Important Questions Class 9 Science Chapter 7: Chapter 7 of Class 9 Science Motion explain the fundamental concepts of how objects move and the factors influencing their motion. Important questions cover topics like distance versus displacement, speed versus velocity and the meaning of acceleration and deceleration.

Students may need to solve problems to find average speed, read distance-time graphs, or use equations of motion for objects moving at a steady rate. It is also important to understand concepts like frame of reference and different types of motion, such as uniform and non-uniform motion. By practicing these key questions, students can strengthen their understanding of motion in the world around them.

Important Questions Class 9 Science Chapter 7 Overview

Chapter 7 of Class 9 Science focuses on the concept of Motion and understanding this chapter is important for students as it lays the foundation for various concepts in physics. The important questions prepared by subject experts of Physics Wallah cover key topics such as the differences between distance and displacement, speed and velocity and the significance of acceleration.

By solving these expert-created questions, learners can enhance their grasp of motion, allowing them to better understand how objects behave in different scenarios and prepare effectively for their exams.

Important Questions Class 9 Science Chapter 7 PDF

For Class 9 Science Chapter 7 which covers the topic of Motion we have compiled a list of important questions in a convenient PDF format.

You can download the PDF using the link provided below to access these important questions and enhance your understanding of motion.

Important Questions Class 9 Science Chapter 7 PDF

Important Questions Class 9 Science Chapter 7 Motion

Here we have provided Important Questions Class 9 Science Chapter 7 Motion-

Very Short Answer Questions (1 Mark)

Q.1. Which of the following statements is correct?

a. Both speed and velocity are the same
b. Speed is a scalar, and velocity is a vector

c. Speed is a vector, and velocity is a scalar
d. None of these

Ans: b) Speed is a scalar, and velocity is a vector

Q.2. What is the slope of the body when it moves with uniform velocity?

a. Positive
b. Negative
c. Zero
d. May be positive or negative

Ans: c) Zero

Q.3. What does an area in a velocity-time graph give?

a. Distance
b. Acceleration
c. Displacement
d. None of the above

Ans: c) Displacement

Q.4. If a body starts from rest, what can be said about the acceleration of the body?

a. Positively accelerated
b. Negatively accelerated
c. Uniformly accelerated
d. None of the above

Ans: a) Positively accelerated

Q.5. What does the slope of the position-time graph give?

a. Speed
b. Acceleration
c. Uniform speed
d. Both (a) and (c) depending on the type of graph.

Ans: a) Speed

Q.6. When a body moves uniformly along a circle, then:

a. Its velocity changes, but speed remains the same
b. Its speed changes, but velocity remains the same
c. Both speed and velocity change
d. Both speed and velocity remain the same

Ans: a) Its velocity changes, but speed remains the same

Q.7. Which of the following statements is correct?

a. Speed and distance are scalar; velocity and displacement are vector
b. Speed and distance are vector; velocity and displacement are vector
c. Speed and velocity are scalar; distance and velocity are vector
d. Speed and velocity are vector; distance and displacement are scalar

Ans: a) Speed and distance are scalar; velocity and displacement are vector

Q.8. What does the slope of a velocity-time graph give?

a. Distance
b. Displacement
c. Acceleration
d. Change in velocity.

Ans: c) Acceleration

Q.9. The displacement of the body can be:

a. Positive
b. Negative
c. Zero
d. All of these.

Ans: d) All of these.

Q.10. Which of the following gives both direction and magnitude?

a. Scalar
b. Vector
c. Both
d. None.

Ans: b) Vector

Q.11. If a moving body comes to rest, then its acceleration is

a. Positive
b. Negative
c. Zero
d. All of these depending on initial velocity.

Ans: b) Negative

Short Answer Questions (2 Marks)

Q.1. Distinguish between speed and velocity.

Ans: Speed is the distance traveled by a body per unit time, while velocity is the rate and direction of an object's movement.

Q.2. Under what condition(s) is the magnitude of the average velocity of an object equal to its average speed?

Ans: The magnitude of the average velocity is equal to the average speed when the distance traveled by the body is equal to its displacement.

Q.3. What does the odometer of an automobile measure?

Ans: The odometer measures the distance covered by an automobile.

Q.4. What does the path of an object look like when it is in uniform motion?

Ans: The path of an object in uniform motion is linear, appearing as a straight line on a graph.

Q.5. Which of the following is true for displacement?

a. It cannot be zero.

Ans: False; displacement can be zero if the starting and ending points are the same.

b. Its magnitude is greater than the distance traveled by the object.

Ans: False; the magnitude of displacement is less than or equal to the distance traveled.

Q.6. When will you say a body is in:

i. **Uniform acceleration?**

Ans: A body is in uniform acceleration when it travels in a straight line, and its velocity changes by equal amounts in equal intervals of time.

ii. **Non-uniform acceleration?**

Ans: Non-uniform acceleration occurs when the velocity of an object changes by unequal amounts in equal intervals of time.

Q.7. Differentiate between Distance and Displacement

Ans: The difference between distance and displacement is as follows:

Distance	Displacement
1. The length of the actual path traveled by the body from the initial position to the final position.	The length of the straight line joining the initial and final positions of the body.
2. It is a scalar quantity, meaning it has only magnitude.	It is a vector quantity, meaning it has both magnitude and direction.
3. Distance is always positive.	Displacement can be positive, negative, or zero.

Q.8. Define Uniform Velocity and Uniform Acceleration

Ans:

- **Uniform Velocity:** A body is said to have uniform velocity if it covers equal displacements in equal intervals of time, regardless of how small those intervals are.
- **Uniform Acceleration:** A body is said to have uniform acceleration if it experiences equal changes in velocity over equal intervals of time, regardless of how small those intervals are.

Q.9. Differentiate Between Scalars and Vectors

Ans: The difference between scalars and vectors is as follows:

Vector	Scalar
1. Has magnitude and specific direction.	Has magnitude but no direction.
2. Can be positive or negative.	Always positive.
3. Examples: Displacement, velocity.	Examples: Distance, speed.

Short Answer Questions (3 Marks)

Q.1. An object has moved through a distance. Can it have zero displacement? If yes, support your answer with an example.

Ans: Yes, an object can have zero displacement even after moving through a distance. Displacement is defined as the change in position of an object. For example, if an object travels from point A to point B and then returns to point A, the total displacement is zero because the initial and final positions are the same.

Q.2. State which of the following situations are possible and give an example for each of these:

a. An object with a constant acceleration but with zero velocity.

Ans: Yes, an object can have a constant acceleration while having zero velocity.

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

Ans: Yes, this situation is also possible. For instance, when an athlete runs along a circular track, their speed remains constant, but their direction changes. In this case, the acceleration is directed toward the center of the circle (centripetal acceleration) and is always perpendicular to the direction of motion. Therefore, the athlete's motion on a circular path is an example of this situation.

Q.3. A cheetah is the fastest land animal and can achieve a peak velocity of 100 km/h up to distances less than 500 m. If a cheetah spots its prey at a distance of 100 m, what is the minimum time it will take to get its prey, if the average velocity attained by it is 90 km/h?

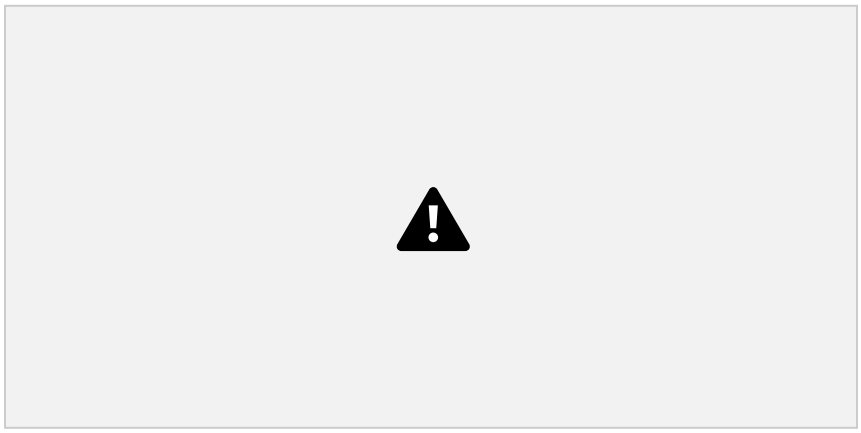
Ans:

Average velocity = 90 km/h = 90km1h
= 90×1000m60×60s = 25 ms^{-1}
Also, Average velocity = Displacement Time taken
∵ Cheetah moves in a straight line displacement is equal to 100 m.
Therefore, time taken = 10025 = 4 s

Q.4. The brakes applied to a car produce an acceleration of 6 ms^{-2} in the opposite direction to the motion. If the car takes 2s to stop after the application of brakes, calculate the distance it travels during this time.

Ans:

We have been given



Thus, the car will move 12 m before it stops after the application of brakes.

Q.5. A car starts from rest and moves along the x-axis with constant acceleration 5 ms^{-2} for 8 seconds. If it then continues with constant velocity, what distance will the car cover in 12 seconds since it started from the rest?

Ans:

Initial velocity ,u = 0
Using $s = ut + 12at^2$
The distance travelled in first 8s,
$s_1 = 0 + 12 \times 5 \times 8^2 = 160$ m
At this point the velocity, $v = u + at$
$= 0 + 5 \times 8 = 40\ ms^{-1}$
So, the distance covered in last four seconds
$s_2 = 40 \times 4 = 160$ m
Hence, total distance, $s = s_1 + s_2$
= 160 m + 160 m = 320 m

Q.6. A motorcyclist drives from A to B with a uniform speed of 30 kmh^{-1} and returns back with a speed of 20 kmh^{-1}. Find its average speed.

Ans:

$$\text{Let AB} = x, \text{ So } t_1 = \frac{x}{30} \text{ and } t_2 = \frac{x}{20}$$

$$\text{Total time} = t_1 + t_2 = \frac{5x}{60} \text{ h}$$

$$\text{Average speed for entire journey} = \frac{\text{Total distance}}{\text{Total time}} = \frac{2x}{\frac{5x}{60}} = \mathbf{24\ kmh^{-1}}$$

Q.7. An object is dropped from rest at a height of 150 m and simultaneously another object is dropped from rest at a height 100 m. What is the difference in their heights after 2 s if both the objects drop with same accelerations? How does the difference in heights vary with time?

Ans:

Initial difference in height = (150 – 100) m = 50 m
Distance travelled by first body in 2 s = $h_1 = 0 + 12\ g(2)^2 = 2g$
Distance travelled by another body in 2 s = $h_2 = 0 + 12\ g(2)^2 = 2g$
After 2 s, height at which the first body will be = $h_1' = 150 – 2g$
After 2 s, height at which the second body will be = $h'_2 = 100 – 2g$
Thus, after 2 s, difference in height = 150 – 2g – (100 – 2g) = 50 m = initial difference in height
Thus, difference in height does not vary with time.

Q.13. An object starting from rest travels 20 m in first 2s and 160 m in next 4s. What will be the velocity after 7s from the start? [NCERT Exemplar]

Ans:
$s_1 = ut + 12\ at^2$ or $20 = 0 + 12a(2)^2$ or $a = 10 ms^{-2}$
$v = u + at = 0 + (10 \times 2) = 20\ ms^{-1}$
$s_2 = 160 = vt' + 12a'(t')^2 = (20 \times 4) + (12a' \times 16) \Rightarrow a' = 10 ms^{-2}$
Since accelerations is the same, we have $v' = 0 + (10 \times 7) = 70\ ms^{-1}$

Q.14. An electron moving with a velocity of $5 \times 10^4\ ms^{-1}$ enters into a uniform electric field and acquires a uniform acceleration of $104\ ms^{-2}$ in the direction of its initial motion.

(i) Calculate the time in which the electron would acquire a velocity double of its initial velocity.
(ii) How much distance the electron would cover in this time? [NCERT Exemplar]

Ans:

Given initial velocity, $u = 5 \times 10^4\ ms^{-1}$
and acceleration, $a = 10^4 ms^{-2}$
(i) Final velocity = $v = 2u = 2 \times 5 \times 10^4 ms^{-1} = 10 \times 10^4 ms^{-1}$

To find t, use v = u + at

$$\text{or} \qquad t = \frac{v-u}{a}$$

$$= \left(\frac{10\times10^4 - 5\times10^4}{10^4}\right) = \frac{5\times10^4}{10^4} = \mathbf{5\ s}$$

$$(ii) \quad \text{Using } s = ut + \frac{1}{2}at^2$$

$$= (5\times10^4)\times 5 + \frac{1}{2}(10^4)\times(5)^2 = 25\times10^4 + \frac{25}{2}\times10^4 \ = \mathbf{37.5 \times 10^4\ m}$$

Benefits of Important Questions Class 9 Science Chapter 7

- **Enhanced Understanding**: These questions help clarify important concepts related to motion, speed, velocity, and acceleration ensuring students grasp fundamental principles.
- **Exam Preparation**: Familiarity with important questions boosts confidence and readiness for tests, as students can anticipate similar questions in their exams.
- **Time Management**: Practicing these questions allows students to learn how to manage their time effectively during exams, ensuring they can complete all questions within the allotted time.
- **Self-Assessment**: Important questions enable students to assess their understanding and identify areas needing further review or practice.