

Motion (Numericals)

Class- 9

1. A body travels from A to B at 40 m/s and from B to A at 60 m/s. Calculate the average speed and average velocity.
2. A body travels the first half of the total distance with velocity V_1 and the second half with velocity V_2 . Calculate the average velocity.
3. A train moves with a speed of 30 km/hr in the first 15 minutes, with another speed of 40 km/hr the next 15 minutes, and then with speed of 60 km/hr in the last 30 minutes. Calculate the average speed of the train for this journey.
4. A body travels a distance S_1 with velocity V_1 and distance S_2 with velocity V_2 in the same direction. Calculate the average velocity of the body.
5. A car travels along a straight line for the first half time with speed 50 km/hr and the second half time with speed 60 km/hr. Find the average speed of the car.
6. A jet plane starts from rest with an acceleration of 3 m/s^2 and makes a run for 35 sec before taking off. What is the minimum length of the runway and what is the velocity of the jet at the take off?
7. An electron travelling with a speed of $5 \times 10^3 \text{ m/s}$ passes through an electric field with an acceleration of 10^{12} m/s^2 . How long will it take for the electron to double its speed? What will be the distance covered by the electron in this time?
8. A car moving along a straight highway with a speed of 72 km/hr is brought to stop within a distance of 100 m. What is the retardation of the car and how long does it take for the car to stop?
9. A bullet travelling with velocity of 16 m/s penetrates a tree trunk and comes to rest in 0.4 m. Find the time taken during the retardation.
10. A ball thrown vertically upwards with speed of 19.6 m/s from the top of a tower returns to the earth in 6 second. Find the height of the tower.
11. A cyclist travels a distance of 4 km from A to B and then moves a distance of 3 km at right angle to AB. Find his resultant displacement and total distance travelled.
12. A boy moves 3M towards east he then turns and moves 4 m towards north. Calculate the distance travelled by the boy and the displacement of the boy.
13. An athlete runs along a circular track of radius 100 m. Calculate the displacement of the athlete and the distance travelled by him, when he covers $3/4$ th of the track.
14. Ram travels on a straight road. He goes from position A to position B. The distance between A and B is 4 km. Now from position B he turns back and travels a distance of 2 km to reach the position C. Find the total distance travelled by Ram during the whole journey and the magnitude of displacement.

15. A taxi driver noted the reading on the odometer fitted in the vehicle as 1052 km when he started the journey. After 30 minutes drive, he noted that the odometer reading was 1088 km. Find the average speed of the taxi.
16. A boy is running on a straight road. He runs 500 m towards north in 2 minutes 10 seconds and then turns back and runs 200 m in 1 minute. Calculate i) his average speed and magnitude of average velocity during first 2 minutes 10 seconds and ii) his average speed and magnitude of average velocity during the whole journey.
17. A train travels 20 km at a uniform speed of 60 km/h and the next 20 km at a uniform speed of 80 km/hr. Calculate its average speed.
18. An object dropped from a leaf false with a constant acceleration of 10 m/s^2 . Find its Speed 2 second after it was dropped.
19. A body starts from rest and moves with a uniform acceleration of 2 m/s^2 . What will be its velocity and displacement at the end of 10 seconds?
20. A body moves with an initial velocity of 2 m/s and uniform acceleration of 3 m/s^2 . Calculate the velocity when it has traveled a distance of 77 m.
21. An athlete completes one round of circular track of diameter 50 m in 10 second. What will be the distance cover and the displacement at the end of 45 second?
22. An object moves with an initial velocity of 10 m/s and uniform acceleration of 0.5 m/s^2 . Calculate the velocity after 10 second and distance travelled in this time.
23. 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 second if both objects drop with same acceleration, how does the difference in heights vary with time?
24. An object starting from rest travels 20 m in first 2 second and 160 m in next 4 second. What will be the velocity after 7 second from the start?
25. A ball is thrown upwards with a speed of 15 m/s . What is its maximum height reached?
26. An object is projected upwards with an initial speed of 25 m/s . What is its velocity after 4 seconds?
27. A stone is dropped from a height of 80 meters. What is its speed just before it hits the ground? (Take $g = 9.8 \text{ m/s}^2$)
28. A body moves upwards with a uniform velocity of 10 m/s . What is the distance traveled by it in 2 seconds?
29. An object is thrown downwards with an initial speed of 12 m/s . What is its velocity after 3 seconds? (Take $g = 9.8 \text{ m/s}^2$)
30. A ball is thrown upwards with an initial speed of 18 m/s . What is its acceleration after 2 seconds?
31. A body falls from rest and travels 49 meters in 3.1 seconds. What is its acceleration? (Take $g = 9.8 \text{ m/s}^2$)
32. An object is projected upwards with an initial speed of 30 m/s . What is its velocity after 5 seconds? (Take $g = 9.8 \text{ m/s}^2$)

33. A car travels from rest to a speed of 30 m/s in 6 seconds. What is its average acceleration?
34. A body falls from a height of 100 meters. What is its speed just before it hits the ground? (Take $g = 9.8 \text{ m/s}^2$)
35. An object moves with a uniform speed of 15 m/s. What is the distance traveled by it in 2.5 minutes?
36. A stone is thrown horizontally with an initial speed of 20 m/s from a height of 50 meters. What is its range? (Take $g = 9.8 \text{ m/s}^2$)
37. A body moves with a uniform acceleration of 2 m/s^2 . If it travels 24 meters in 4 seconds, what is its initial velocity?
38. An object is projected upwards with an initial speed of 25 m/s at an angle of 60 degrees with the horizontal. What is its maximum height reached? (Take $g = 9.8 \text{ m/s}^2$)
39. A car travels 150 kilometers in 3 hours. What is its average speed? If it travels the same distance in 2 hours, what is its average acceleration?
40. A body falls from rest and travels 121 meters in 5 seconds. What is its acceleration? (Take $g = 9.8 \text{ m/s}^2$)
41. A body moves with a uniform acceleration of 4 m/s^2 . If it travels 32 meters in 4 seconds, what is its initial velocity?
42. An object is moving with a uniform speed of 20 m/s. If it travels 120 meters in 6 seconds, what is its acceleration?
43. A body falls from a height of 150 meters. What is its speed just before it hits the ground? (Take $g = 9.8 \text{ m/s}^2$)
45. An object moves with a uniform velocity of 15 m/s for 10 seconds. Then, it accelerates uniformly at 2 m/s^2 for 5 seconds. Find its final velocity and distance traveled.
46. An object moves with a uniform acceleration of 3 m/s^2 for 10 seconds. Then, it moves with a uniform velocity of 30 m/s for 5 seconds. Find its total distance traveled.
47. A train travels from rest to 80 km/h in 10 minutes with uniform acceleration. Find its acceleration and distance traveled.
49. A body moves with a uniform velocity of 20 m/s for 5 seconds. Then, it decelerates uniformly at 2 m/s^2 for 5 seconds. Find its final velocity and distance traveled.
50. An object moves with a uniform acceleration of 4 m/s^2 for 12 seconds. Then, it moves with a uniform velocity of 40 m/s for 8 seconds. Find its total distance traveled.
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