CLASS IX – SCIENCE PRACTICE PAPER (2026-27)

Chapter 4: Describing Motion Around Us

Max. Marks: 40 **Time Allowed: 1 hour 30 minutes**

General Instructions:

(i) This question paper consists of **20 questions** in **5 sections (A to E)**. All questions are compulsory. Internal choice is given in some questions.

(ii) **Section A** has 10 questions of 1 mark each: Q1–8 are Multiple Choice Questions and Q9–10 are Assertion–Reason questions.

(iii) **Section B** has 4 Very Short Answer questions of 2 marks each (about 30–40 words).

(iv) **Section C** has 3 Short Answer questions of 3 marks each (about 50–60 words).

(v) **Section D** has 2 Case-Based questions of 4 marks each.

(vi) **Section E** has 1 Long Answer question of 5 marks with an internal choice.

(vii) Questions are competency-based and application-oriented. Show all steps, with units, in numerical questions. Take $g = 10\ \text{m s}^{-2}$ wherever required.

(viii) **Questions 2, 6, 12, 16, 19 and 20 are figure-based** and refer to Fig. 1 to Fig. 6.

SECTION A – Objective Questions (10 × 1 = 10 marks)

1 A child walks 30 m east along a straight road and then 20 m west along the same road. The total distance travelled and the displacement of the child are: **1**

(A) 50 m and 10 m towards east

(B) 50 m and 50 m towards east

(C) 10 m and 50 m towards east

(D) 10 m and 10 m towards east

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2 **[Figure-based]** Fig. 1 shows the position-time graphs of three objects P, Q and R moving along a straight line. Which statement is correct? **1**

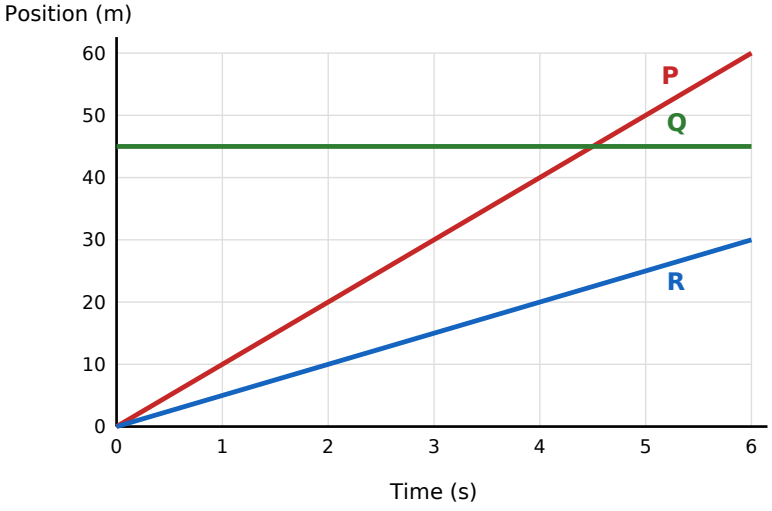


Fig. 1: Position-time graphs of P, Q and R

(A) P is at rest.

(B) Q is at rest and P has a greater velocity than R.

(C) R has a greater velocity than P.

(D) Q moves with a constant velocity of 45 m s^{-1}.

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3 A cyclist rides once around a circular park and returns to the starting point. Which of the following is zero for the whole trip although the cyclist was moving all the time? **1**

(A) Distance travelled

(B) Average velocity

(C) Time interval

(D) Average speed

4 The velocity of a scooter changes from 10 m s^{-1} to 30 m s^{-1} in 5 s along a straight road. Its average acceleration is: **1**

(A) 2 m s^{-2}
(B) 4 m s^{-2}
(C) 6 m s^{-2}
(D) 8 m s^{-2}

5 A ball is thrown vertically upwards. At the highest point of its path, which statement is correct? **1**

(A) Velocity is zero and acceleration is zero.
(B) Velocity is zero but acceleration is 10 m s^{-2} directed downwards.
(C) Velocity is maximum and acceleration is zero.
(D) Velocity is zero and acceleration is directed upwards.

6 **[Figure-based]** Fig. 2 shows the velocity-time graph of a car moving in a straight line. The displacement of the car between 0 s and 6 s is: **1**

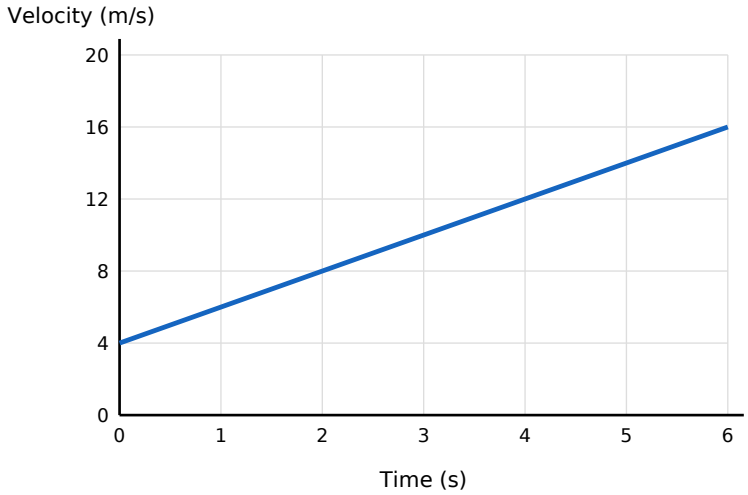


Fig. 2: Velocity-time graph of a car

(A) 60 m
(B) 120 m
(C) 96 m
(D) 72 m

7 A car starts from rest and moves with a constant acceleration of 2 m s^{-2} in a straight line. Its velocity after covering 100 m is: **1**

(A) 10 m s^{-1}
(B) 20 m s^{-1}
(C) 40 m s^{-1}
(D) 200 m s^{-1}

8 The area enclosed between the velocity-time graph and the time axis for a given time interval represents the: **1**

(A) acceleration
(B) average speed
(C) displacement
(D) time interval

Questions 9 and 10 consist of two statements: Assertion (A) and Reason (R). Choose the correct option:
(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, and R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

9 **Assertion (A):** An object moving with a constant speed in a circular path is an accelerated object. **1**

Reason (R): In uniform circular motion the direction of velocity changes continuously.

10 **Assertion (A):** The magnitude of the displacement of an object can be greater than the distance travelled by it. **1**

Reason (R): Displacement is the net change in position and its magnitude is the straight-line separation between the initial and final positions.

SECTION B – Very Short Answer Questions (4 × 2 = 8 marks)

11 Differentiate between **distance travelled** and **displacement** on any two points. (1 + 1) **2**

12 **[Figure-based]** Fig. 3 shows the position-time graph of a car moving along a straight road. P, Q and R are three parts of the graph. **2**

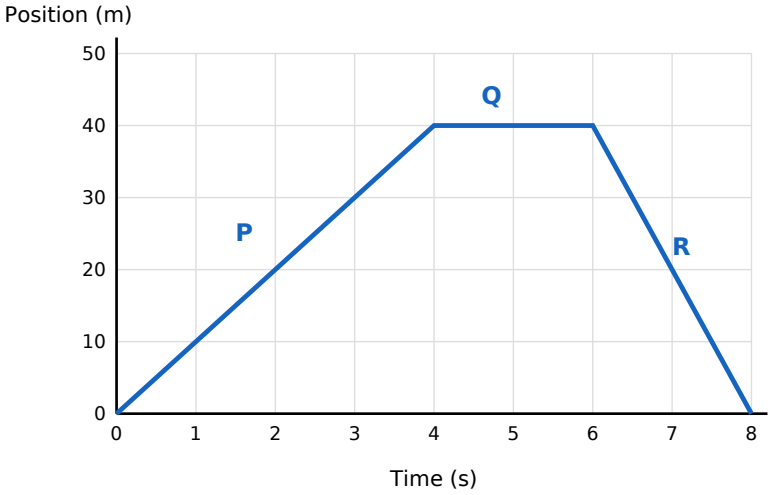


Fig. 3: Position-time graph of a car

(a) Find the velocity of the car in part P (0 s to 4 s). (1)

(b) What is the state of motion in part Q? Also state the average velocity of the car for the whole 8 s. (1)

13 Two friends stand 240 m apart on a straight path. They start walking towards each other at the same instant, with speeds 1.5 m s^{-1} and 2.5 m s^{-1}. After how much time will they meet? (2) **2**

14 *Attempt either option A or B.* **2**

A. A vehicle moves on a circular track at a constant speed of 20 km h^{-1}. Is it accelerating? Justify your answer. (2)

OR

B. A car travelling at 36 km h^{-1} is brought to rest in 5 s by applying brakes. Find its average acceleration and explain the meaning of its sign. (1 + 1)

SECTION C – Short Answer Questions (3 × 3 = 9 marks)

15 A cyclist rides 12 km east on a straight road in 36 minutes and then returns 6 km west along the same road in the next 24 minutes. For the whole journey, find the (i) total distance and displacement, (ii) average speed, and (iii) average velocity. (1 + 1 + 1) **3**

16 **[Figure-based]** Fig. 4 shows the velocity-time graph of a car moving in a straight line. **3**

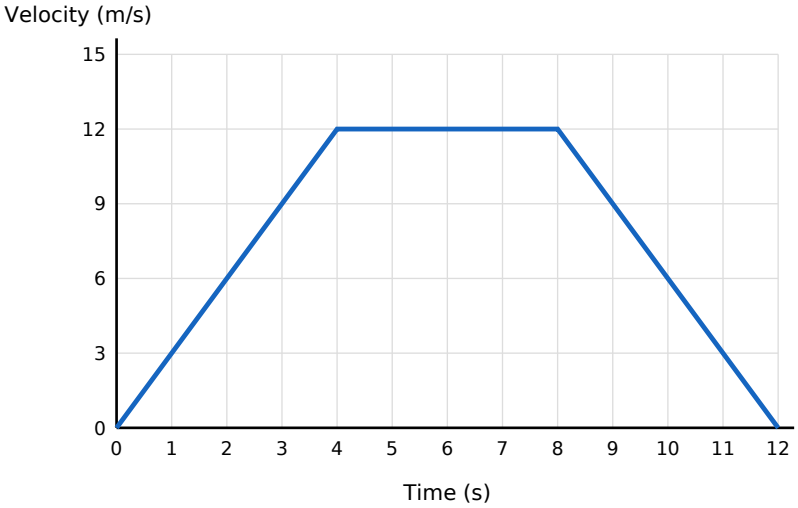


Fig. 4: Velocity-time graph of a car

(i) Find the acceleration of the car between 0 s and 4 s. (1)

(ii) Find the acceleration between 8 s and 12 s and explain the meaning of its sign. (1)

(iii) Calculate the total displacement of the car in 12 s from the graph. (1)

17 *Attempt either option A or B.* **3**

A. A car moving at 15 m s^{-1} accelerates uniformly at 2 m s^{-2} for 6 s. Find (i) its final velocity and (ii) the distance travelled in these 6 s. (1 + 2)

OR

B. A train moving at 72 km h^{-1} is stopped by applying brakes after it travels 200 m. Find (i) the acceleration (retardation) of the train and (ii) the time taken to stop. (2 + 1)

SECTION D – Case-Based Questions (2 × 4 = 8 marks)

18 **Case Study: A Stone Dropped from a Bridge** **4**

A student drops a small stone from rest from a bridge into a river. Taking the downward direction as positive, the stone moves with a constant acceleration of 10 m s^{-2} and takes 4 s to reach the water.

(i) Find the velocity of the stone 2 s after it is dropped. (1)

(ii) Find the velocity with which the stone hits the water. (1)

(iii) Find the height of the bridge above the water. (1)

(iv) State the direction of the acceleration of the stone and why it is the same in every second of its fall. (1)

19 Case Study: Safe Distance on the Highway **4**

[Figure-based] The distance a vehicle travels after the driver sees danger has two parts: the *reaction distance* (covered at constant speed during the driver's reaction time) and the *braking distance* (covered while the brakes act). A car moves at 72 km h^{-1} on a straight highway. The driver sees a stationary truck 65 m ahead (Fig. 5), takes 0.5 s to react and then applies brakes, which produce an acceleration of –4 m s^{-2}.

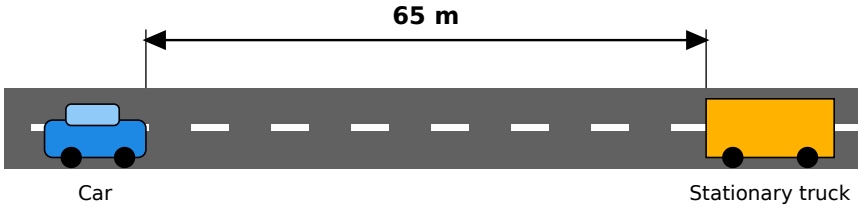


Fig. 5: A car approaching a stationary truck

(i) Express the speed of the car in m s^{-1}. (1)

(ii) Find the reaction distance of the car. (1)

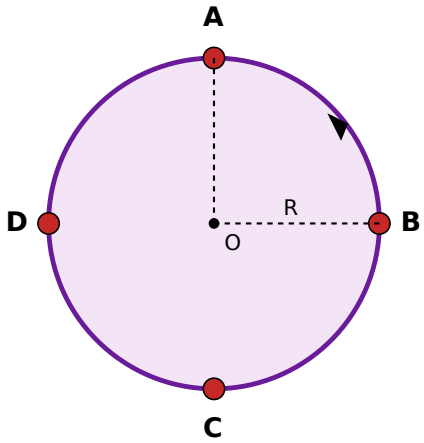
(iii) Find the braking distance of the car. (1)

(iv) Will the car hit the truck? What would happen if the car were moving at 108 km h^{-1} with the same reaction time and braking? Support with calculation. (1)

SECTION E – Long Answer Question (1 × 5 = 5 marks)

20 **[Figure-based]** Fig. 6 shows the top view of a circular merry-go-round of radius R = 14 m. A child sitting at A moves clockwise at a constant speed and completes one revolution in 44 s. Take π = 22/7. **5**

Attempt either option A or B.



Clockwise motion, A → B → C → D

Fig. 6: Top view of a merry-go-round (A, B, C, D are four positions)

A.

(i) State the direction of the velocity of the child at A. (1)

(ii) Why is the motion of the child accelerated even though the speed is constant? (1)

(iii) Find the distance travelled in one revolution and the average speed of the child. (1)

(iv) What are the displacement and the average velocity of the child after one complete revolution? (1)

(v) Find the distance travelled and the magnitude of displacement when the child moves from A to C. (1)

OR

B.

(i) Explain why the velocity of the child changes continuously while the speed does not. (1)

(ii) Find the time taken by the child to go from A to B. (1)

(iii) Find the distance travelled by the child from A to B. (1)

(iv) Find the magnitude of the displacement from A to B. Take √2 = 1.41. (1)

(v) A marble moving along the circular edge in the same way is released at C. In which direction will it move? Give a reason. (1)

***** END OF QUESTION PAPER *****