



Class 9 Science Chapter 4 – Important MCQs

Describing Motion Around Us

 **New NCERT *Exploration* | 2026–27**

These MCQs are based on the **new NCERT Chapter 4**, including motion in a straight line, position, distance, displacement, speed, velocity, acceleration, motion graphs, kinematic equations, free fall and uniform circular motion.



SECTION A – MOTION & POSITION

1. What is linear motion?

- A. Motion along a circular path
- B. Motion in a straight line
- C. Motion without time
- D. Motion with changing mass

 **Answer: B. Motion in a straight line**

2. To describe the position of an object, we need to specify a:

- A. Reference point
- B. Mass only
- C. Temperature
- D. Force only

 **Answer: A. Reference point**

3. An object is said to be in motion when its position with respect to a reference point:

- A. Does not change with time
- B. Changes with time
- C. Is always zero
- D. Is always positive

✓ **Answer: B. Changes with time**

4. An object is at rest when its position with respect to the reference point:

- A. Changes continuously
- B. Does not change with time
- C. Becomes negative
- D. Becomes zero

✓ **Answer: B. Does not change with time**

The textbook defines motion and rest relative to a specified reference point.

5. Which of the following is an example of linear motion?

- A. A car moving along a straight road
- B. A fan blade rotating
- C. Earth revolving around the Sun
- D. A stone moving in a circle

✓ **Answer: A. A car moving along a straight road**



SECTION B – DISTANCE & DISPLACEMENT

6. Distance travelled by an object is:

- A. The total length of the path travelled
- B. The shortest distance between initial and final positions
- C. Always zero
- D. Always negative

☒ **Answer: A. The total length of the path travelled**

7. Displacement is:

- A. Total path length
- B. Net change in position
- C. Distance multiplied by time
- D. Rate of change of distance

☒ **Answer: B. Net change in position**

8. Which quantity has both magnitude and direction?

- A. Distance
- B. Speed
- C. Displacement
- D. Time

☒ **Answer: C. Displacement**

9. Which quantity is a scalar?

- A. Displacement
- B. Velocity
- C. Acceleration
- D. Distance

☒ **Answer: D. Distance**

10. If an object returns to its starting point, its displacement is:

- A. Equal to the distance
- B. Zero

- C. Always negative
- D. Greater than the distance

✓ **Answer: B. Zero**

11. Which statement is correct?

- A. Distance can be negative.
- B. Displacement can be zero even when distance is non-zero.
- C. Speed always has direction.
- D. Time has direction.

✓ **Answer: B. Displacement can be zero even when distance is non-zero.**



SECTION C – SPEED & VELOCITY

12. Average speed is calculated as:

- A. Total distance $\div$ total time
- B. Displacement $\div$ total time
- C. Change in velocity $\div$ time
- D. Distance $\times$ time

✓ **Answer: A. Total distance $\div$ total time**

Formula:

Average speed = Total distance / Total time

13. Average velocity is calculated as:

- A. Total distance $\div$ time
- B. Displacement $\div$ time interval
- C. Time $\div$ displacement
- D. Distance $\times$ time

✓ **Answer: B. Displacement $\div$ time interval**

Formula:

Average velocity = Displacement / Time interval

14. Which quantity can be zero even when an object has travelled a non-zero distance?

- A. Distance
- B. Displacement
- C. Speed
- D. Time

 **Answer: B. Displacement**

15. If two objects travel the same distance in different times, the object taking less time has:

- A. Lower average speed
- B. Greater average speed
- C. Zero speed
- D. Zero displacement

 **Answer: B. Greater average speed**

16. Which statement is correct?

- A. Speed has both magnitude and direction.
- B. Velocity has magnitude but no direction.
- C. Velocity has both magnitude and direction.
- D. Distance has direction.

 **Answer: C. Velocity has both magnitude and direction.**



SECTION D – ACCELERATION

17. Average acceleration is:

- A. Change in velocity $\div$ time interval
- B. Change in distance $\div$ time
- C. Distance $\div$ velocity
- D. Velocity $\times$ time

✓ **Answer: A. Change in velocity $\div$ time interval**

Formula:

Average acceleration = Change in velocity / Time interval

18. The SI unit of acceleration is:

- A. m/s
- B. m/s²
- C. km/h
- D. m²/s

✓ **Answer: B. m/s²**

19. If velocity increases in the direction of motion, acceleration is:

- A. Opposite to motion
- B. In the direction of motion
- C. Always zero
- D. Perpendicular to motion

✓ **Answer: B. In the direction of motion**

20. If an object moves with constant velocity, its acceleration is:

- A. Zero
- B. Always positive
- C. Always negative
- D. Infinite

✓ **Answer: A. Zero**



SECTION E – MOTION GRAPHS

21. A horizontal position-time graph represents an object that is:

- A. At rest
- B. Accelerating
- C. Moving in a circle
- D. Changing mass

☒ **Answer: A. At rest**

22. A straight inclined line on a position-time graph indicates:

- A. Constant velocity
- B. Zero time
- C. No position
- D. Constant mass

☒ **Answer: A. Constant velocity**

23. The slope of a position-time graph represents:

- A. Acceleration
- B. Velocity
- C. Distance
- D. Mass

☒ **Answer: B. Velocity**

24. The slope of a velocity-time graph represents:

- A. Distance
- B. Acceleration
- C. Mass
- D. Position

✓ Answer: B. Acceleration

25. A velocity-time graph parallel to the time axis represents:

- A. Constant velocity
- B. Increasing velocity
- C. Increasing acceleration
- D. Zero time

✓ Answer: A. Constant velocity

26. The area under a velocity-time graph represents:

- A. Displacement
- B. Acceleration
- C. Mass
- D. Time

✓ Answer: A. Displacement



SECTION F – KINEMATIC EQUATIONS

27. Which is a kinematic equation for constant acceleration?

- A. $v = u + at$
- B. $F = ma$
- C. $P = W/t$
- D. $W = Fs$

✓ Answer: A. $v = u + at$

28. In the equation $v = u + at$, u represents:

- A. Final velocity
- B. Initial velocity

- C. Acceleration
- D. Displacement

✓ Answer: B. Initial velocity

29. In the equation $v = u + at$, v represents:

- A. Initial velocity
- B. Final velocity
- C. Time
- D. Distance

✓ Answer: B. Final velocity

30. In the equation $v = u + at$, a represents:

- A. Acceleration
- B. Area
- C. Average speed
- D. Position

✓ Answer: A. Acceleration

31. Which equation relates displacement, initial velocity, acceleration and time?

- A. $s = ut + \frac{1}{2} at^2$
- B. $v = u + at$
- C. $v^2 = u^2 + 2as$
- D. $F = ma$

✓ Answer: A. $s = ut + \frac{1}{2} at^2$

32. Which equation relates velocity, acceleration and displacement?

- A. $v^2 = u^2 + 2as$
- B. $s = ut + \frac{1}{2} at^2$

C. $v = u + at$

D. $P = W/t$

✓ Answer: A. $v^2 = u^2 + 2as$



SECTION G – FREE FALL

33. The acceleration due to gravity is represented by:

A. s

B. g

C. u

D. t

✓ Answer: B. g

34. Near the Earth's surface, acceleration due to gravity is approximately:

A. 1.8 m/s^2

B. 5.6 m/s^2

C. 9.8 m/s^2

D. 98 m/s^2

✓ Answer: C. 9.8 m/s^2

35. For a freely falling object, if upward is taken as positive, acceleration due to gravity is:

A. +g

B. -g

C. 0

D. 2g

✓ Answer: B. -g

36. When solving a motion problem, after choosing the positive direction, it should:

- A. Be changed whenever convenient
- B. Remain consistent
- C. Always point upward
- D. Always point downward

✓ **Answer: B. Remain consistent**



SECTION H – UNIFORM CIRCULAR MOTION

37. Uniform circular motion is motion along a circular path with:

- A. Constant speed
- B. Constant direction
- C. Zero speed
- D. Increasing mass

✓ **Answer: A. Constant speed**

38. In uniform circular motion, velocity changes because:

- A. Speed changes continuously
- B. Direction changes continuously
- C. Mass changes
- D. Time stops

✓ **Answer: B. Direction changes continuously**

39. Which is an example of circular motion?

- A. A car moving on a straight road
- B. A stone tied to a string and rotated in a circle

- C. A falling stone
- D. A train moving on a straight track

✓ Answer: B. A stone tied to a string and rotated in a circle

40. In uniform circular motion, the speed is:

- A. Constant
- B. Always zero
- C. Continuously increasing
- D. Continuously decreasing

✓ Answer: A. Constant



SECTION I – APPLICATION-BASED MCQs

41. A person walks 5 m east and then 5 m west. What is the displacement?

- A. 10 m
- B. 5 m
- C. 0 m
- D. 25 m

✓ Answer: C. 0 m

42. In the same situation, what is the total distance travelled?

- A. 0 m
- B. 5 m
- C. 10 m
- D. 25 m

✓ Answer: C. 10 m

43. A car travels 100 km in 2 hours. Its average speed is:

- A. 25 km/h
- B. 50 km/h
- C. 100 km/h
- D. 200 km/h

 **Answer: B. 50 km/h**

Calculation:

$$\text{Average speed} = 100 / 2 = 50 \text{ km/h}$$

44. An object starts from rest and accelerates at 2 m/s^2 for 5 s. Its final velocity is:

- A. 2 m/s
- B. 5 m/s
- C. 10 m/s
- D. 25 m/s

 **Answer: C. 10 m/s**

Using:

$$v = u + at$$

$$v = 0 + (2)(5)$$

$$v = 10 \text{ m/s}$$

45. If an object's velocity changes from 10 m/s to 20 m/s in 5 s, its average acceleration is:

- A. 1 m/s^2
- B. 2 m/s^2
- C. 5 m/s^2
- D. 10 m/s^2

 **Answer: B. 2 m/s^2**

$$\text{Average acceleration} = (20 - 10) / 5 = 2 \text{ m/s}^2$$

46. A body moves with constant velocity of 5 m/s for 10 s. Its displacement is:

- A. 2 m
- B. 15 m
- C. 50 m
- D. 100 m

 **Answer: C. 50 m**

Displacement = velocity × time

$$= 5 \times 10 = 50 \text{ m}$$

47. Which situation has zero displacement but non-zero distance?

- A. An object remaining at rest
- B. An object moving in one direction only
- C. An object returning to its starting point
- D. An object that never moves

 **Answer: C. An object returning to its starting point**

48. A steeper position-time graph indicates:

- A. Smaller velocity
- B. Greater velocity
- C. Zero velocity
- D. Zero acceleration always

 **Answer: B. Greater velocity**

49. A horizontal velocity-time graph above the time axis indicates:

- A. Constant positive velocity
- B. Zero velocity
- C. Increasing acceleration
- D. Decreasing velocity

✓ Answer: A. Constant positive velocity

50. Which statement about uniform circular motion is correct?

- A. Velocity remains constant because speed remains constant.
- B. Speed remains constant but velocity changes because direction changes.
- C. Both speed and velocity are zero.
- D. Direction remains constant.

✓ Answer: B. Speed remains constant but velocity changes because direction changes.



QUICK ANSWER KEY

Q	Ans.	Q	Ans.	Q	Ans.
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1	B	18	B	35	B
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2	A	19	B	36	B
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3	B	20	A	37	A
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4	B	21	A	38	B
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5	A	22	A	39	B
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6	A	23	B	40	A
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7	B	24	B	41	C
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8	C	25	A	42	C
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9	D	26	A	43	B
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10	B	27	A	44	C
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11	B	28	B	45	B
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12	A	29	B	46	C
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13	B	30	A	47	C
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14	B	31	A	48	B
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15 B 32 A 49 A

16 C 33 B 50 B

17 A 34 C

MUST-REMEMBER FORMULAS

Average Speed

Average speed = Total distance / Total time

Average Velocity

Average velocity = Displacement / Time interval

Average Acceleration

Average acceleration = Change in velocity / Time interval

First Equation of Motion

$$v = u + at$$

Second Equation of Motion

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

Third Equation of Motion

$$v^2 = u^2 + 2as$$

Free Fall

Use $a = g$ or $a = -g$, depending on the chosen positive direction.

Graphs

Slope of position-time graph = velocity

Slope of velocity-time graph = acceleration

Area under velocity-time graph = displacement

These are the core Chapter 4 concepts and formulas reflected in the new textbook and its chapter-end practice.