Ball moving up the inclined plane

D. Whirling stone

Answer: B



Watch Video Solution

4. Velocity : ms^{-1} :: acceleration : ?

A. ms^{-2}

B. m^2s

C. $m^{-2}s$

D. ms^2

Answer: A



Watch Video Solution

5. When the driver pushes the accelerator of the car, then

A. the time interval to reach the destination decreases.

B. the time interval to reach the destination remains the same.

C. the speed and time interval both increase.

D. the time interval to reach the destination increases.

Answer: A



Watch Video Solution

6. Which of the following is not a vector ?

A. Speed

B. Acceleration

C. Velocity

D. Displacement

Answer: A



Watch Video Solution

7. The velocity of the car was measured by a traffic police through his radar gun at that instant. The gun measured

A. Instantaneous acceleration

B. Instantaneous velocity

C. Average acceleration

D. Average velocity

Answer: B



Watch Video Solution

8. Siva completed half revolution of circular path of radius 'a' units. Displacement of Siva is

A. a' units

B. 2a' units

C. πa units

D. $2\pi a$ units

Answer: B



Watch Video Solution

9. Acceleration of a person moving with constant velocity

A. Infinite

B. Positive acceleration

C. Negative acceleration

D. Zero

Answer: D



Watch Video Solution

10. Thanish starts at 8 am to Ananthapuram from Amaravathi and reaches at 6pm. The distance between Amaravathi and Ananthapuram is 500 km. Average velocity of Thanish is



[Watch Video Solution](#)

11. Based on the direction find the Odd one.

A. Velocity

B. Displacement

C. Speed

D. Acceleration

Answer: C



[Watch Video Solution](#)

12. Is speed in Specified direction.

A. Distance

B. Velocity

C. Acceleration

D. Displacement

Answer: B



Watch Video Solution

13. Match the following equations of uniform accelerated motion formulae

P) $a =$, X) $ut + \frac{1}{2}at^2$

Q) $s =$, Y) $\frac{v - u}{t}$

R) $v^2 =$, Z) $v^2 + 2as$

A. P - X, Q - Y, R - Z

B. P - Y, Q - X, R - Z

C. P - Z, Q - X, R - Y

D. P - Y, Q - Z, R - X

Answer: B



Watch Video Solution

14. Which of the following is Non-Uniform motion :

A. Motion of a ball on inclined plane

B. Uniform circular motion

C. A stone thrown in air

D. All the above

Answer: D



15. If the equation of motion of an object is $v^2 = 2as$, the initial velocity is ...

A. Zero

B. infinity

C. 10 m/s

D. We can't say

Answer: A



16. Assertion (A) : Speedometer of a vehicle reads instantaneous velocity

Reason (R) : The speed at any instant is called instantaneous velocity

A. Both A and R are correct, R is correct

explanation of A

B. Both A and R are correct, R is not correct

explanation of A

C. A is correct, R is incorrect

D. A is incorrect, R is correct

Answer: A



Watch Video Solution

Objective Type Questions

1. A body released from height 'h' takes time 't' to reach ground. After time $t/2$. Its height from the ground is

A. $\frac{h}{2}$

B. $\frac{h}{4}$

C. $\frac{3h}{4}$

D. $\frac{h}{3}$

Answer: C



Watch Video Solution

2. Which of the following is correct ?

A. Distance \geq Displacement

B. $\frac{\text{Distance}}{\text{Displacement}} \geq 1$

C. Both A & B

D. None

Answer: C



Watch Video Solution

3. Ratio of the distance travelled in 1 second, 2 seconds, 3 seconds

A. $1^2 : 2^2 : 3^2$

B. 1 : 3 : 5

C. 1 : 2 : 3

D. 1 : 5 : 9

Answer: A



Watch Video Solution

4. Which of the following is correct ?

A. Acceleration due to gravity in vacuum is

the same irrespective of size and mass of

body.

B. Acceleration in vacuum is absent.

C. Acceleration due to gravity in vacuum depends on mass.

D. Acceleration due to gravity is zero at poles.

Answer: A



Watch Video Solution

5. If a body is projected horizontally from the top of a tower the time taken by it to reach the ground depends upon

A. velocity of projection

B. height of the tower

C. both A & B

D. neither of these two

Answer: B



Watch Video Solution

6. Both average velocity and average instantaneous velocity are equal when a body is moving with

- A. uniform velocity in same direction
- B. uniform velocity in different directions
- C. uniform acceleration
- D. none

Answer: A



Watch Video Solution

7. A body projected vertically with a velocity 'u' from ground. Its velocity

A. at half of maximum height is $\frac{u}{2}$

B. at $\frac{3^{th}}{4}$ of maximum height is $\frac{u}{\sqrt{2}}$

C. at $\frac{1^{rd}}{3}$ of maximum height is $\sqrt{\frac{2}{3}}u$

D. at $\frac{1^{th}}{4}$ of maximum height is $\frac{\sqrt{2}}{3}u$

Answer: C



Watch Video Solution

8. A freely falling body describes a distance x in first 2 seconds and a distance y in next 2 seconds. Then

A. $y = x$

B. $y = 2x$

C. $x = 2y$

D. $y = 3x$

Answer: D



Watch Video Solution

9. The height from which a body is released is numerically equal to the velocity acquired finally. Then that height is

A. g

B. $2g$

C. $4g$

D. $8g$

Answer: B



Watch Video Solution

10. A physical quantity with magnitude as well as direction is called quantity.

A. scalar

B. vector

C. linear

D. none of these

Answer: B



Watch Video Solution

11. Speed of a body at any particular instance is known as

A. velocity

B. average speed

C. instantaneous speed

D. none of these

Answer: C



Watch Video Solution

12. The physical quantity with only magnitude is called

A. scalar

B. vector

C. axial

D. linear

Answer: A



Watch Video Solution

13. Instantaneous speed can be represented by of the curve at a given instant of time.

A. distance

B. midpoint

C. slope

D. none of these

Answer: C



Watch Video Solution

14. Average speed =

A. $\frac{\text{Total distance}}{\text{Time taken}}$

B. $\frac{\text{Total time}}{\text{Time distance}}$

C. $\frac{\text{Total displacement}}{\text{Time time}}$

D. $\frac{\text{Total time}}{\text{Time displacement}}$

Answer: A



Watch Video Solution

15. In Motion distance and displacement are same.

A. curvilinear

B. rotational

C. vibrational

D. rectilinear

Answer: D



Watch Video Solution

16. is the rate of change of velocity.

A. Displacement

B. Velocity

C. Acceleration

D. Momentum

Answer: C



Watch Video Solution

17. Negative acceleration is called

A. deceleration

B. retardation

C. both A & B

D. neither A nor B

Answer: C



Watch Video Solution

18. If the speed of an object decreases, the direction of velocity and acceleration are in Direction.

A. same

B. opposite

C. unable to say

D. none of these

Answer: A



Watch Video Solution

19. Acceleration of a person moving with constant velocity

A. positive

B. negative

C. zero

D. none of these

Answer: C



Watch Video Solution

20. At maximum height the final velocity is

.....

A. u

B. $\frac{u^2}{2g}$

C. $\frac{2u}{g}$

D. zero

Answer: D



Watch Video Solution

21. A body is projected horizontally with a velocity $\sqrt{29}$ m/s from a height 10 m, the velocity on reaching the ground m/s.

A. $\sqrt{29}$

B. 10

C. 15

D. 20

Answer: C



Watch Video Solution

22. Is speed in Specified direction.

A. displacement

B. velocity

C. acceleration

D. momentum

Answer: B



Watch Video Solution

23. If an ant completes one circular motion, then the displacement is

A. $2\pi r$

B. πr

C. $4\pi r$

D. zero

Answer: D



Watch Video Solution

24. When a train comes to rest, then the acceleration is

A. positive

B. negative

C. maximum

D. none of these

Answer: B



Watch Video Solution

25. Direction of acceleration is along the direction of

A. velocity

B. constant velocity

C. increase in velocity

D. all the above

Answer: A



Watch Video Solution

26. The motion is said to be If acceleration is constant.

A. uniform motion

B. uniform accelerated motion

C. non-uniform accelerated motion

D. none of these

Answer: B



Watch Video Solution

27. The S.I unit of acceleration is

A. m

B. m/s

C. m / s^2

D. m^2 / s

Answer: C



Watch Video Solution

28. If the direction of velocity changes continuously and speed remains constant, then the body will be in Motion.

A. circular

B. rotatory

C. non-uniform circular

D. uniform circular

Answer: D



Watch Video Solution

29. The unit of distance is

A. m

B. s

C. kg

D. m/s

Answer: A



Watch Video Solution

30. The unit of speed is

A. m

B. m/s

C. m / s^2

D. m^2 / s

Answer: B



Watch Video Solution

31. The unit of force is

A. kg

B. Newton

C. Kelvin

D. kg m/s

Answer: B



Watch Video Solution

32. Average velocity =

A. $\frac{\text{Total distance}}{\text{Total time}}$

B. $\frac{\text{Total displacement}}{\text{Total time}}$

C. Total distance \times Time

D. $\frac{\text{Total time}}{\text{Total displacement}}$

Answer: B



Watch Video Solution

33. First law of motion is

A. $v = u + at$

B. $s = ut + \frac{1}{2}at^2$

C. $v^2 - u^2 = 2as$

D. $S_n^{th} = u + \frac{1}{2}a(n - A)$

Answer: A



Watch Video Solution

34. Second law of motion is

A. $v = u + at$

B. $s = ut + \frac{1}{2}at^2$

C. $v^2 - u^2 = 2as$

D. None of these

Answer: B



Watch Video Solution

35. Third law of motion is

A. $v = u + at$

B. $s = ut + \frac{1}{2}at^2$

C. $v^2 - u^2 = 2as$

D. None of these

Answer: C



Watch Video Solution

36. Acceleration =

A. $a = \frac{v - u}{t}$

B. $a = \frac{d}{t}$

C. $a = \frac{s}{t}$

D. $a = v \times t$

Answer: A



Watch Video Solution

37. Assertion (A) : Displacement is a vector.

Reason (R) : Displacement has both magnitude and direction.

- A. Both A and R are true and R supports A.
- B. Both A and R are true but R does not support A.
- C. A is true but R is false.
- D. A is false but R is true.

Answer: A





Watch Video Solution

38. If an ant completes one circular motion, then the displacement is

A. $2\pi r$

B. πr

C. zero

D. $2r$

Answer: C



Watch Video Solution

39. Distance : meter :: displacement :

A. m^2

B. m/s

C. $1/m$

D. m

Answer: D



Watch Video Solution

40. If the distance between two points is ' x ' meters, then the displacement is

A. $= x$ meters

B. $> x$ meters

C. $< x$ meters

D. A or C

Answer: D



Watch Video Solution

41. Average speed : $\frac{\text{total distance}}{\text{time taken}}$:: :

("displacement")/("time taken")

- A. average velocity
- B. average acceleration
- C. average force
- D. none of the given

Answer: A



Watch Video Solution

42. Average velocity becomes zero, if a particle move in this way of points.

A. $A \rightarrow B$

B. $A \rightarrow B \rightarrow C$

C. $A \rightarrow B \rightarrow C \rightarrow B$

D. $A \rightarrow B \rightarrow C \rightarrow A$

Answer: D



Watch Video Solution

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

- A. uniform motion
- B. non - uniform motion
- C. circular motion
- D. no motion

Answer: A



Watch Video Solution

44. The shape of a S - t graph for a non - uniform motion always be

A. straight line

B. curved line

C. A or B

D. none

Answer: C



Watch Video Solution

45. If the revolving of earth stops, its path of escaping is

A. along the direction of velocity vector

B. along the direction of curved path

C. along the direction of diameter of the curved path

D. we cannot say

Answer: A



Watch Video Solution

46. Consider the motion of the tip of the minute hand of a clock in one hour

- A. distance is zero
- B. displacement is zero
- C. the average speed is zero
- D. average velocity is non-zero

Answer: A



Watch Video Solution

47. Two bullets A & B fired simultaneously, horizontally and with different speeds from the same plane. Which bullet will hit the ground first ?

A. A

B. B

C. A and B

D. Depend on their masses

Answer: C



Watch Video Solution

48. A body is projected vertically up from ground with a speed \sqrt{gh} . The average speed of total motion is

A. $\sqrt{\frac{gh}{2}}$

B. $\frac{\sqrt{gh}}{2}$

C. $\sqrt{2gh}$

D. none

Answer: B



Watch Video Solution

49. A freely falling body crosses the points A, B and C with velocities v , $2v$, $3v$. Then $AB : AC =$

A. $1 : 2$

B. $1 : 3$

C. $1 : 1$

D. $3 : 8$

Answer: D



Watch Video Solution

50. Take a ball and release it from the top of a inclined plane, what is your observation ?

A. Speed of the ball is constant.

B. Speed of the ball increases gradually.

C. Speed of the ball decreases gradually.

D. Speed first increases and then decreases.

Answer: B



Watch Video Solution

51. Tie a stone to a rope. Whirl the rope and rotate the stone in a circular path cut the rope. Your observation is

A. stone moves along the tangent of the path.

B. stone falls in the centre of the path.

C. stone takes revers direction.

D. none

Answer: A



Watch Video Solution

52. A vector can be represented as a directed line segment in which length indicates and arrow indicates

A. magnitude, direction

B. direction, magnitude

C. magnitude, speed

D. speed, velocity

Answer: A



Watch Video Solution

53. The shape of distance vs time graph for a body which is in uniform motion is

A. curve

B. straight line

C. zig zag

D. none of these

Answer: B



Watch Video Solution

$$54. v = u + at \quad \dots .1$$

$$s = ut + \frac{1}{2}at^2 \quad \dots .2$$

$$v^2 = 2as + u^2 \quad \dots .3$$

$$v^2 + u^2 = 2as \quad \dots .4$$

Which of the above is not a equation of uniform acceleration ?

A. 1

B. 3

C. 4

D. 1, 2, 3

Answer: C



Watch Video Solution

55. Slope of the distance vs time graph

A. Displacement

B. speed

C. velocity

D. acceleration

Answer: B



Watch Video Solution

56. If the average speed of a bus is 40 m/s.

What is the time to travel a distance of 12 km ?

A. 5 min

B. 300 min

C. 480 min

D. None

Answer: A



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

A. 28 m/hr

B. 28 km/hr

C. 2800 m/sec

D. 2.8 km/hr

Answer: B



Watch Video Solution

58. A particle on a blade of the electrical fan moves in

- A. uniform motion
- B. uniform speed
- C. circular path
- D. above all

Answer: D



Watch Video Solution

59. Motion of a rocket : (a) : : Motion of a satellite around the earth : (b)

A. (a) = uniform, (b) = non - uniform

B. (a) = non - uniform, (b) = uniform

C. (a) = uniform, (b) = uniform

D. (a) = non - uniform, (b) = non - uniform

Answer: B



Watch Video Solution

60. If we are travelling in a bus, when the driver presses the acceleration, our bodies press against the seat due to

- A. acceleration
- B. uniform motion
- C. deceleration
- D. none

Answer: A



Watch Video Solution

61. Deceleration observes in

A. moving train comes to rest

B. starting of the train

C. both A and B

D. motion of earth

Answer: A



Watch Video Solution

62. A ball is thrown upwards with 10 m/s velocity after 1 sec, what is its height?

A. 10 m

B. 5 m

C. 15 m

D. 0 m

Answer: B



63. The speedometer of a bike or car gives

A. instantaneous speed

B. uniform speed

C. uniform velocity

D. acceleration

Answer: A



64. With respect to passengers in a moving bus the state of motion of tree is

A. rest

B. motion in same direction

C. motion in opposite direction

D. none of these

Answer: C



Watch Video Solution

65. When we apply brakes to car then travels with

- A. acceleration
- B. constant velocity
- C. retardation
- D. none of these

Answer: C



Watch Video Solution